



**TECHNICAL ASSISTANCE FOR PROMOTING  
DECENT FUTURE OF WORK APPROACH WITH  
A FOCUS ON GENDER EQUALITY  
  
(TREESP1.3. FoW/P-01)**

**TÜRKIYE**

**CATEGORY 4: COORDINATION AND COOPERATION MECHANISMS**

**Intervention 8: Sector Studies**

**Sub-Intervention 8.4: Sector Studies Recommendations Report**

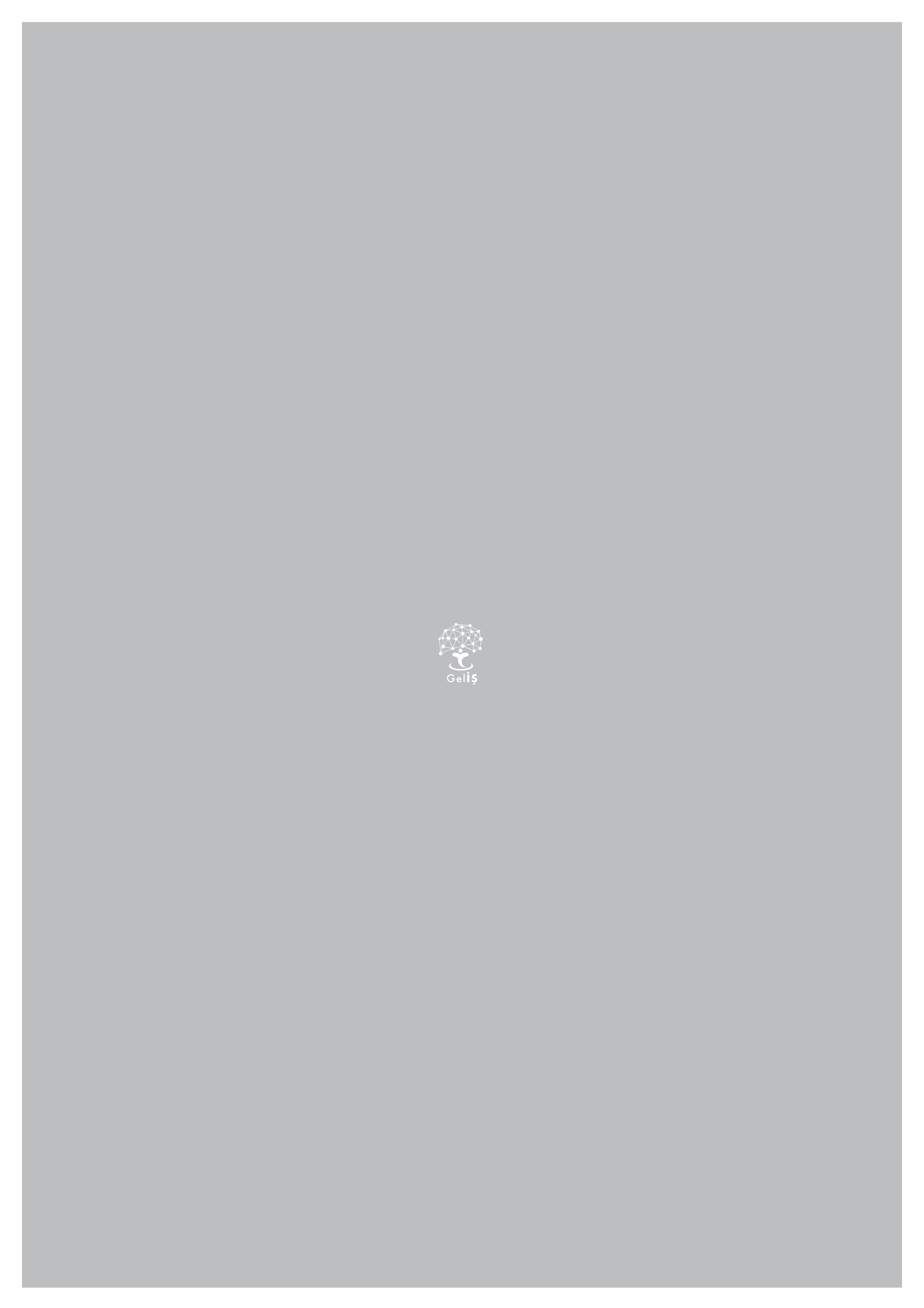
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# Abbreviations

|  |  |
| --- | --- |
| **Abbreviation** | **Meaning** |
| 21C | 21st Century |
| AI | Artificial Intelligence |
| CPD | Continuous Professional Development |
| EU | European Union |
| ICT | Information and Communication Technology |
| ILO | International Labour Organization |
| MOH | The Ministry of Health |
| MoLSS | The Ministry of Labour and Social Security |
| MONE | The Ministry of National Education |
| NSFE | Non-Standards Forms of Employment |
| OB | Operation Beneficiary |
| OHS | Occupational Health and Safety |
| PwDs | People with Disabilities |
| RPA | Robotic Process Automation |
| SMART | Specific, Measurable, Achievable, Relevant, Time-bound |
| STEM | Science, Technology, Engineering, Mathematics |
| SWOT | Strengths, Weaknesses, Opportunities and Threads |
| TAT | Technical Assistance Team |
| TNA | Training Needs Analysis |
| ToR | Terms of References |
| TVET | Technical and Vocational Education and Training |
| UI | User Interface |
| UX | User Experience |
| VQA | Vocational Qualification Agency |
| VR | Virtual Reality |

# Executive Summary

This Report was commissioned by the Turkish Ministry of Labour and Social Security (MoLSS)’s Department for Employment Policies, to examine the current situation within 5 sectors of Türkiye – Education, Health, Energy, Banking/Finance, and ICT. The Report was produced by a Technical Assistance Team (TAT) working within the EU-funded project ‘Technical Assistance for Promoting Decent Future of Work Approach with a Focus on Gender Equality’.

The information has been derived from numerous sources (each element of which is attached to this Report in a series of standalone Annexes):

* Extensive desk research involving sectoral analyses of each selected sector from a Turkish and an international perspective;
* A series of SWOT Analysis Workshops involving sectoral experts from each sector;
* A Pre-Study Workshop at which 77 representatives of the public, private and third sectors formulated their ideas on the current and future state of their respective sectors;
* A field study involving 840 respondents using semi-structured questionnaires;
* A Post-Study Workshop at which 96 representatives of the public, private and third sectors provided feedback to the draft Recommendations.

This has been carefully analysed and processed to produce a series of 102 evidence-based recommendations which are presented in 2 categories: cross-sectoral and sector-specific.

The project’s Terms of Reference (ToR) required that 5 sectors be studied. To provide some element of choice, 7 sectors were initially examined (the 5 which were eventually chosen together with the Automotive and Textile sectors) through a thorough and deep desk research exercise, and MoLSS representatives selected the 5 sectors mentioned above.

The study was conducted against a backdrop of increasing changes in the World of Work. Already, the impact of increased digitalisation is being felt in the way we bank and the way we shop, with significant moves towards online services. Commentators suggest that, by 2030, some 7.5m jobs will be lost in Türkiye through the forces of digitalisation, robotisation, automation and AI, although the same commentators predict that some 9m new jobs can be created by the very forces which will have eliminated the older jobs in the first place. But, to take advantage of the new job opportunities, new skills will be needed, which will require existing workers to adapt, and a new generation of workers to be prepared. The extent to which Türkiye is successful in meeting the challenges of this process of transition will depend on the preparedness of the private and public sectors – the former to identify and train for the new skills, and the latter to create awareness for the changes and develop policies and strategies to support them.

These factors underpinned the study covered in this Report. Through extensive dialogue with many interested stakeholders - employers, employees and sector experts from the public and private sectors - a picture emerged of how stakeholders perceived the changes which would affect them, and the extent to which they were ready for them.

The study included a focus on gender in order to assess the extent to which women might be disproportionately affected by the changes. In Türkiye, women appear to be less drawn to technologically-oriented professions, and could, therefore, be more severely impacted by a future in which technology-related jobs may predominate. In fact, this is not a specifically Turkish phenomenon. A study visit to Finland in October 2022, in which TAT accompanied 8 representatives of MoLSS to consider how that country was facing up to similar challenges, revealed that Finnish women too tended to opt for careers outside of technology, despite scoring as well or better than males in technology at academic levels prior to joining the workforce. Finnish institutions were at something of a loss in explaining the reasons for this, but it did reflect the fact that this is an issue which has broad implications and which will need to be addressed.

This Report is the result of a collaborative effort to which many stakeholders have contributed with their time, ideas and comments. This has been greatly appreciated by the project team, who have been very impressed by the depth of knowledge and commitment they have encountered during the assignment.

# Introduction and background on the intervention

This Report has been produced by the EU-funded project ‘Technical Assistance for Promoting Decent Future of Work Approach with a Focus on Gender Equality’ (2021-2023). Its main goal is to identify the situation regarding new forms of employment and changing skill needs profile considering digital transformation in pre-selected five sectors (Education, Health, Energy, Banking/Finance, and ICT).This Report is designed to help policymakers understand sectoral needs for the new forms of employment and employment relations that have emerged with the use of new and digital technologies and business processes in sectors.

The information included in this Report has been derived from:

* An extensive desk research into international and Turkish approaches (see Annex 1).
* A series of SWOT Analysis Workshops, conducted online with stakeholders from 5 pilot provinces (Ankara, Istanbul, Adana, Bursa, İzmir) representing the interests of 5 sectors (health, education, energy, ICT, banking/finance) to complement the desk research and field study elements envisaged in the Project’s ToR (see Annex 2).
* A Pre-Study Stakeholder Workshop at which 77 representatives of the public and third sectors formulated their views on current challenges and opportunities of mentioned 5 sectors in Türkiye (see Annex 3).
* Face-to-face interviews with over 750 sector experts, decision makers, employers, and employees in 5 provinces: Ankara, Adana, Bursa, İstanbul, and İzmir, representing 5 sectors (health, education, energy, ICT, banking/finance) (see Annexes 4,5 & 6).
* A Post Study Workshop at which XX representatives of the public and third sectors were able to consider and evaluate the draft Recommendations arising from the above, before they were formalised into the current Report (see Annex 7).

# Context

The project’s Terms of Reference (ToR) set the following task for the Project’s Technical Assistance Team (TAT):

*Sector studies will be conducted in five sectors to determine their labour demands, skills and occupations within the scope of Future of Work approach. Indicative sectors which are chosen in accordance to the ILO Reports issued on 2017 and 2019[[1]](#footnote-1), can be chosen among informatics/automation, education, health, transportation, media/communication, energy, finance and banking sectors, etc. Final decision to define 5 sectors is subject to the prior approval of the Operation Beneficiary. Each sector analysis will be carried out in the perspective of the prominent professions of the future, the qualifications of the labour force that will be needed, the lost professions, the policy proposals that are compatible with the works of the future, etc. The research will be carried out as desk study in the light of current social and technological developments and academic and scientific studies. The research will include also 750 indicative face to face interviews (30 people from each sector and from each city) with representatives of institutions/organisations, employers, employees, etc. in Ankara, Adana, Bursa, İstanbul and İzmir. A detailed report will be drafted in English with executive Turkish summary by including each sector and it will be used to update relevant strategy plans and/or policies. It will be published on the official web site of the Operation Beneficiary.*

# Brief information on the sectors chosen for study including findings from the desk study

TAT had conducted desk research into a range of sectors. The 5 sectors (Education, Health, Energy, Banking/Finance, and ICT) had been selected by the Project’s Beneficiary (MoLSS - Department of Employment Policies) following the submission of desk research reports submitted by the Project’s Key Experts. The full Desk Research Report may be seen at Annex 1.

The desk research had highlighted the following areas for consideration during the field studies and stakeholder meetings – for each sector, the key issues have been listed followed by a series of ‘preliminary policy recommendations’, which were used to a) refine questions for the field study questionnaires, and b) provide background information for the SWOT Analysis Workshop and the Pre-Study Workshops (further detail about these elements is contained below and in the Annexes):

# Summary of Common Points for Further Consideration

* Policies on education of new skills are needed with prepared centres with new technologies.
* Desk research shows a generally healthy situation in each sector.
* Each sector will face many challenges over the coming decade.
* Change will eliminate many traditional jobs.
* Change will also provide many new job opportunities.
* Flexibility, adaptability, and creativity to be encouraged.
* Education must meet the needs for new skills.
* Public/private partnerships to be strengthened to ensure demand/supply balance for new skills.

### Education

* VET can play a central role in preparing young people for work, developing the skills of adults, and responding to the labour-market needs of the economy.
* Strong vocational programmes increase competitiveness, but many programmes fail to meet labour market needs. The linkages between VET and the labour market need to be strengthened to meet the need for skilled manpower.
* 21C skills: creativity, learning to learn, ITC literacy and new skills in sustainable and economic development, gender equity, global citizenship.
* Role of educators is evolving as learning facilitators, career counsellors, vocational instructors, social workers.

#### Preliminary Policy Recommendations

* Strengthen systems for the validation and recognition of all forms of learning aimed at reskilling and upskilling workers – ‘building back better’ and achieve full employment.
* Quotas of higher education institutions to be determined by sectoral and regional skills needs; intake capacities; supply and demand equilibrium; and minimum occupancy rates of existing programmes.
* Develop and reinforce capacities of TVET trainers and trainees, and of the TVET managers to adjust to constantly evolving circumstances. (Includes capacity development for ‘blended learning’ - a combination of face-to-face and remote training, online and offline instruction, and high-/low/no-tech solutions).
* Enhance access to education and training, improving internet infrastructure, ensuring affordable connectivity, and investing in developing/maintaining easy access to distance learning platforms and learning spaces.
* Reinforce the skills development for both men and women in the sector to adapting to a changing business models and labour market, to ensuring equality of opportunity and to promoting social cohesion.

### Health

* Jobs need to be redefined (embracing telehealth and mobile clinics).
* NSFE (Non-Standards Forms of Employment) - fixed term and part-time work, temporary and agency work - need to be better regulated.
* Women participation in the sector is high but there is a gender pay gap of 20%.
* Technological advances will have significant impact - Mobile Health App, 3D, AI, Electronic health, Genomics (E-Health services).
* New skills needed for tasks of greater complexity (telemedicine, cybersecurity), requiring high-quality education and lifelong learning.
* Increased demand is expected (over 60´s expected to increase by 51% by 2050 impacting care services and end of life services), and sector will require significantly more jobs by 2030.

#### Preliminary Policy Recommendations

* Policies to deal with demographic and epidemiological challenges that could affect equity in access to quality health service. (More of 50% of older people will not have access to long term care).
* The sector also could be an exemplar of gender equality and decent employment opportunities for women and young people.
* Important also to properly compensate women’s contribution to the care economy and solve the pay gap (more pronounced than in other sectors).

### Energy

* The National Development Plan includes a special section on renewable Energy.
* Renewable energies represent a great opportunity to Türkiye for employment and gives a possibility for women in non-traditional areas.
* New skills are needed to support the ongoing global energy transition to renewables. More vocational training is required, stronger curricula, more teacher training and expanded use of ICT for remote learning. Possibility that renewable energy can be better integrated into national curricula for students in all levels of education.
* Public-private partnerships for meeting sectoral labour requirements, promoting national skill standards, providing on-the-job training, and improving the quality of training overall.

#### Preliminary Policy Recommendations

* ICT can play an important role in the delivery of education and training related to renewable energy.
* Partnership of industry and TVET institutions (experts to contribute to the curriculum as well as deliver training digitally) + industry financing of TVET programmes.
* Public-private partnerships for meeting sectoral labour requirements, promoting national skill standards, providing on-the-job training, and improving the quality of training overall.
* More focus on educating girls and women in the renewable energy sector + STEM.
* Increase numbers of women in the renewable energy sector, through improved workplace conditions, mentorship, and professional development.

### Financial and Banking Sector

* Banking dominates Turkish financial sector, accounting for more than 70% of overall financial services, but insurance services and other financial activities show significant growth potential.
* Employment likely to grow with a new model of employee/employer and employer/client relations (more agile workforces). Opportunities for young people through mobile banking.
* The National Development Plan includes digital transformation and the creation of Digital Transformation Centres, prepared for cybersecurity training and new technologies
* Many coming digital banking skills: Artificial Intelligence, Big Data Analytics, Blockchain Engineering. These skills constitute a real challenge particularly for women.
* Ability in European languages of capital markets, and awareness of professional financial conduct to be enhanced.

#### Preliminary Policy Recommendations

* Policies on education for new skills needed with prepared centres of new technologies and lifelong learning.
* Need to develop new talent models to facilitate flexible, self-organising teams that come together for a common purpose.
* Institutions should also focus on workplace redesign - to achieve balance between in-person work environments and remote arrangements - based on specific needs of various roles or jobs.
* Working women need care services to facilitate their involvement in digital transformation.

### ICT

* ICT is in a central position that affects the development of the other sectors and has a multiplier effect on the economy. (TKP - 2019 – 2023)
* ICT-linked employment in these industries has grown during the last years (except during 2020) and it continues, giving opportunities to young people, women, and People with Disabilities (PwDs). However, the sector has a long tradition of insecure work (atypical work).
* Upskilling and reskilling initiatives will play a key role in talent transformation. (21.1m workers will need to improve their skills to be better equipped for retain their positions and to seize new opportunities). New skills in cybersecurity will be needed.
* Crowdsourcing is a developing trend.

#### Preliminary Policy Recommendations

* Need to normalise new job tasks, particularly in digital technology.
* Companies and employees need to evaluate the ‘standard’ employment relationship in a new work environment (that embraces automation, AI, and digital technologies)
* SMART policies needed to raise productivity levels and ensure sustainable, inclusive economic growth through basic and applied research.
* Need to accelerate mechanisms and incentives through job centres for acquisition of transferable new technological skills.
* Need to encourage mindset of lifelong learning opportunities - “learning to learn”.

# Findings from SWOT Workshops

A series of sector-specific SWOT Analysis Workshops which had been conducted in February with relevant stakeholders from five provinces and 5 sectors. The full SWOT Analysis Report may be seen at Annex 2.

# **Strengths**

### Education

* The high rate of female employees in the Education Sector,
* Young teachers can adapt to digital technologies faster
* Providing in-service digital trainings to increase the skills of experienced teachers regarding the use of digital technology
* As a result of strengthening the link between Vocational High Schools and Vocational Training Centres and the Private Sector, increasing skills as well as employability through vocational trainings for the workforce needed by the Private Sector in different fields.
* Compliance of the regulatory infrastructure

### Health

* High rate of female employees
* The young generation in the sector is dynamic and innovative with their ability to learn quickly and adapt to technology.
* The fact that the sector has cross-cutting aspects with different sectors
* The rapid development of Health Tourism
* In-service training given in workplaces
* Having the qualified infrastructure of the Health System

### Energy

* Increasing female employment rate in wind and solar energy sub-sectors, which are among renewable energies
* Qualified workforce in the energy sector
* To have an entrepreneurial young population that adapts quickly to digital transformation and has fast language adaptation
* The sector has international legislation and standards
* The development of the concept of doing business with automation in the energy sector with the effect of digital transformation
* The old traditionalist generation has a lot of knowledge/experience and can adapt to digital transformation

### Finance and Banking

* The fact that the rate of female employees in the sector is higher than many other sectors,
* Increasing number of women among managers
* High quality of manpower and high level of education,
* Positive impact of Internet, Mobile Banking on the industry's business volumes, business models and employment
* The rapid technological transformation of the sector
* The sector's ability to provide both internal and external resources in order to provide the needed financing to the Turkish economy.
* Having the infrastructure to develop all kinds of new banking and finance applications
* New working models in banking
* Reliability of the industry
* Having strong and diverse capital
* The education system provides adequately equipped personnel to the sector.
* Sustainable development certificate programs, professional association training

### Information and Communication Technology

* Balance in the number of women and men at the engineering level in the sector
* Increasing interest of young people in the sector
* Having intersections of the sector with all sectors
* The IT Sector has a broad perspective
* Institutions/organisations have financial support programs for the sector
* Student business co-working environments
* Providing employability-enhancing trainings by NGOs and institutions/organisations

# **Weaknesses**

### Education

* The low participation rate of women in management
* The fact that women have a high workload due to the combination of working life and home life negatively affects their professional development.
* Experienced teachers are less equipped to use information technology than younger teachers
* The fact that the flexible working conditions and wages of teachers working in the private sector are unsatisfactory, negatively affect their motivation.
* Failure to integrate the education curriculum with technological developments
* The lack of sufficient trainers for different branches needed in various sectors in vocational high schools or the need to increase the skills and knowledge of existing trainers
* Incentives are not sufficiently announced

### Health

* The proportion of women in management positions is low
* Heavy working conditions
* Lack of qualified auxiliary personnel and intermediate staff'
* Lack of supply from doctors and pharmacists for open positions
* Accelerating the brain drain abroad in the health sector
* Investor-employer ratio is below the average of Türkiye
* Density caused by citizens not knowing the functioning of the health system

### Energy

* In the Energy Sector, gender preferences are predominantly in favour of men
* The rate of female employees is low
* Women's interest in the sector is low
* Low job vacancies in the industry
* Due to the insufficient production of technological products needed in the energy sector, the tendency to purchase imported products is high.
* Industry audit and measurement issues
* Lack of brand awareness
* Legislation is not clear enough
* Insufficient funding

### Finance and Banking

* Small scale compared to developed countries
* The financial sector has lost its popularity among recent graduates and young professionals.
* Experienced generation being more distant from technology than younger generation
* Since banks are not perceived as technology companies, technology graduates do not apply.
* Low interest of women in training on ICT
* Difficulty attracting talent
* Especially low soft skills in new graduates

### ICT

* Lack of qualified personnel due to brain drain abroad
* Low quality of education in universities
* Lack of equipment in the training provided
* Low interest of women in information technologies
* Informal work of people doing business abroad
* Alumni profile and employer demands mismatch (skill gaps)
* State incentive legislation is running with the old system
* Lack of sound action plans
* Attracting trained personnel from SMEs with the opportunities offered by large-scale companies

# **Opportunities**

### Education

* The intersection of education with all sectors
* Educational activities to encourage women to entrepreneurship
* Position-less working-education environment without the concept of time and space with the pandemic process
* Having financial support programmes for capacity building in the education sector, improving education curricula and technical infrastructure of schools
* Supporting the efforts of teachers from all age groups to improve themselves through professional development and different educational development programmes
* Conducting special studies for disadvantaged areas
* Vocational courses include practical internship applications
* Studies to improve equality of opportunity in education and vocational training
* Increasing the financial resources that can meet the training demands of teachers for developing technologies

### Health

* Carrying out studies on the targeted components of the health transformation project
* The positive contribution of new technologies to the health sector
* Positive effects that will emerge as the health system adapts to digital transformation
* Open jobs brought by the future development of the fields of telemedicine, Robotic Surgery, Artificial Intelligence
* The need to address health literacy trainings for citizens within the scope of the Health Transformation Programme
* Standardization of education in the health sector in legislation

### Energy

* The preference of women for the energy sector-oriented vocational departments of universities is increasing.
* Potential for an increase in energy investments in the future
* Increase in government support provided to the sector
* Increasing demand for investment in open business areas
* Increased opportunities to be closer to the EU market as a result of technical harmonisation with the EU Convention
* Increasing employee-employer collaboration environments

### Finance and Banking

* High growth potential of the financial sector
* The pandemic process accelerates the transformation of alternative distribution channels
* Elimination of time and space constraints for employees
* Increased collaboration between banks and technology companies
* The effect of the young population profile on the technological development of the sector
* Giving new generation knowledge and skills training to the experienced generation
* Increasing the new generation rooted interbank communication with the cooperation of Start-Up and Fintech
* Accelerating the transformation of alternative distribution channels
* Blockchain developments
* Increased interest of women in IT training

### ICT

* Highly educated young population
* Excessive interest of the young population in the sector
* Having intersections of the sector with all sectors
* Efforts to increase youth and women employment
* The positive effect of the gaming industry on women's employment
* Fast conversion to the metaverse side
* More involvement of the sector in the competitive market
* Increasing the incentives and supports given to the sector

# **Threats**

### Education

* Sustainability of Information Technologies trainings is not at a satisfactory level
* Weak technological infrastructure in disadvantaged areas
* Rapid transformation of future-oriented knowledge and skills
* Obsolete recruitment processes

### Health

* Slowing of professional development due to the workload of health personnel
* Affected by burnout syndrome
* Insufficient follow-up of technology in health
* Inaccurate information about health given to citizens on the Internet,
* Failure to implement the legislation

### Energy

* Insufficient number of personnel with the communication skills required by the sector
* Long-term resolution of gender-based preferences in recruitment
* The younger generation does not show enough interest in the knowledge and skills conveyed by the experienced generation.
* Automation replaces blue-collar employees if blue-collar personnel adapt to Digital Transformation late
* Insufficient product and product replication support

### Finance and Banking

* Infrastructure needs for the inclusion of the financial sector in the system with private capital
* Low awareness of new generation financial instruments and lack of legislation
* New talents do not prefer the financial sector
* Question marks on the work-life balance of young employees in the banking sector
* Robo-technology, digital technologies replacing workers
* Fin-Tech and e-Commerce, competitive pressure of start-ups
* Currency substitution
* Declining propensity to save

### ICT

* Insufficient meeting of the intense human resource needs in the industry
* The low number of female personnel in professions other than engineering
* Loss of investment because of major game development companies being sold abroad (killing the goose that lays the golden egg)
* Lack of interdisciplinary interaction for future planning
* The studies planned to continue the competition in this field in the global world have not been clarified yet.

# Findings from Pre-Study Workshop

Participants validated SWOT findings and approved the approach and the methodology presented by TAT. They also ensured a support when researchers would arrive in project provinces. Participants from the ministry of education provincial directorates mentioned about their specific research procedures, but they guaranteed that they apply may simplified procedures for research presented. The full Pre-Study Workshop may be seen at Annex 3.

All participants noted that education and ICT are cross sectional sectors important for all sectors. Experts in both sectors also defines themselves as sectors provides ancillary services to other sectors. As long as these sectors improve their quality services and inputs, other sectors will be affected positively. For example, students who cannot interact with qualified educators will result a lack of knowledge in theory and practice. Those who will not be able to learn enough to retain in the sector. Lack of knowledge and skills in the education and ICT sectors lead to basic problems such as the decrease in the quality of services provided and thus the inability to keep up with the rapid change and transformation of the world.

All sectors have some difficulties regarding recruitment of qualified staff especially in digital technology. It changes by sectors. Below there are some opinions gathered through the pre-study workshop.

* In **education sector**, there is a need to transform education from conventional education to digital education. All kind of staff to produce digital training materials are needed. Participants mentioned that use of technology, adapting to technological changes, transferring information, coping with stress, persuading and leadership are the knowledge and skills that will be needed in the education sector. Education experts assume that online education demand will increase in all levels of education, vocational education and training, adult education, and professional development. Therefore, there will be high demand for professional staff trained in the field of ICT, such as content creators, designers, network technologies specialists, cloud technologies specialists and multimedia programmers. Additionally, stress tolerance, creativity, innovation, analysis, and teamwork skills are demanded in the sector.
* Bottleneck qualified personnel in **the health sector** are all kind of technicians, radiology experts, paediatric cardiovascular surgery physicians, home care staff, intensive care and operating room nurses, stem cell researchers, physiotherapist, occupational therapist, Artificial Intelligence, Supported Medical Device Maintenance, and Software Specialists, code writing knowledge, development of scanning devices, health informatics specialists and health lawyers. As in all other sectors, the lack of qualified personnel affects the significant increase in workload, long working hours, shifts, fatigue, mistakes, personnel injuries, and carelessness in many other matters. As an interesting finding, the lack of qualified personnel increases the workload of unqualified personnel. For example, a worker who has to do the cleaning work may unfortunately have to take care of the patient or they may do extra work such as blood gas reading. This situation both negatively affects the society's view of the sector and causes professional disrepute.
* The **energy sector** is a risky area in terms of work, and it is necessary to take the required training that includes the risks related to the job done and reveals their importance. In addition, even if people have a bachelor's degree, technology and working conditions are constantly changing. There is a need for up-to-date training in their fields to adapt to changing technology and always keep their knowledge fresh. The fact that Türkiye has just entered the field of renewable energy and nuclear energy sectors. Hence, bottleneck jobs are especially in the fields of mining, renewable energy, and nuclear energy. Participants from energy sector also mentioned about increasing demand for automation systems related occupational groups to maintain and to control electricity. Participants mentioned that unfilled vacancies will result with occupational accidents, business disruptions, being faced with sanctions, not being able to evaluate the opportunities in the sector, slow progress of processes due to not keeping up with digitalization, and paper, time, energy, etc. waste. Priority for training in energy sector shall be given to nuclear energy and renewable energy. Available personnel need training primarily on energy production, energy diversity and energy efficiency. It is important to receive training on alternative energy and green energy.
* In **finance and banking sector**, participants think that all staff in the sector are qualified enough to do their daily jobs, so there is a need for experienced staff instead of qualified in new technologies. Most demanded staff are artificial intelligence specialists, data engineers, big data specialists, data analysts, information technology and digitalization-related professions, cloud technologies, insurance and profession specialists, software engineers, cyber security specialists. Additionally, skills needed are adaptability to flexible and remote working, adapting to the digital age and change, using technology effectively, ability to adapt to agile working style, analytical thinking, working under stress, numerical intelligence, three-dimensional thinking, questioning-comparison, following and applying today's technological developments closely, and noticing the unnoticed. Lack of knowledge and skills cause operational and financial risks, failure to achieve targets, decrease in bank profits and customer loss.
* In **ICT sector**, all kind of specialties are in bottleneck. Especially, there is a high demand for software developers, user experience (UX)/ user interface (UI) designers, full stack developers, cybersecurity analysts, machine learning staff, database administrators and IT support specialists etc.

Participants from all sectors mentioned that the lack of qualified personnel reduces the compliance with the emerging digital technologies and new business terminologies and processes. They also indicated that the innovations developed in the sector remain limited in a small group within a narrow framework. Besides, most university curricula are obsolete, therefore, low level of job compatibility of new graduates are obvious to meet with the sectoral needs.

Although sometimes the right person in terms of knowledge, skills and experiences can be found, keeping this person in sectors are also difficult because of relatively low salaries in comparing with salaries abroad for similar tasks or positions.

There is a need for training in more technical subjects and terminology for people coming from different areas. For example, a lawyer in any sector should grasp relevant technical and sectoral terminology. It is also applicable for any experienced and qualified ICT staff. These kinds of staff should be trained to learn sector. Otherwise, whatever they produce may fail. Additionally, professionals from all fields newly added to the specific sector must have the qualifications to keep up with the digital transformation.

In the digitalised world, the personnel working in all sectors also need to receive serious intensive training for the sector related tools. In addition, there is a need for serious training in software and electronics so that they can reach the competence to contribute to the development of new sectoral devices.

It was agreed that the skills for data analysis, data reading and analytical thinking should be introduced and increased for all sectors covered by the project.

# Summary of Policy Recommendations from Pre-Study Workshop

There were also policy recommendations discussed along with the Pre-study workshop.

* Sectoral Human Resource Planning should be carried out in close collaboration with subject matter ministries and the Ministry of Labour and Social Security.
* There is a need for a study on different dimensions of remote and flexible working.
* There is a need for regulations that will ensure the work-life balance of women. The effect of women's gender roles is likely to negatively affect their knowledge and skills in working life.
* A common and sectoral, education, training and continuous professional development strategies should be developed for all sectors.
* As in Finland, use of maternity leave should be used equally by men and women.
* On-the-job gender equality training, more crèches and hospices, maternity leave. Maternity leaves to be given to men as well.
* Occupational standards should be adapted for future jobs.
* Continuous Professional Development (CPD) should be encouraged.
* Trainings on work and family reconciliation with the spouses should be expanded to all sectors.
* Hands-on training, one can learn by doing, should be expanded, and supported. Trainings should be designed as motivating rather than compulsory.
* Legislations should be improved for supporting employees and their families in psychological and physical health issues in order to increase employee loyalty and belonging, to create an environment of trust, to accomplish performance management correctly, to protect common working principles within the team, to maintain work-life balance, and to support the well-being of employees and their families.
* Strategic workforce plan, talent transformation programs and new working models should be developed to benefit from the benefits of automation, artificial intelligence, and digital technologies.
* It is necessary to support the development of sector employees by taking into account the skills of the future. In particular, digitalisation; data usage, agile working; sustainability should be the focus areas. In addition to these, it is important to prepare employees at all levels in organisations for the future, with skills such as a development mindset, managing change, emotional resilience, creativity, and building relationships and bonds based on trust.
* Employees should receive practical rather than theoretical training. Turkish industry is one that requires manual dexterity. The training of our stakeholders in this direction should be supported by practical training rather than just finishing school and starting the profession. Our assistant personnel should be trained both in terms of communication and practice. Self-development is left to the initiative of the individual. If the person wants, he can equip himself. However, the easy accessibility of these trainings will be a serious convenience for professional development.

# Field Survey Methodology

In line with the Terms of References document, TAT conducted semi-structured interviews with 30 individuals in each city per each sector as shown in the table below, ultimately reaching 750 interviewees in total. This approach was presented during the Pre-study Workshop and approved by the participants. Details of responses may be seen at Annexes 4, 5 and 6.

The interview context and accordingly TAT approach was slightly differed for demand (employers) and supply side (employees) of the labour market. Within this context, three different forms were used to collect relevant data from target groups: Sector experts/decision makers; employers/managers and employees. In order to make the data comparable, similar questions from different perspectives have been asked to above-mentioned three groups. Questionnaires have been tested internally within the Ministry and the TAT.

The type and content of questionnaires are as follows:

**Figure 1 - Type and content of questionnaires**

The questionnaires aimed to explore the following information to gain an understanding of the current situation and the future trends in respect of jobs and skills requirements in the ICT Sector (See Annex X):

* What is the level of knowledge and perceptions both decision makers/sector expert, employer and employees about the decent work concept and emerging work types such as remote work?
* Which of the provisions are most widely used by the employees?
* What are the opinions of decision makers, employers, and employees about adaptation to new and digital technologies?
* What are the chances of a woman reaching managerial levels in the sector?
* What are the needed skills/competences in the sector?
* What are the future skills to be required in the sector?
* What are the chances of a woman reaching managerial levels in the sector?

More always better in sampling, however, sector studies should be perceived as a pilot study to reveal first tendencies for big-size research later. Results will help to the Ministry to calculate sufficient sampling sizes for both demand and supply sides of the labour market for further research on skill needed in different economic sectors. Although there are many debates in literature[[2]](#footnote-2), our aim was to decrease design effect. Therefore, we have decided on a minimum of 30 interviews per target groups (male and female employer/administrator, male and female employees) and 30 interviews for professional organisations/NGOs and decision-makers.

**Table 1 - Sampling size per target group per sector**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sector | Employer | Employee | Professional organisations/ NGOs / local decision makers | Total |
| Education | 47 | 59 | 51 | 172 |
| Health | 38 | 100 | 42 | 180 |
| Energy | 37 | 75 | 62 | 174 |
| Finance & Banking | 54 | 78 | 40 | 172 |
| ICT | 49 | 72 | 51 | 172 |
| Total | 225 | 384 | 261 | 870 |

Source: TAT Elaboration

As shown in table above a convenience quota sampling has been used to access these different groups in 5 pre-selected sectors and provinces. In convenience sampling, we select individuals into our sample based on their availability to the researchers rather than selecting subjects at random from the entire population. As a result, the extent to which the sample is representative of the target population is not known. However, we will interpret differences and relationships for different groups and categories.

The access to target groups has been facilitated by the institutions participated in the SWOT meeting and Pre-Study workshop. The process is summarized below:

**Figure 2 – Process for access to respondents**

MoLSS sent official letters about research to governorates of pre-selected five provinces. Additionally, GM of Banks and Financial Institutions and institutions related with energy sector have been informed by OB. As expected, the internal procedures was not last too long and institutions facilitated access to sector experts, employers and employees as much as possible to get their feedback by means of the questionnaire prepared.

# Findings from Sector Study Survey

Sector study findings are given sector by sector.

# Education Sector

### Number of interviewed people

The main element of the field study for Education Sector was a total of 171 face-to-face interviews with sector experts, decision makers, employers, managers and employees in Information and Communication Sector, conducted in Ankara, Bursa, Izmir, Adana and Istanbul, to gain an understanding of the current situation and the future trends in respect of jobs and skills requirements. For this purpose, three different questionnaires were prepared (Annex X), one for decision makers/sector experts, one for employers and one for employees with questions influenced by feedback from stakeholders during the stakeholder meetings and the Pre-Study Workshop. The field study was conducted during March 2022.

The questionnaires consist of subjects below:

1. General information about the respondents

2. Decent work concept, flexible and remote work

3. Digital technologies and adaptation

4. Bottleneck jobs, future skills and qualification needs

5. Workforce development and upskilling

6. Prominent professions, lost professions

7. Gender dimensions, opportunities for PwDs

Table 1 presents the number of surveys conducted in each province by respondent type.

**Table 2 - Number of surveys conducted by respondent in each of the provinces in the education sector**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sector** | **Decision Makers/Sector experts** | **Employer** | **Employee** | **Total** |
| Adana | 15 | 9 | 13 | **37** |
| Ankara | 14 | 10 | 10 | **34** |
| Bursa | 12 | 7 | 12 | **31** |
| İstanbul | 13 | 11 | 12 | **36** |
| İzmir | 12 | 9 | 12 | **33** |
| **Total** | **66** | **46** | **59** | **171** |

Source: TAT Elaboration

### Awareness about decent work concept, flexible and remote work

Decent work is defined as “productive work for women and men in conditions of freedom, equity, security and human dignity”.[[3]](#footnote-3) In general, work is considered as decent when: it pays a fair income and guarantees a secure form of employment and safe working conditions. More than a third of respondents stated that they heard the concept and know what it covers. There is a statistically significant difference between sector experts, employers, and employees in terms of awareness of the concept (p<0.05). Nearly half of the employees claimed that they had never heard of the concept. Awareness of female employees (47.8%) about the concept is greater than awareness of male employees (42.3%). However, the awareness about the exact definition ratio is higher if the male respondent stated that she heard the concept.

**Table 3 - Awareness about decent work concept in education sector**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Sector Expert (n=66)** | **Employer (n=46)** | **Employee (n=59)** | **Total (n=171)** |
| Yes, I heard, I don't know the definition | **34.8** | **39.1** | **35.6** | **36.3** |
| Yes, I heard, I know the definition | 34.8 | 37.0 | 23.7 | 31.6 |
| No, I didn't hear | 30.3 | 23.9 | 40.7 | 32.2 |
| Total | 100 | 100 | 100 | 100 |

Source: TAT Elaboration

Working conditions associate new business models with the future of work. According to ILO, flexible and remote work is expected to become more prevalent soon by the help of the new and digital technologies and emerging business tools.[[4]](#footnote-4) These new business models will also allow marginalised workers to join the workforce, as well as workers with family responsibilities. However, without rules and regulations, such new business models may be abused by two sides of the labour market.

Nearly half of the respondents (48.5%) indicated that flexible and remote work arrangements are available in the education sector, mainly with unwritten rules.

**Table 4 - Flexible and remote work arrangements in education sector**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Sector Expert (n=62)** | **Employer (n=46)** | **Employee (n=59)** | **Total (n=167)** |
| Yes, but there are no written rules | **29.0** | **6.5** | **18.6** | **19.2** |
| Yes, it is implemented with written rules | 37.1 | 37.0 | 15.3 | 29.3 |
| No | 33.9 | 56.5 | 66.1 | 51.5 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |

Source: TAT Elaboration

Respondents in the education sector are generally agreed and happy that flexible and remote working arrangements allow employees to fulfil family responsibilities and participate in family and social activities. They also claim that flexible or remote work does not affect work performance negatively. Only one-fifth of the respondents claim that flexible or remote work arrangements cause early leave from the job or employee turnover. They also state that flexible or remote work does not disrupt business processes in the sector. Most respondents disagree that people who use flexible or remote work arrangements are generally less committed to work. They believe this work modality does not affect focusing on the meetings thanks to web conferencing tools. More than one-third of sector experts and employers indicate that work-related expenses are covered if the employee works flexible or remotely. As an exciting finding, a quarter of employees stated that they feel like they constantly work because of such work modality.

**Table 5 - Percentage of participants agree with the statements about Flexible and remote work arrangements in education sector (%)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Sector Expert** | **Employer** | **Employee** |
| Flexible or remote working arrangements allow employees to fulfil their family responsibilities. | 77.6% | 70.2% | 75.8% |
| Flexible or remote working arrangements help employees participate in family and social activities. | 62.0% | 66.0% | 71.6% |
| Institutions/organisations/workplaces can track their employees' flexible working hours or remote work. | 62.0% | 76.6% | 66.2% |
| Employees can focus more on their work with flexible or remote working arrangements. | 46.0% | 46.8% | 62.5% |
| Other employees who do not work this way react negatively to people who work according to flexible or remote work arrangements. | 38.8% | 28.9% | 34.3% |
| Within the scope of flexible or remote working arrangements, employees' work-related expenses (food, electricity, internet, heating, etc.) outside the workplace are covered. | 36.7% | 38.3% | 0.0% |
| Some employees would not be able to work without flexible or remote work arrangements. | 33.3% | 14.6% | 4.4% |
| It negatively affects flexible or remote working performance. | 20.0% | 21.3% | 0.0% |
| From time to time, employees can miss meetings within the institution/organization/workplace in a flexible or remote working arrangement. | 18.0% | 10.6% | 10.1% |
| Flexible or remote working arrangements make employees less committed to their role at work. | 16.0% | 18.8% | 7.2% |
| Flexible or remote working negatively affects occupational health and safety. | 14.0% | 19.1% | 0.0% |
| Flexible or remote working arrangements make it difficult for employees to do their work. | 8.0% | 18.8% | 5.8% |
| Flexible or remote working arrangements can disrupt business processes | 8.0% | 19.1% | 21.2% |
| In our industry, customers or the serviced audience cannot adapt to the implementation of flexible or remote working arrangements. | 6.1% | 14.9% | 30.9% |
| I feel like I'm constantly working because of flexible or remote work arrangements. | 0.0% | 0.0% | 25.7% |

Source: TAT Elaboration

Majority of the sector experts and decision makers reported that the new forms of employment and employment relations that have emerged with the use of digital technologies in the education sector is insufficient (97.7%).

**Figure 3 – Sufficiency of the new forms of employment and employment relations that have emerged with the use of digital technologies in the education sector (%)**

Source: TAT Elaboration

### Digital technologies and adaptation

Sector experts and decision-makers claim that digital infrastructure in the sector is behind the new technologies used in developed countries (55.6%). However, nearly half of the sector experts and decision-makers think differently. They say the technology is either the same or ahead of the similar technologies used in developed countries (44.4%). Employers’ perceptions about digital infrastructure used in their institutions are relatively positive. They claim their organisations’ digital infrastructure is close to the newest technology used in developed countries (6.9 out of 10). If they want to adapt their technology to the latest technology, they assume that transforming it to the newest one is not too tricky (6.1 out of 10).

**Figure 4 – Comparison of digital infrastructure in education sector with similar technologies used in developed countries (%)**

Source: TAT Elaboration

In support of the earlier finding, decision-makers stated that high application costs (58.6%) and lack of technical infrastructure (58.6%) are two significant barriers to technology adaptation. The integration challenges follow these two into the system (37.9%), failure of the education system to keep up with the digital transformation in the education sector (37.9%) and lack of technical knowledge of currently employed staff (37.9%).

**Figure 5 – Barriers to new and digital technology adaptation in the education sector (%)**

Source: TAT Elaboration

Employers/managers in the education sector stated the primary difficulty is the lack of budget (63.0%). Additionally, they also mentioned about cost-effectiveness factor (56.5%). Nearly a third reported difficulties accessing technological/digital infrastructure (37.0%). A quarter mentioned about lack of trained human resources (23.9%).

**Figure 6 – Difficulties for adaptation of existing digital technological infrastructure to the newest technology (%)**

Source: TAT Elaboration

More than two-thirds of decision makers (69.1%) think that most of the companies in the sector invest in the new technologies, however the investment is not sufficient for digital transformation (47.6%).

**Figure 7 – Investment to the new technologies in the education sector (%)**

Source: TAT Elaboration

Almost half of the sector experts (50.0%) and employers (51.1%) stated that technology obsolescence risk is higher, especially in new technologies for the ICT sector. Apart from uncertainties in the general economy, half of them think that transformation is not cost-beneficial (51.1%). Additionally, almost half the sector experts/decision-makers and a third of employers stated that the quality of academic education is important when they make investment decisions. Employers indicated that industry-related information about qualified personnel is also essential when they think about investment.

**Figure 8 – Effects on investment decisions in education sector (%)**

Source: TAT Elaboration

Most employers in the education sector evaluated that their institution’s technological/digital infrastructure dramatically impacts the quality of the services produced (89.8%).

Most sector experts and decision-makers agree that there is a need for education for available labour in the sector (65.2%). They also confirm that number of qualified staff is increasing (45.3%) but not in parallel with the improvement in digital technologies (19.7%) - figure 9 below shows how new or emerging technologies affect employment in the education sector.

**Figure 9 – How new or emerging technologies affect the labour market/employment (%)**

Source: TAT Elaboration

According to nearly half of sector experts/decision-makers (45.0%), training is provided to overcome the difficulties and increase compliance with new and digital technologies in the ICT sector. Additionally, training needs are analysed to improve curricula in training institutions (37.5%). Specifically, the Digital Transformation Office of the Presidency leads the transformation in public. So that they stated about digital strategies and action plans development (31.3%). Additionally, some of them mentioned about university-industry cooperation (28.1%) and incentives given to employees for self-development (28.0%).

**Figure 10 – Actions done to increase compliance with new and digital technologies in the education sector (%)**

Source: TAT Elaboration

### Prominent professions, lost professions in education sector

Exactly same amount of decision makers/sector experts stated that digital technologies would not replace employees (54.1%) and employment will not be decreased in the education sector due to emerging new and digital technologies.

**Figure 11 – Expected effect of new technologies in employment in the education sector (%)**

Source: TAT Elaboration

Some decision-makers who agree with the statements above said that the education sector might change its shape in the future with the help of digitalization and emerging new technologies. According to them, education will remain one of the most popular sectors in the future as education is a basic need for any human being. Yet, there is no apparent effect on educators (especially teachers). Decision-makers and sector experts have stated that although there will be no loss in a profession in this sector, the lagging or unqualified personnel might be eliminated. However, they also think that the number of working hours will decrease instead of the number of employees. Besides, they also stated that changing communication tools and methodologies would affect the qualifications and skills of the managers and employees in the education sector.

It also seems that there is not much evidence on the impact of digitalization or emerging technologies on education systems regarding compliance with the expectations. However, they mentioned that artificial intelligence would play an important role in the education sector. They claimed that robots might replace employees if and only if they learn the feelings of humans and act precisely like human beings.

According to sector experts in the education sector, positions that cannot be filled or can be filled with difficulty in public/private institutions/organisations in the education sector include senior positions such as researcher, expert academics/lecturers/professors, and experienced software personnel.

Although only one-third stated that robots would replace human employees soon, they also conflicted with themselves in terms of a need for new personnel in their institutions due to technological innovations and developments in the education sector through digitalization. More than half (56.8%) of employers reported that there is a need for new personnel at their workplaces due to innovations in technology and developments in the sector.

**Figure 12 – Need for new personnel due to innovations in technology and developments in the education sector (%)**

Source: TAT Elaboration

Employers and managers in the education sector stated that creative industries and design-oriented needs would come to the fore in the education sector due to technological innovation and developments and innovations in their institutions or the sector. Some of the sector experts mentioned digital education context and content creators, and the need for education designers, communication experts, and digital media experts would be most needed for digital transformation and compliance. Through the provision of digital tools, there is an increasing need for change in the teaching systems declared by sector experts.

Employers and managers stated that auxiliary staff, positions that require intensive labour-power, may be lost because of the introduction of distance education. They also claim that number of the teaching staff may be decreased, but these would be replaced by other staff such as designers, digital context and content creators, communication experts, software engineers etc. Measurement and evaluation would also be important in the future so that people who use big data and statistical methods efficiently will also be required for the education sector.

Some of them also claimed that only schools for children who need special education would remain; others would transform to the digital environment, such as metaverses.

When employers struggle to fill vacancies, this is often due to a lack of the required skills, qualifications, or experience among applicants. Collectively, these are known as skill-shortage vacancies. Vacancies in establishments were proving hard-to-fill due to difficulties in finding applicants with appropriate experience (52.2%) and knowledge and skills (47.8%). These reasons were followed by lower wages (34.8%) or lack of social opportunities and rights (26.1%).

**Figure 13 – Reasons stated by employers/ managers for struggling with hard-to-fill positions in the education sector (%)**

Source: TAT Elaboration

Figure 14 below shows sector experts' evaluations of the reasons for hard-to-fill positions in the education sector. Most of them stated difficulty with retaining qualified personnel (51.6%). They also reported that performance evaluation and reward mechanisms do not work efficiently in the education sector (48.4%). Then insufficient wages, social opportunities, and brain drain higher in the sector, especially in hard-to-fill positions (40.6%), were underlined as reasons for struggling with hard-to-fill positions. More than one-third of the sector experts and decision-makers (35.9%) stated that the failure of education systems to keep up with the digital transformation in the education sector causes difficulties in filling positions in the education sector. This also causes the inability to persuade talented staff (34.4%).

**Figure 14 – Reasons stated by sector experts/ decision makers for struggling with hard-to-fill positions in the education sector (%)**

Source: TAT Elaboration

Figure 15 shows the impacts reported by employers who had difficulty filling their vacancies because of skill shortages. The majority of decision-makers in the education sector stated that there is always an increasing burden on other personnel (60.6%). Hence, the lack of skilled personnel causes inabilities to provide service at the expected quality (45.5%), the expectations of service recipients fail (31.8%.), and then satisfaction decreases (18.2%). Nearly half of employers also reported delays in delivering services (49.0%) or even no services (21.2%).

**Figure 15 – Impact of hard-to-fill positions to the education sector (%)**

Source: TAT Elaboration

Nearly half of the employers/managers (44.0%) reported that they cope with the situation by providing more training to existing staff and reviewing and renewing the business processes. The latter coping strategies was stated as ceasing offering some services (perhaps lectures) that were given by skilled teaching staff (32.0%) and redefining existing tasks (28.0%).

**Figure 16 – Coping strategy to decrease impact of hard-to-fill positions in the education sector (%)**

Source: TAT Elaboration

Most employers (80.4%) stated that artificial intelligence would be the most prominent area in the education sector. However, nearly two-thirds of decision-makers and sector experts noted that data science and analytics would be more pronounced in the sector (60.6%). Employers and managers claimed that cloud computing would also be one of the more critical areas for the sector (56.5%).

According to both, these three are followed by programming, web, and application development (51.5%) and digital design and data visualisation (47.0%). Employers and managers also mentioned wearable technologies (43.5%), 3D printing capability and 5G for the sector (41.3%).

**Figure 17 – Digital technologies be more prominent in the education sector (%)**

Source: TAT Elaboration

Sector experts and decision-makers stated that artificial intelligence (AI) is mostly used in information technology automation (54.5%). According to sector experts/ decision-makers, the AI helps increase performance and efficiency (31.8%), management of equipment and devices (27.3%), decision support (24.2%), cyber security (24.2%) and quality control (24.2%).

**Figure 18 – Areas which artificial intelligence applications used in the education sector (%)**

Source: TAT Elaboration

According to the majority of sector experts/decision-makers, the most common skill employers felt to stand out in the education sector would be artificial intelligence usage skills (60.6%). More than half of them also mentioned analytical thinking and innovation (57.6%), active learning skills (57.6%), reasoning and innovation (56.1%), data science and data analytics (54.5%), and communication skills (53.0%).

Employers' first option for technical skills to stand out shortly seems more practical as analytical thinking and innovation (63.0%). They also agree with sector experts on reasoning and innovation (58.7%), communication skills (58.7%) and active learning skills (55.7%).

**Figure 19 – Skills to be stand out in the education sector (%)**

Source: TAT Elaboration

### Training, workforce development and upskilling for new technologies and digital adaptation

Staff training is a powerful tool in allowing employers to cope with skills shortages and skill gaps within their workplace, develop their workforce to comply with requirements of the new and/or digital technologies, and increase productivity and expertise.

Most decision-makers/ sector experts (72.0%) claimed that existing education staff needs the training to adapt to new and digital technologies.

**Figure 20 – Need for training of existing staff in the education sector (%)**

Source: TAT Elaboration

Employers/managers take action to cope with the skill shortages of their employees. Most employers/managers (92.6%) indicated that they have realized or planned new training events to cope with the skill shortages of the employees. They noted that performance evaluations and organizing business processes according to skills (37.0%) were the foremost coping strategies with skill shortages of available staff in the education sector.

**Figure 21 – Employers action for coping skill shortages of employees (%)**

Source: TAT Elaboration

Almost 79.7% of employees in the education sector reported that they develop their skills by following the relevant portals, blogs, and forums on the web. Two-thirds of employees said they either participate in the appropriate in-house training (69.5%) or benefit from online or distance education programs (61.0%). Cooperation between friends and colleagues was observed at a high level in the sector. More than half of employees reported support from friends to increase their skills and pieces of knowledge (57.6%). Half reported participation in training outside the workplace with their means (42.4%). Although the first two skill and knowledge development methods are common for both male and female employees, there are statistically significant differences between female and male employees in the first two knowledge development ways. Male employees stated that more than female employees follow relevant portals, blogs and forums and receive training outside of working hours by their own means. However, female employees reported that they also participate in in-house training. Male employees reported benefits from online or distance education programmes more frequently (63.0%).

**Figure 22 – Employees skills and knowledge development ways (%)**

Source: TAT Elaboration

Two-thirds of employers or managers reported training needs analysis to understand what is needed in the education sector. The Ministry of National Education (MoNE) supports school managers' and teachers' development through training needs assessments through systematic processes applied by the Directorate General Teacher Training and Development and many other projects. Therefore, the sector determines training needs regularly.

**Figure 23 – Conduct TNA to determine training needs (%)**

Source: TAT Elaboration

Two-thirds of employers in the education sector reported regular Occupational Health and Safety (OHS) training. Orientation training and training on new technologies take second place on the training list in the education sector (50.0%).

**Figure 24 – Training provided in the education sector (%)**

Source: TAT Elaboration

Only one-third of employers and managers in the education sector reported that their employees demanded training (37.0%).

**Figure 25 – Training demand for skill development in the education sector (%)**

Source: TAT Elaboration

Slightly more than half of the employees in the education sector confirmed that they have participated in the training. There is no statistically significant difference by gender in training participation (p>0.05). Half (47.1%) reported that they demanded precisely some of the training provided; however, only 17.1% reported that the training provided was what they had requested. Although, 78.3% of female and 82.1% of male employees reported satisfaction with training packages to close their skill and knowledge gaps.

**Figure 26 – Participation in training in the education sector by gender (%)**

Source: TAT Elaboration

Female employees reported that the contribution of training to income, the transformation of training outcomes to work-life and length of training are the most critical factors affecting satisfaction levels. According to male employees, the essential factors are practical applications during the training and contribution of training to income.

**Figure 27 – Factors affecting satisfaction from training in the education sector by gender (%)**

Source: TAT Elaboration

Most employees in the education sector reported no change in their expectations after the training provided. While female employees were expecting a promotion, male employees expected an increase in their salaries. If they have not got a wage increase, they intend to change their workplaces.

**Figure 28 – Change in expectation after training in the education sector by gender (%)**

Source: TAT Elaboration

Most employers (84.8%) reported equal opportunity for skill development in the education sector. In parallel, male and female employees (85.0%) claim the same.

**Figure 29 – Equal opportunity for skill development in the education sector by gender (%)**

Source: TAT Elaboration

### Gender and disability perspective in the education sector

Slightly more than a third of the sector experts and decision-makers believe that developing and increasing the use of new and digital technologies will facilitate women’s employment in the education sector. However, nearly one-fifth (17.9%) still think negative about the same issue.

**Figure 30 – Effect of new and digital technologies on women ‘s participation in the employment and in the education sector (%)**

Source: TAT Elaboration

Employees reported a 55.7% probability that a woman could be a manager in the education sector. Female employees claimed that the likelihood of being a manager in the education sector is 66.6%, but male counterparts claimed a 42.8% probability that a woman could be a manager.

According to sector experts and decision-makers, male-dominated culture in working life (56.0%), lack of role models (30.0%), long working hours (26.0%) and preference for being with family (22.0%) are the main barriers to a smaller number of women managers in the education sector.

**Figure 31 – Reason for lower number of women managers in the education sector (%)**

Source: TAT Elaboration

In order to increase the number of women managers in the education sector, more than half of the sector experts and decision-makers recommended increasing nursery facilities (59.1%), supporting postpartum part-time work opportunities (51.5%) and introducing role models (51.5%) to increase the number of women managers in the education sector. Provision of gender equality training (43.9%) and supporting female employees for socialization and networking (39.4%) were also recommended.

**Figure 32 – What can be done to increase number of women managers in the education sector (%)**

Source: TAT Elaboration

As can be seen in the figure below, both sector experts (77.1%) and employers (77.5%) stated that new forms of employment and developments in technology would support the employability of People with Disabilities (PwDs) in the education sector.

**Figure 33 – New forms of employment and new technologies support increase in the participation of PwDs in the education sector (%)**

Source: TAT Elaboration

Slightly more than half of the decision-makers and sector experts (50.8%) reported that assistive technologies would support PwDs in the labour market and the education sector. They indicated that technological transformation (44.6%) and changing the society's perspective (43.1%) would also support PwDs in the market. Decision-makers suggest that facilitating PwDs' participation in education will also keep them to be in the market (67.4%).

**Figure 34 – New forms of employment and new technologies support increase in the participation of PwDs in the education sector (%)**

Source: TAT Elaboration

# Health Sector

### Number of interviewed people

The main element of the field study for Health Sector was a total of 180 face-to-face interviews with sector experts, decision makers, employers, managers and employees in Health Sector, conducted in Ankara, Bursa, Izmir, Adana and Istanbul, to gain an understanding of the current situation and the future trends in respect of jobs and skills requirements. For this purpose, three different questionnaires were prepared (Annex X), one for decision makers/sector experts, one for employers and one for employees with questions influenced by feedback from stakeholders during the stakeholder meetings and the Pre-Study Workshop. The field study was conducted during March 2022.

The questionnaires consist of subjects below:

1. General information about the respondents

2. Decent work concept, flexible and remote work

3. Digital technologies and adaptation

4. Bottleneck jobs, future skills and qualification needs

5. Workforce development and upskilling

6. Prominent professions, lost professions

7. Gender dimensions, opportunities for PwDs

Table 6 presents the number of surveys conducted in each province by respondent type.

**Table 6 - Number of surveys conducted by respondent in each of the provinces in the health sector**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sector** | **Decision Makers/Sector experts** | **Employer** | **Employee** | **Total** |
| Adana | 12 | 9 | 13 | **34** |
| Ankara | 10 | 10 | 18 | **38** |
| Bursa | 4 | 6 | 21 | **31** |
| İstanbul | 5 | 4 | 23 | **32** |
| İzmir | 11 | 9 | 25 | **45** |
| **Total** | **42** | **38** | **100** | **180** |

Source: TAT Elaboration

### Awareness about decent work concept, flexible and remote work

Decent work is defined as “productive work for women and men in conditions of freedom, equity, security and human dignity”.[[5]](#footnote-5) Work is generally considered decent when it pays a fair income. It guarantees a secure form of employment and safe working conditions. More than half of the respondents said they heard the concept and know what it covers (54.4%). There is a statistically significant difference between sector experts, employers, and employees in terms of awareness of the concept (p<0.05). More than half of the employees (53.0%) claimed that they had never heard of the concept. The awareness of female employees (43.2%) about the concept is less than that of male employees (57.3%). However, the awareness about the exact definition ratio is higher if female respondent stated that she heard the concept.

**Table 7 - Awareness about decent work concept in** **health sector**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Sector Expert (n=42)** | **Employer (n=38)** | **Employee (n=100)** | **Total (n=180)** |
| Yes, I heard, I don't know the definition | **23.8** | **28.9** | **27.0** | **26.7** |
| Yes, I heard, I know the definition | 38.1 | 36.8 | 20.0 | 27.8 |
| No, I didn' hear | 38.1 | 34.2 | 53.0 | 45.6 |
| Total | 100 | 100 | 100 | 100 |

Source: TAT Elaboration

Working conditions associates new business models with the future of work. According to ILO, flexible and remote work is expected to become more prevalent shortly with the help of the new and digital technologies and emerging business tools.[[6]](#footnote-6) These new business models will also allow marginalised workers to join the workforce, as well as workers with family responsibilities. However, without rules and regulations, such new business models may be abused by two sides of the labour market.

Unlike other sectors, most respondents (86.0%) indicated that flexible and remote work arrangements are unavailable in the health sector, mainly with unwritten rules. They claim that customers or the serviced audience cannot adapt to implementing flexible or remote working arrangements in the health sector. Only 13.5% of employers state that flexible and remote works arrangements with unwritten rules are available in the health sector.

**Table 8 - Flexible and remote work arrangements in health sector**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Sector Expert (n=41)** | **Employer (n=37)** | **Employee (n=93)** | **Total (n=171)** |
| Yes, but there are no written rules | **12.2** | **13.5** | **3.2** | **7.6** |
| Yes, it is implemented with written rules | 12.2 | 8.1 | 3.2 | 6.4 |
| No | 75.6 | 78.4 | 93.5 | 86.0 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |

Source: TAT Elaboration

As seen in Table 9, respondents in the health sector generally agreed and were happy that flexible and remote working arrangements allow employees to fulfil family responsibilities and participate in family and social activities.

**Table 9 - Percentage of participants agree with the statements about flexible and remote work arrangements in health sector (%)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Sector Expert** | **Employer** | **Employee** |
| **Flexible or remote working arrangements allow employees to fulfil their family responsibilities.** | 70.3% | 63.3% | 69.8% |
| **Flexible or remote working arrangements help employees participate in family and social activities.** | 70.3% | 53.3% | 71.4% |
| **Institutions/organisations/workplaces can track their employees' flexible working hours or remote work.** | 65.7% | 50.0% | 64.9% |
| **In our industry, customers or the serviced audience cannot adapt to the implementation of flexible or remote working arrangements.** | 59.5% | 43.3% | 36.8% |
| **Other employees who do not work this way react negatively to people who work according to flexible or remote work arrangements.** | 47.1% | 36.7% | 26.3% |
| **Flexible or remote working arrangements make employees less committed to their role at work.** | 40.5% | 43.3% | 17.7% |
| **Flexible or remote working arrangements make it difficult for employees to do their work.** | 37.8% | 61.3% | 13.8% |
| **Flexible or remote working arrangements can disrupt business processes** | 37.8% | 46.7% | 21.0% |
| **Employees can focus more on their work with flexible or remote working arrangements.** | 32.4% | 16.7% | 52.4% |
| **From time to time, employees can miss meetings within the institution/organisation/workplace in a flexible or remote working arrangement.** | 30.6% | 36.7% | 10.2% |
| **Some employees would not be able to work without flexible or remote work arrangements.** | 28.6% | 3.8% | 3.2% |
| **It negatively affects flexible or remote working performance.** | 28.6% | 44.8% | 0.0% |
| **Flexible or remote working negatively affects occupational health and safety.** | 22.2% | 18.5% | 0.0% |
| **Within the scope of flexible or remote working arrangements, employees' work-related expenses (food, electricity, internet, heating, etc.) outside the workplace are covered.** | 12.9% | 7.4% | 0.0% |
| **I feel like I'm constantly working because of flexible or remote work arrangements.** | 0.0% | 0.0% | 10.2% |

Source: TAT Elaboration

Most sector experts and decision-makers reported that the new forms of employment and employment relations that have emerged with the use of digital technologies in the health sector are insufficient (70.4%).

**Figure 35 – Sufficiency of the new forms of employment and employment relations that have emerged with the use of digital technologies in the health sector (%)**

Source: TAT Elaboration

### Digital technologies and adaptation

Sector experts and decision-makers claim that digital infrastructure in the sector is either the same or ahead of the new technologies used in developed countries (56.1%). However, nearly half of the sector experts and decision-makers think differently. They say the technology behind the similar technologies used in developed countries (43.9%). Employers’ perceptions about digital infrastructure used in their institutions are relatively positive. They claim their organisations’ digital infrastructure is close to the newest technology used in developed countries (8.2 out of 10). If they want to adapt their technology to the latest technology, they assume that transforming it to the newest one is not difficult.

**Figure 36 – Comparison of digital infrastructure in health sector with similar technologies used in developed countries (%)**

Source: TAT Elaboration

In support of the earlier finding, decision-makers stated that lack of technical infrastructure (50.0%) and inadequate standards and legislation are two major barriers to technology adaptation. These two are followed by high application costs (35.0%), integration challenges into the system and a lack of technical knowledge of currently employed personnel (32.5%).

**Figure 37 – Barriers to new and digital technology adaptation in the health sector (%)**

Source: TAT Elaboration

Slightly more than a third of employers stated that lack of trained human resources (36.8%) and cost-effectiveness (34.2%) are the two main difficulties in adapting existing digital technology infrastructure to the newest technology. Nearly a quarter also mentioned difficulties in accessing technical/digital infrastructure (26.3%) and lack of budget (23.7%).

**Figure 38 – Difficulties for adaptation of existing digital technological infrastructure to the newest technology (%)**

Source: TAT Elaboration

Decision-makers (75.0%) think that most of the companies in the sector invest in new technologies. However, the investment is not sufficient for digital transformation (58.3%).

**Figure 39 – Investment to the new technologies in the health sector (%)**

Source: TAT Elaboration

Although decision-makers and sector experts mostly claim uncertainties in the general economy affect investment decisions in the sector, both decision-makers and employers agree on those crucial factors: technology obsolescence risk and investment’s cost-benefit. Additionally, more than a third of the sector experts/decision-makers mentioned about availability of staff to manage the digital technologies (40.0%). They also note that the quality of academic education and higher wages demanded by qualified personnel affect investment decisions.

**Figure 40 – Effects on investment decisions in health sector (%)**

Source: TAT Elaboration

Most employers in the health sector evaluated that their institution’s technological/digital infrastructure dramatically impacts the quality of the services produced (79.0%).

Figure 41 below shows how new or emerging technologies affect employment in the health sector. Most sector experts and decision-makers agree that there is a need for education for current staff working in the sector (76.2%). Only close to a quarter of them confirmed the ratio of bottleneck professions (26.3%). They reported an increase in the number of qualified staff in the sector (21.4%) and employment quality (16.7%) but not in parallel with the progress in digital technologies (23.8%). One-tenth of sector experts also reported an increase in open jobs (11.9%). Only a few mentioned a rise in the number of women employees and PwDs in the sector. However, sector experts noted equal opportunities for gender in employment. Some sector experts mentioned that new technologies or robots would replace workers (14.3%).

**Figure 41 – How new or emerging technologies affect the labour market/employment (%)**

Source: TAT Elaboration

According to 41.5 per cent of sector experts/decision-makers, training is provided in order to overcome difficulties and increase compliance with new and digital technologies in the health sector. According to sector experts, digital transformation in the health sector was started nearly a decade ago with the slogan of “hospitals with no paper”. Close to one-third (31.7%) of sector experts mentioned that digital strategies and action plans are being prepared in the health sector. Decision-makers also claim that training needs are analysed to improve curricula in training institutions (29.3%). TUBITAK and the Health Institutes of Türkiye (TUSEB) work closely in preparing digital transformation strategies. Hence, some of them also refer that the public-university-industry cooperation model in digital transformation processes in the health field is important and being developed (19.5%). However, A quarter of decision-makers and sector experts declared insufficiency in these efforts (24.4%).

**Figure 42 – Actions done to increase compliance with new and digital technologies in the health sector (%)**

Source: TAT Elaboration

### Prominent professions, lost professions in health sector

Decision-makers/sector experts stated that digital technologies would replace employees (41.5%). However, close to half of them is not agree with a decrease in the employment in the sector due to new automation technologies.

**Figure 43 – Expected effect of new technologies in employment in the health Sector (%)**

Source: TAT Elaboration

Some decision-makers who disagreed with the statements above stated that the health sector is a sector supporting the survival of human beings. They support the idea of change in working processes in the future with the help of new and digital technologies. As long as the target is to increase life quality and expected life, public and private sectors will always invest in the sector and human resources. They claim that the sector will still be popular in the future. It has also been stated that although there will be no loss as a profession in this sector, the lagging or unqualified personnel may be eliminated from the sector.

Close to two-thirds (64.7%) of employers reported no need for new personnel at their workplaces due to technological innovations and developments in the sector.

**Figure 44 – Need for new personnel due to innovations in technology and developments in the health Sector (%)**

Source: TAT Elaboration

In the health sector, on the other hand, according to sector experts and managers, bottleneck positions in the health sector are technical personnel in the network and informatics, personnel working as operating room technicians and personnel who will work in the field of health in general.

When employers and managers struggle to fill vacancies, this is often due to applicants lacking the required skills, qualifications, or experience (62.5%). They said that especially the positions that require an intense work pace are hard to fill in the health sector (37.5%). A quarter declared that applicants find the offered wages (25.0%), the social opportunities and rights offered insufficient for these positions (12.5%).

**Figure 45 – Reasons stated by employers/ managers for struggling with hard-to-fill positions in the health sector (%)**

Source: TAT Elaboration

Sector experts also evaluated the reasons for hard-to-fill positions in the health sector. More than half of them reported a failure to reward performance in the health sector (52.4%), insufficient wages and social opportunities (42.9%) and another failure to set wages fairly by considering qualifications (42.9%). These reasons mainly cause difficulty retaining qualified personnel (45.2%) and brain drains in professions needed by the health sector (38.1%). Only a quarter mentioned insufficient quality or expertise (26.2%).

**Figure 46 – Reasons stated by sector experts/ decision makers for struggling with hard-to-fill positions in the health Sector (%)**

Source: TAT Elaboration

Figure 47 shows the impacts reported by employers who had difficulty filling their vacancies because of skill shortages. Most decision-makers indicated an increasing burden on other sector staff (59.5%). The second impact was mentioned as delays in delivering services (45.2%) and the inability to offer certain services at the expected level of quality (42.9%) or even no services (42.9%). They also mentioned outsourcing the work in the sector (38.1%) by sending patients to other institutions. They claimed a low-level satisfaction of patients because of all these impacts (38.1%)

Some of them also reported an inability to keep up with technological changes and new working practices appears because of the insufficient number or capability of staff (21.4%).

**Figure 47 – Impact of hard-to-fill positions to the health Sector (%)**

Source: TAT Elaboration

Nearly two-thirds of the employers/managers (63.6%) reported that they provide more training to existing staff. The latter coping strategies are stated as developing new recruitment strategies (36.4%) and use of internships actively (27.4%). Other coping strategies in the sector were indicated as redefining existing jobs (27.3%) and increasing wages (in the private sector).

**Figure 48 – Coping strategy to decrease impact of hard-to-fill positions in the health sector (%)**

Source: TAT Elaboration

The majority of sector experts (92.2%) and employers (79.6%) stated that artificial intelligence would be the most prominent area in the health sector soon. They reported that the second important area would be robotic process automation, and the third one would be wearable technologies. Decision-makers and sector experts also frequently mentioned the ability to use virtual reality (VR) and advance human-machine interfaces.

**Figure 49 – Digital technologies be more prominent in the health sector (%)**

Source: TAT Elaboration

Sector experts and decision makers stated that artificial intelligence mostly used in information technology automation (50.0%). They also stated that AI can be used in management of equipment and devices (38.1%), in cyber security (28.6%) and quality control (23.8%).

**Figure 50 – Areas which artificial intelligence applications used in the health sector (%)**

Source: TAT Elaboration

According to the majority of sector experts/decision-makers, the most common skills employers felt to stand out in the health sector would be analytical thinking, reasoning and innovation (65.8%) and the ability to use wearable technologies (55.3%). They reported active learning skills (47.4%) and using decision-support systems (44.7%) will be leading talents in the near future.

Employers' first option for technical skills to stand out in the near future is the ability to use artificial intelligence (54.8%). Employers indicated in parallel with the sector experts that ability to use wearable technologies and analytical thinking, reasoning, and innovation (42.9%) skills will be important.

**Figure 51 – Skills to be stand out in the health sector (%)**

Source: TAT Elaboration

### Training, workforce development and upskilling for new technologies and digital adaptation

Staff training is a powerful tool in allowing employers to cope with skills shortages and skill gaps within their workplace, develop their workforce to comply with requirements of the new and/or digital technologies, and increase productivity and expertise.

The majority of decision-makers/ sector experts (89.2%) claimed that existing staff in the health sector needs training for adaptation to new and digital technologies.

**Figure 52 – Need for training of existing staff in the health sector (%)**

Source: TAT Elaboration

Employers/managers take action to cope with the skill shortages of their employees. The majority of employers/managers (91.7%) indicated that they have either provided/funded or planned skill development training programmes for their employees. More than a third reported performance evaluations to understand the lack of skills needed (37.5%). In another action, one-third reported that they had reorganized business processes according to employees’ skills (33.3%). Increasing staff supervision was also mentioned by a quarter of respondents (25.0%).

**Figure 53 – Employers action for coping skill shortages of employees (%)**

Source: TAT Elaboration

Most employees (79.0%) in the health sector reported that they developed their skills by participating in in-house training. More than half of them (52.4%) stated that they also follow relevant portals, blogs, and forums on the web. Nearly a third of employees reported that either they use the opportunity of learning from their colleagues, or they use their means to get more knowledge or benefit from online or distance education programmes.

It was noticed that the first two professional development ways are common for both male and female employees. Male employees mentioned more frequently that they benefit from online or distance education and training outside the workplace. Female employees in the health sector reported more on relevant portals, blogs and forums and got help from their colleagues and acquaintances.

**Figure 54 – Employees skills and knowledge development ways (%)**

Source: TAT Elaboration

The majority of employers reported that they conducted training needs analysis (TNA) to understand what exactly needed. The Ministry of Health (MOH) conducts TNAs through different specific projects to understand training needs of the health staff.

**Figure 55 – Conduct TNA to determine training needs (%)**

Source: TAT Elaboration

Most employers and managers mainly reported job-specific training (75.0%) and onboarding/orientation training given to employees (65.6%). More than half also indicated Occupational Health and Safety (OHS) are provided to staff frequently (59.4%). However, some of them also mentioned training in new technologies (34.4%), new products and services (31.3%), hardware (25.0%) and software training (18.8%). More than a quarter of them stated that they also supported the distance education fees of their staff (28.1%).

**Figure 56 – Training provided in the health sector (%)**

Source: TAT Elaboration

Slightly more than half of employers reported that their employees demanded training (54.1%)

**Figure 57 – Training demand for skill development in the health sector (%)**

Source: TAT Elaboration

The majority of employees in the health sector confirmed that they have participated in the training. There is no statistically significant difference by gender in training participation (p>0.05). Nearly one-fifth reported that they demanded precisely some of the training provided; however, only 1.8% said that the training provided was exactly what they had requested. Despite the fact that they have not requested training, 75.0% of female and 90.0% of male employees reported satisfaction with training packages provided for them to close their skill and knowledge gaps

**Figure 58 – Participation in training in the health sector by gender (%)**

Source: TAT Elaboration

According to female employees, the practicality of training (47.5%), length (37.5%), transferability of real-life (20.0%) are the main aspects of satisfaction from training if training is implemented within work time (22.5%), and outcomes reflect the income (45.0%). Male employees relate the satisfaction factors with practical aspects in training (40.0%), its length (40.0%) and transferability of outcomes to real life (40.0%). Male employees also stated that they prefer proper training duration during working time.

**Figure 59 – Factors affecting satisfaction from training in the health sector by gender (%)**

Source: TAT Elaboration

Majority of employees reported no change in their expectations after training (60.5%). Some employees, especially female ones, reported a wage increase and promotion within the company.

**Figure 60 – Change in expectation after training in the health sector by gender (%)**

Source: TAT Elaboration

Nearly two-thirds of employers (60.6%) reported equal opportunity for skill development in the health sector. Male employees (84.0%) claim the same. However, only half of the female employees (52.7%) confirmed equal skill development opportunities. There is a statistically significant difference between female and male responses (p<0.05).

**Figure 61 – Equal opportunity for skill development in the health sector by gender (%)**

Source: TAT Elaboration

### Gender and disability perspective in the health sector

More than one-third of the sector experts and decision (36.1%) makers believe that the development and increase of new and digital technologies will facilitate women’s employment in the health sector more. However, one-tenth (11.1%) still think negatively about the same issue.

**Figure 62 – Effect of new and digital technologies on women ‘s participation in the employment and in the health sector (%)**

Source: TAT Elaboration

Employees positively evaluated the possibility of a woman being a manager. According to them, the probability is 69.5%. Female employees claimed that the likelihood of being a manager in the health sector is 68.8%, but male counterparts claimed a 71.4% probability that a woman could be a manager.

In order to increase the number of women managers in the health sector, close to half of the sector experts and decision-makers recommend providing gender training in the sector (42.9%) and increasing nursery facilities (40.5%). A third of them also suggest supporting female employees to increase their socialization and communication network (38.1%), the establishment of women working groups (33.3%), provision of coaching and leadership training sessions for women (31.0%) and introduction of role models (31.0%).

**Figure 63 – Reason for lower number of women managers in the health sector (%)**

Source: TAT Elaboration

In order to increase the number of women managers in the health sector, close to half of the sector experts and decision makers recommend provision of gender training in the sector (42.9%) and increasing nursery facilities (40.5%). A third of them also suggest support female employees to increase their socialization and communication network (38.1%), establishment of women working groups (33.3%), provision of coaching and leadership training sessions for women (31.0%) and introduction of role models (31.0%).

**Figure 64 – What can be done to increase number of women managers in the health sector (%)**

Source: TAT Elaboration

As can be seen in the figure 65 below, both sector experts (81.3%) and employers (86.7%) stated that new forms of employment and developments in the technology will support employability of People with Disabilities (PwDs) in the health Sector.

**Figure 65 – New forms of employment and new technologies support increase in the participation of PwDs in the health sector (%)**

Source: TAT Elaboration

Majority of decision makers and sector experts (73.8%) and employers/managers (63.2%) reported that assistive technologies will support PwDs to be in the labour market and the ICT sector. They indicated that artificial intelligence applications and technological transformation will also support PwDs to be in the market. Both decision makers and employers suggest that facilitation of PwDs participation in education will also support them to be in the market.

**Figure 66 – New forms of employment and new technologies support increase in the participation of PwDs in the health sector (%)**

Source: TAT Elaboration

# Energy Sector

### Number of interviewed people

The main element of the field study for Energy Sector was a total of 174 face-to-face interviews with sector experts, decision makers, employers, managers and employees in Health Sector, conducted in Ankara, Bursa, Izmir, Adana and Istanbul, to gain an understanding of the current situation and the future trends in respect of jobs and skills requirements. For this purpose, three different questionnaires were prepared (Annex X), one for decision makers/sector experts, one for employers and one for employees with questions influenced by feedback from stakeholders during the stakeholder meetings and the Pre-Study Workshop. The field study was conducted during March 2022.

The questionnaires consist of subjects below:

1. General information about the respondents

2. Decent work concept, flexible and remote work

3. Digital technologies and adaptation

4. Bottleneck jobs, future skills and qualification needs

5. Workforce development and upskilling

6. Prominent professions, lost professions

7. Gender dimensions, opportunities for PwDs

Table 10 presents the number of surveys conducted in each province by respondent type.

**Table 10 - Number of surveys conducted by respondent in each of the provinces**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sector** | **Decision Makers/Sector experts** | **Employer** | **Employee** | **Total** |
| Adana | 11 | 3 | 16 | **30** |
| Ankara | 17 | 6 | 13 | **36** |
| Bursa | 10 | 7 | 17 | **34** |
| İstanbul | 12 | 11 | 15 | **38** |
| İzmir | 12 | 10 | 14 | **36** |
| **Total** | **62** | **37** | **75** | **174** |

Source: TAT Elaboration

### Awareness about decent work concept, flexible and remote work

Decent work is defined as “productive work for women and men in conditions of freedom, equity, security and human dignity”.[[7]](#footnote-7) In general, work is considered as decent when: it pays a fair income. it guarantees a secure form of employment and safe working conditions. A quarter of respondents stated that they heard the concept and knows what it covers. There is a statistically significant difference between sector experts, employers, and employees in terms of awareness about the concept (p<0.05). More than half of the employees claimed that they never heard the concept. Awareness of male employees (42.3%) about the concept is less than awareness of female employees (47.8%). However, the awareness about the exact definition ratio is higher if male respondent stated that she heard the concept.

**Table 11 - Awareness about decent work concept in energy sector**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Sector Expert (n=62)** | **Employer (n=37)** | **Employee (n=75)** | **Total (n=174)** |
| Yes, I heard, I don't know the definition | **21.0** | **37.8** | **21.3** | **24.7** |
| Yes, I heard, I know the definition | 51.6 | 29.7 | 22.7 | 34.5 |
| No, I didn't hear | 27.4 | 32.4 | 56.0 | 40.8 |
| Total | 100 | 100 | 100 | 100 |

Source: TAT Elaboration

Working conditions associates new business models to the future of work. According to ILO flexible and remote work is expected to become more prevalent soon by the help of the new and digital technologies and emerging business tools.[[8]](#footnote-8) These new business models will also allow marginalised workers to join the work force, as well as workers with family responsibilities. However, without rules and regulations, such new business models may be abused by two sides of the labour markets.

Most of the respondents (54.1%) indicated that flexible and remote work arrangements are available in the energy sector mainly with unwritten rules. Even two-third of employers and managers state that flexible and remote works arrangements with unwritten rules are available in the energy sector.

**Table 12 - Flexible and remote work arrangements in energy sector**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Sector Expert (n=60)** | **Employer (n=36)** | **Employee (n=74)** | **Total (n=170)** |
| Yes, but there are no written rules | **35.0** | **44.4** | **18.9** | **30.0** |
| Yes, it is implemented with written rules | 18.3 | 25.0 | 28.4 | 24.1 |
| No | 46.7 | 30.6 | 52.7 | 45.9 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |

Source: TAT Elaboration

As can be seen from Table 13, respondents in the energy sector generally agreed and were happy that flexible and remote working arrangements allow employees to fulfil family responsibilities and participate in family and social activities. All agree that institutions can track their employees’ flexible and remote work hours. They also claim that flexible or remote work does not affect work performance negatively. Only one-fifth of the respondents claim that flexible or remote work arrangements cause early leave from the job or employee turnover. They also state that flexible or remote work does not disrupt business processes in the sector. Most respondents disagree that people who use flexible or remote work arrangements are generally less committed to work. They believe this work modality does not affect focusing on the meetings thanks to web conferencing tools. However, very few indicate that work-related expenses are covered if the employee works flexible or remotely. As an interesting finding, a quarter of employees stated that they feel like they constantly work because of such work modality.

**Table 13 - Percentage of participants agree with the statements about Flexible and remote work arrangements in energy sector (%)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Statements** | **Sector Expert** | **Employer** | **Employee** |
| **Flexible or remote working arrangements help employees participate in family and social activities.** | 54.7% | 40.6% | 54.8% |
| **Flexible or remote working arrangements allow employees to fulfil their family responsibilities.** | 52.7% | 54.5% | 54.8% |
| **Institutions/organisations/workplaces can track their employees' flexible working hours or remote work.** | 50.0% | 60.6% | 70.0% |
| **Other employees who do not work this way react negatively to people who work according to flexible or remote work arrangements.** | 44.0% | 42.4% | 54.7% |
| **Within the scope of flexible or remote working arrangements, employees' work-related expenses (food, electricity, internet, heating, etc.) outside the workplace are covered.** | 28.8% | 25.0% | 0.0% |
| **It negatively affects flexible or remote working performance.** | 28.3% | 33.3% | 0.0% |
| **In our industry, customers or the serviced audience cannot adapt to the implementation of flexible or remote working arrangements.** | 27.5% | 18.8% | 25.4% |
| **Flexible or remote working arrangements make employees less committed to their role at work.** | 26.9% | 25.0% | 17.5% |
| **From time to time, employees can miss meetings within the institution/organisation/workplace in a flexible or remote working arrangement.** | 26.4% | 12.1% | 17.5% |
| **Employees can focus more on their work with flexible or remote working arrangements.** | 26.4% | 12.5% | 42.6% |
| **Flexible or remote working arrangements make it difficult for employees to do their work.** | 24.5% | 24.2% | 20.0% |
| **Flexible or remote working arrangements can disrupt business processes** | 22.6% | 18.2% | 23.8% |
| **Some employees would not be able to work without flexible or remote work arrangements.** | 21.2% | 12.9% | 14.5% |
| **Flexible or remote working negatively affects occupational health and safety.** | 15.1% | 6.1% | 0.0% |
| **I feel like I'm constantly working because of flexible or remote work arrangements.** | 0.0% | 0.0% | 21.7% |

Source: TAT Elaboration

Majority of the sector experts and decision makers reported that the new forms of employment and employment relations that have emerged with the use of digital technologies in the ICT sector is not sufficient.

**Figure 67 – Sufficiency of the new forms of employment and employment relations that have emerged with the use of digital technologies in the energy sector (%)**

Source: TAT Elaboration

### Digital technologies and adaptation

Sector experts and decision makers claim that digital infrastructure in the sector behind the new technologies used in the developed countries (48.3.0%). However, close to half of the sector experts and decision makers also thinks differently. They say that the technology almost the same with similar technologies used in developed countries (46.7%). Employers’ perception about digital infrastructure used in their institutions are relatively positive. They claim that their organisations’ digital infrastructure close to the newest technology used in developed countries (7.4 out of 10). If they want to adapt their technology to the newest technology, they assume that transforming their technology to the newest one is not too difficult.

**Figure 68 – Comparison of digital infrastructure in energy sector with similar technologies used in developed countries (%)**

Source: TAT Elaboration

As a support of the above-mentioned finding, decision makers stated that lack of technical infrastructure (63.7%) and high application costs (51.7%). They have reported lack of technical knowledge of the current staff and integration challenges are also crucial barriers for technology adoption in the energy sector.

**Figure 69 – Barriers to new and digital technology adaptation in the energy sector (%)**

Source: TAT Elaboration

Employers stated that the first difficulty in adapting existing digital technology infrastructure to the newest technology is the lack of trained human resources (54.1%). Close to half of employers claim that modernization is not cost-effective (43.2%), and they have budget constraints (29.7%). One-tenth stated that access to the new technology is not that easy in the energy sector (8.1%).

**Figure 70 – Difficulties for adaptation of existing digital technological infrastructure to the newest technology (%)**

Source: TAT Elaboration

Decision makers (71.9%) think that most of the companies in the sector invest in the new technologies, however the investment is not sufficient for digital transformation (43.9%).

**Figure 71 – Investment to the new technologies in the energy sector (%)**

Source: TAT Elaboration

Almost half of the sector experts and decision makers (58.1%) and employers and managers (78.4%) stated a cost benefit case of conversion. Uncertainties in economy and technology obsolescence risk were also mentioned as factors for investment decisions in the energy sector. Employers also reported industry about related information of qualified staff and quality of academic education.

**Figure 72 – Effects on investment decisions in energy sector (%)**

Source: TAT Elaboration

The majority of employers in the energy sector evaluated that their institution’s technological/digital infrastructure greatly impacts the quality of the services produced (70.3%).

Figure 73 below shows how new or emerging technologies affecting employment in the energy sector. Most of the sector experts and decision makers are agree that there is a need for education for available labour in the sector (75.8%). they stated that both number of qualified staff (37.1%) and their qualifications (29.0%) of existing staff also increased since employees want themselves to be adapted to the sector needs. They also reported an increase in the number of bottleneck professions (29.0%). One fifth of the employers and managers indicated that number of female employees also increases in the sector (19.4%).

**Figure 73 – How new or emerging technologies affect the labour market/employment (%)**

Source: TAT Elaboration

According to close to half of sector experts/decision makers (46.7.0%), trainings are provided in order to overcome the difficulties and increase compliance with new and digital technologies in the energy sector. Additionally training needs are analysed to improve curricula in training institutions. Some of them also refer that digital strategies and action plans are being developed (35.0%) and about university-industry cooperation (18.3%)

**Figure 74 – Actions done to increase compliance with new and digital technologies in the energy sector (%)**

Source: TAT Elaboration

### Prominent professions, lost professions in energy sector

Decision makers/sector experts stated that digital technologies would replace employees (48.4%) and there will be a decrease in employment due to new automation technologies (59.7%).

**Figure 75 – Expected effect of new technologies in employment in the energy Sector (%)**

Source: TAT Elaboration

The energy sector has largely remained as a physical industry but is rapidly facing a transformation. A sector that has relied on on-site personnel for decades is now embracing a remote workforce. Some sector experts and decision makers suggested that an understanding the needs of the workforce in the energy sector.

They said that having a remote work policy would help companies attract high-quality talent. Therefore, implementing flexible and remote work models will not only help energy companies retain their existing employees, it will also let them attract a healthy pool of new talent.

Majority of them (73.5%) of employers and managers reported that there is no need for new personnel at their workplaces due to innovations in technology and developments in the sector.

**Figure 76 – Need for new personnel due to innovations in technology and developments in the energy Sector (%)**

Source: TAT Elaboration

However, some of them declared a shortage of competent personnel who have a knowledge about the changing technology in the energy sector. Employers and managers mentioned about electrical and electronics engineers with the required knowledge about new technologies such as SCADA[[9]](#footnote-9) automation and computing

When employers struggle to fill vacancies, this is often due to low wages (55.6%) and social rights and opportunities in the energy sector (33.3%). They have reported a lack of the required skills, qualifications, or experience among applicants. Collectively, these are known as skill-shortage vacancies. In addition, they also mentioned about poor career opportunities in the energy sector restricts application of talents in the sector (22.2%).

**Figure 77 – Reasons stated by employers/ managers for struggling with hard-to-fill positions in the energy Sector (%)**

Source: TAT Elaboration

Sector experts also evaluated the reasons for hard-to-fill positions in the energy sector. Most of them stated that a primary difficulty is retaining qualified people in the sector due to failures in setting wages fairly by considering qualifications (40.3%). Hence, they admitted that the sector could not retain qualified personnel (54.8%) and brain drain higher in the sector especially in hard-to-fill positions (35.5%). They also reported a failure of education systems to keep up with the digital transformation in the industry (35.5%).

**Figure 78 – Reasons stated by sector experts/ decision makers for struggling with hard-to-fill positions in the energy Sector (%)**

Source: TAT Elaboration

Figure 79 shows the impacts reported by employers who had difficulty filling their vacancies because of skill shortages. Most of decision makers stated that the burden increases on other staff in (59.7%). There is an inability to keep up with technological changes (43.5%). There are delays in delivering services (41.9%) ad new products and service development (35.5%). These all decreases the quality (32.3%) and customer satisfaction (25.8%).

**Figure 79 – Impact of hard-to-fill positions to the energy Sector (%)**

Source: TAT Elaboration

A third of employers indicated that they outsource such tasks or offered some services with delays (33.3%). Surprisingly, training provided to existing staff comes as latter coping strategy and only one-fifth mentioned about.

**Figure 80 – Coping strategy to decrease impact of hard-to-fill positions in the energy sector (%)**

Source: TAT Elaboration

Both sector experts (61.3%) and employers (59.5%) stated that artificial intelligence would be the most prominent area in the energy sector soon. Decision makers and sector experts reported that the secondary important areas would be the cloud computing, wearable technologies, and robotic process automation (RPA). They also mentioned about smart sensors and advanced human-machine interfaces would be counted for prominent areas in terms of digital transformation.

When it comes to employers, they mentioned about cloud computing, wearable technologies, robotic process automation, data science and data analytics amongst prominent areas for the energy sector.

**Figure 81 – Digital technologies be more prominent in the energy sector (%)**

Source: TAT Elaboration

Sector experts and decision makers stated that artificial intelligence mostly used in management of equipment and devices (37.1%). The AI also is used to increase performance and efficiency (33.9) and in cyber security (30.6%). According to sector experts/ decision makers the AI helps quality control and information technology automation (27.4%).

**Figure 82 – Areas which artificial intelligence applications used in the energy sector (%)**

Source: TAT Elaboration

According to majority of sector experts/decision makers the most common skill that employers felt to be stand out in the energy sector would especially be soft skills such as communication, reasoning, analytical thinking and innovation. Then use of AI, technology design and programming and creativity comes.

Employers first option for technical skills to be stand out in the near future is communication skills (56.8%). According to employers and managers, ability to adapt knowledge and experience to work, digital marketing and performance measurement and management are also important skills to be stand out in the energy sector.

**Figure 83 – Skills to be stand out in the energy sector (%)**

Source: TAT Elaboration

### Training, workforce development and upskilling for new technologies and digital adaptation

Training for staff is a powerful tool in allowing employers to cope with skills shortages and skill gaps within their workplace, and to develop their workforce to compliance with requirements by the new and/or digital technologies and to increase productivity and expertise.

Majority of decision makers/ sector experts (81.3%) claimed that existing staff in the energy sector needs training for adaptation to new and digital technologies.

**Figure 84 – Need for training of existing staff in the energy sector (%)**

Source: TAT Elaboration

Employers/managers take action to cope with skill shortages of their employees. Majority of employers/managers indicated that they have either provided/funded or planned skill development training programmes for their employees (83.3%). As another action, they reported that they have reorganized business processes according to employees’ skills (54.2%). Slightly more than one-third (37.5%) indicated that they increased staff supervision and one-fifth (20.8%) stated performance evaluations.

to Half of them reported performance evaluations to understand lack of skills needed. Some 4.3% said that they recruited foreign workers who have special skills.

**Figure 85 – Employers action for coping skill shortages of employees (%)**

Source: TAT Elaboration

Almost 77.8% of employees in the energy sector reported that they develop their skill by means of participating in in-house training sessions (76.0%), getting help from their colleagues (50.7%) and following the relevant portals, blogs, and forums on the web (49.3%). One third of employees reported that either they benefit from online or distance education programs (40.0%) or receive training outside of working hours (26.7%).

There are statistically significant differences measured by gender. Orders change after participation in in-house training sessions. Female employees reported following the relevant portals, blogs and forums as well as benefit from online and distance education programs. Male employees indicated that they get help from their colleagues and also follow web sources.

**Figure 86 – Employees skills and knowledge development ways (%)**

Source: TAT Elaboration

Two-thirds of employers (67.6%) reported training needs analysis to understand what exactly needed.

**Figure 87 – Conduct TNA to determine training needs (%)**

Source: TAT Elaboration

Employers and managers mainly reported job-specific training (88.9%), occupational health and safety training (85.2%) and onboarding / orientation training to their employees/staff. These are followed by software training (44.4%), training for new products or services (40.7%), and hardware training (37.0%).

Employers and managers also mentioned about management training (29.6%) and training on the new technologies (25.9%).

**Figure 88 – Training provided in the energy sector (%)**

Source: TAT Elaboration

More than half of employers reported that their employees demanded training (54.1%)

**Figure 89 – Training demand for skill development in the energy sector (%)**

Source: TAT Elaboration

Majority of employees in the energy sector confirmed that they have participated in training. There is no statistically significant difference by gender in training participation (p>0.05). Close to a quarter reported that they demanded exactly some of training provided, however no one reported that training provided was exactly they had requested. Although, 84.2% of female and 64.8% of male employees reported satisfaction about training packages provided for them to close their skill and knowledge gaps.

**Figure 90 – Participation in training in the energy sector by gender (%)**

Source: TAT Elaboration

Mostly employees reported that time of training is the most important factor about their satisfaction (40.4%). They do not like training could be conducted out of working hours, especially on holidays. However, male employees indicated that training should have an impact on income (51.6%), include practical applications (45.2%).

**Figure 91 – Factors affecting satisfaction from training in the energy sector by gender (%)**

Source: TAT Elaboration

Majority of employees, especially male ones, reported expectation of promotion within the company and increase in their wages because they increased their qualifications. Female employees expect more promotion within the company. The second expectation after training expectation of wage increase. Only one-third mentioned about no further expectation because of a training provided.

**Figure 92 – Change in expectation after training in the energy sector by gender (%)**

Source: TAT Elaboration

Majority of employers (73.2%) reported equal opportunity for skill development in the energy sector. In parallel male employees (79.2%) claim the same. Although it is higher, less than two-thirds of female employees (60.9%) reported equal opportunity in skill development. There is a statistically significant difference between female and male responses (p<0.05).

**Figure 93 – Equal opportunity for skill development in the energy sector by gender (%)**

Source: TAT Elaboration

### Gender and disability perspective in the energy sector

Very close to half of the sector experts and decision makers (48.1%) believe that development and increase of use of new and digital technologies will facilitate women’s participation in the employment in the energy sector. However, one-tenth (11.1%) of still thinks negative in the same issue.

**Figure 94 – Effect of new and digital technologies on women ‘s participation in the employment and in the energy sector (%)**

Source: TAT Elaboration

Employees reported a 43.6% probability that a woman could be a manager in the energy sector. Female employees claimed that the likelihood of being a manager in the energy sector is 36.4%, but male counterparts claimed a 46.8% probability that a woman could be a manager.

According to sector experts and decision-makers, there are few or no role models in the sector (51.9%) and the male-dominated culture in the sector (48.1%) affect women becoming a manager. They also consider other factors such as working environment (23.1%) and long working hours (21.2%) in the energy sector (23.1%).

**Figure 95 – Reason for lower number of women managers in the energy sector (%)**

Source: TAT Elaboration

In order to increase the number of women managers in the energy sector, close to half of the sector experts and decision makers recommend introducing role models (48.4%). They also propose increase in nursery facilities (35.5%) and support female employees to increase their socialization and communication networks (33.9%), provide more training to increase women’s technical knowledge and skills (30.6%).

**Figure 96 – What can be done to increase number of women managers in the energy sector (%)**

Source: TAT Elaboration

As can be seen in the figure below, both sector experts (82.5%) and employers (68.0%) stated that new forms of employment and developments in the technology will support employability of People with Disabilities (PwDs) in the energy Sector.

**Figure 97 – New forms of employment and new technologies support increase in the participation of PwDs in the energy sector (%)**

Source: TAT Elaboration

Nearly two-thirds of decision makers and sector experts (66.1%) reported that assistive technologies will support PwDs to be in the labour market and the energy sector. They indicated that technological transformations (51.6%), and efforts by stakeholders to include PwDs in the labour market (35.5%).

Employers also mentioned about the new forms of employment and employment relations (52.8%) and changing portfolio of skill needs may facilitate participation of PwDs in the Labour Market (36.1%).

**Figure 98 – New forms of employment and new technologies support increase in the participation of PwDs in the energy sector (%)**

Source: TAT Elaboration

# Finance and Banking

### Number of interviewed people

The main element of the field study for Finance and Banking Sector was a total of 173 face-to-face interviews with sector experts, decision makers, employers, managers and employees in Finance and Banking Sector, conducted in Ankara, Bursa, Izmir, Adana and Istanbul, to gain an understanding of the current situation and the future trends in respect of jobs and skills requirements. For this purpose, three different questionnaires were prepared (Annex X), one for decision makers/sector experts, one for employers and one for employees with questions influenced by feedback from stakeholders during the stakeholder meetings and the Pre-Study Workshop. The field study was conducted during March 2022.

The questionnaires consist of subjects below:

1. General information about the respondents

2. Decent work concept, flexible and remote work

3. Digital technologies and adaptation

4. Bottleneck jobs, future skills and qualification needs

5. Workforce development and upskilling

6. Prominent professions, lost professions

7. Gender dimensions, opportunities for PwDs

Table 14 presents the number of surveys conducted in each province by respondent type.

**Table 14 - Number of surveys conducted by respondent in each of the provinces**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sector** | **Decision Makers/Sector experts** | **Employer** | **Employee** | **Total** |
| Adana | 8 | 11 | 12 | **31** |
| Ankara | 6 | 12 | 14 | **32** |
| Bursa | 5 | 10 | 17 | **32** |
| İstanbul | 12 | 12 | 19 | **43** |
| İzmir | 9 | 10 | 16 | **35** |
| **Total** | **40** | **55** | **78** | **173** |

Source: TAT Elaboration

### Awareness about decent work concept, flexible and remote work

Decent work is defined as “productive work for women and men in conditions of freedom, equity, security and human dignity”.[[10]](#footnote-10) In general, work is considered as decent when: it pays a fair income. it guarantees a secure form of employment and safe working conditions. A quarter of respondents stated that they heard the concept and knows what it covers. There is a statistically significant difference between sector experts, employers, and employees in terms of awareness about the concept (p<0.05). Exactly half of the employees claimed that they never heard the concept. Awareness of female employees (53.0%) about the concept is less than awareness of male employees (59.2%). However, the awareness about the exact definition ratio is higher if female respondent stated that she heard the concept.

**Table 15 - Awareness about decent work concept in Finance and Banking sector**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Sector Expert (n=40)** | **Employer (n=55)** | **Employee (n=78)** | **Total (n=173)** |
| Yes, I heard, I don't know the definition | **45.0** | **27.3** | **25.6** | **30.6** |
| Yes, I heard, I know the definition | 30.0 | 40.0 | 29.5 | 32.9 |
| No, I didn't hear | 25.0 | 32.7 | 44.9 | 36.4 |
| Total | 100 | 100 | 100 | 100 |

Source: TAT Elaboration

Working conditions associates new business models to the future of work. According to ILO flexible and remote work is expected to become more prevalent in the near future by the help of the new and digital technologies and emerging business tools.[[11]](#footnote-11) These new business models will also allow marginalised workers to join the work force, as well as workers with family responsibilities. However, without rules and regulations, such new business models may be abused by two sides of the labour markets.

Most of the respondents (76.9%) indicated that flexible and remote work arrangements are available in Finance and Banking sector mainly with unwritten rules. Even two-third of employer states that flexible and remote works arrangements with unwritten rules are available in the ICT sector.

**Table 16 - Flexible and remote work arrangements in Finance and Banking sector**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Sector Expert (n=40)** | **Employer (n=54)** | **Employee (n=78)** | **Total (n=172)** |
| Yes, but there are without written rules | **27.5** | **9.3** | **16.7** | **16.9** |
| Yes, it is implemented with written rules | 47.5 | 55.6 | 47.4 | 50.0 |
| No | 25.0 | 35.2 | 35.9 | 33.1 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |

Source: TAT Elaboration

Respondents in Finance and Banking sector generally agreed and are happy that flexible and remote working arrangements allow employees to fulfil family responsibilities and to participate in family and social activities. They reported that their institutions can track their employees’ flexible working hours or remote work outcomes and outputs. They also claim that flexible or remote work do not affect work performance negatively. Only one fifth of the respondents claims that flexible or remote work arrangements are cause of early leave from the job or employee turnover. They also state that flexible or remote work do not disrupt business processes in the sector. Most of the respondents do not agree with people who use flexible or remote work arrangements are generally less committed to work. They believe that this work modality does not affect focusing on the meetings thanks to web conferencing tools. However, only one-third of them indicates that work related expenses are covered if the employee work flexible or remotely. As an interesting finding a quarter of employees (25.8%) stated that they feel like they constantly work because of such work modality.

**Table 17 - Percentage of participants agree with the statements about flexible and remote work arrangements in ICT sector (%)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Statements** | **Sector Expert** | **Employer** | **Employee** |
| Institutions/organisations/workplaces can track their employees' flexible working hours or remote work. | 76.9% | 78.8% | 77.4% |
| Flexible or remote working arrangements help employees participate in family and social activities. | 65.0% | 59.6% | 48.4% |
| Flexible or remote working arrangements allow employees to fulfil their family responsibilities. | 65.0% | 71.2% | 56.5% |
| Employees can focus more on their work with flexible or remote working arrangements. | 52.5% | 34.6% | 54.7% |
| Other employees who do not work this way react negatively to people who work according to flexible or remote work arrangements. | 44.7% | 32.0% | 46.0% |
| Within the scope of flexible or remote working arrangements, employees' work-related expenses (food, electricity, internet, heating, etc.) outside the workplace are covered. | 29.7% | 32.6% | 0.0% |
| Flexible or remote working arrangements make employees less committed to their role at work. | 17.9% | 11.5% | 18.8% |
| Flexible or remote working arrangements make it difficult for employees to do their work. | 17.5% | 21.6% | 9.4% |
| In our industry, customers or the serviced audience cannot adapt to the implementation of flexible or remote working arrangements. | 15.0% | 21.6% | 17.5% |
| Some employees would not be able to work without flexible or remote work arrangements. | 12.5% | 3.9% | 3.2% |
| It negatively affects flexible or remote working performance. | 10.3% | 30.8% | 0.0% |
| From time to time, employees can miss meetings within the institution/organisation/workplace in a flexible or remote working arrangement. | 10.0% | 15.4% | 14.3% |
| Flexible or remote working negatively affects occupational health and safety. | 7.7% | 4.0% | 0.0% |
| Flexible or remote working arrangements can disrupt business processes | 5.0% | 8.0% | 23.8% |
| I feel like I'm constantly working because of flexible or remote work arrangements. | 0.0% | 0.0% | 25.8% |

Source: TAT Elaboration

Nearly two-thirds of the sector experts and decision makers (63.3%) reported that the new forms of employment and employment relations that have emerged with the use of digital technologies in the Finance and Banking sector is not sufficient.

**Figure 99 – Sufficiency of the new forms of employment and employment relations that have emerged with the use of digital technologies in the Finance and Banking sector (%)**

Source: TAT Elaboration

### Digital technologies and adaptation

Sector experts and decision makers claim that digital infrastructure in the sector behind the new technologies used in the developed countries (52.9%). However, close to half of the sector experts and decision makers also thinks differently. They say that the technology either same or ahead of the similar technologies used in developed countries (47.1%). Employers’ perception about digital infrastructure used in their institutions are relatively positive. They claim that their organisations’ digital infrastructure close to the newest technology used in developed countries (8.1 out of 10). If they want to adapt their technology to the newest technology, they assume that transforming their technology to the newest one is not difficult.

**Figure 100 – Comparison of digital infrastructure in Finance and Banking sector with similar technologies used in developed countries (%)**

Source: TAT Elaboration

According to decision makers and sector experts in the finance and banking sector the main barrier to new and digital technology adoption in the businesses is concern about cyber security (52.6%) and lack of technical structure (52.6%). These two are followed by the integration challenges (42.1%), high application costs (39.8%), Lack of technical knowledge of currently employed staff in the sector (36.8%) and difficulty accessing the qualified personnel.

**Figure 101 – Barriers to new and digital technology adaptation in the Finance and Banking sector (%)**

Source: TAT Elaboration

Employers stated that adapting available digital technology infrastructure to the newest technology is not cost-effective (35.8%). They also reported lack of trained human resources (26.4%) and difficulties in accessing newest technological/digital technologies (20.8%).

**Figure 102 – Difficulties for adaptation of existing digital technological infrastructure to the newest technology (%**

Source: TAT Elaboration

Majority of decision makers (94.4%) think that companies in the sector invest in the new technologies, however the investment is not sufficient for digital transformation (50.0%).

**Figure 103 – Investment to the new technologies in the Finance and Banking sector (%)**

Source: TAT Elaboration

Almost two-thirds of the sector experts (66.7%) and employers (63.6%) stated that while investment decision is taken, mostly cost-benefit analysis is conducted. More than half of them also reported technology obsolescence risk is higher especially in new technologies for finance and banking sector. The availability of staff to manage the digital technologies as well as technological change and uncertainties in economic conditions are also considered during decision making for investment.

**Figure 104 – Effects on investment decisions in Finance and Banking sector (%)**

Source: TAT Elaboration

The majority of employers in the finance and banking sector evaluated that their institution’s technological/digital infrastructure greatly impacts the quality of the services produced (91.0%).

Figure 105 below shows how new or emerging technologies affecting employment in finance and banking sector. Most of the sector experts and decision makers are agree that there is a need for education for available labour in the sector (64.1%). They also claim that new technologies or robots replace workers in the sector (43.6%). Due to renewing in technologies and business processes number of qualified staff is increasing in the sector (35.9%) but not in parallel with the speed of technological change (23.1%). Hence they confirmed an increase in vacancies and hard-to fill positions.

**Figure 105 – How new or emerging technologies affect the labour market/employment (%)**

Source: TAT Elaboration

According to nearly half of sector experts/decision makers in the finance and banking sector (51.3%), trainings are provided in order to overcome the difficulties and increase compliance with new and digital technologies in the sector. They also confirm that training needs are analysed well to improve curricula in training institutions. Specifically Digital Transformation Office of Presidency leads the transformation in public. Additionally, the Banking Regulation and Supervision Agency take role in digital transformation to support banks. Hence, some of them also refer digital strategies and action plans (41.0%). One-third of them mentioned about university-industry cooperation (33.3%) and provision of access to technology in the sector (33.3%).

**Figure 106 – Actions done to increase compliance with new and digital technologies in the Finance and Banking sector (%)**

Source: TAT Elaboration

### Prominent professions, lost professions in Finance and Banking sector

Most of the decision makers and sector experts in the finance and banking sector stated that digital technologies would replace employees (70.3%) and employment will be decreased due to new automation technologies. They gave examples such as algorithms and robots ruling the stock market.

**Figure 107 – Expected effect of new technologies in employment in the Finance and Banking Sector (%)**

Source: TAT Elaboration

Banking and financial transactions have traditionally been something done in the real world almost every day. People would go to their banks to withdraw money, transfer money from one place to another, to pay their bills, and settle their finances. People was talking to a helpful staff and interact with people for financial matters in a building. However, now these kinds of facilities are quickly becoming unnecessary. Online banking is getting more and more complex every day to support people to transfer money or pay for goods with just the push of a button or mostly screen touches.

Consequently, decision makers and sector experts think that there may not be a need for new personnel due to innovations in technology and developments in the finance and banking sector. They had already stated that robots will replace the human employees soon, so almost two-thirds of them (64.4%) think that there would not be need for new personnel.

**Figure 108 – Need for new personnel due to innovations in technology and developments in the Finance and Banking Sector (%)**

Source: TAT Elaboration

However, one-third of decision makers and sector experts reported a need for new personnel such as controller, software developer, interface designer, application developer, software engineer, information security specialist, artificial intelligence specialist, data analyst, risk analyst.

When employers struggle to fill vacancies, this is often due to a low wage (60.0%) and social opportunities and rights offered (46.7%). Then lack of the required knowledge and skills (20.0%) or experience among applicants (20.0%). Collectively, these are known as skill-shortage vacancies.

**Figure 109 – Reasons stated by employers/ managers for struggling with hard-to-fill positions in the Finance and Banking Sector (%)**

Source: TAT Elaboration

Sector experts also evaluated the reasons for hard-to-fill positions in the finance and banking sector. Most of them also stated that wages and social opportunities are insufficient in the sector (55.3%), hence they could not retain qualified personnel (50.0%) and brain drain higher in the sector especially in hard-to-fill positions (36.8%). They also claimed that there is a failure to set wages fairly by considering qualifications (47.4%) and failure to reward performance (44.7%).

**Figure 110 – Reasons stated by sector experts/ decision makers for struggling with hard-to-fill positions in the Finance and Banking Sector (%)**

Source: TAT Elaboration

Figure 111 shows the impacts reported by employers who had difficulty filling their vacancies because of skill shortages. Most of decision makers and sector experts reported increasing burden on other personnel to complete the business processes (56.4%). Skill shortages and gaps including with lack of personnel in hard-to-fill positions cause low quality (48.7%) and delays in delivering services (48.7%). At the end all causes to decrease in satisfaction of customers (41.0%).

**Figure 111 – Impact of hard-to-fill positions to the Finance and Banking Sector (%)**

Source: TAT Elaboration

Slightly more than half of the employers/managers (73.3%) reported that they provide more training to existing staff. The latter coping strategies are stated as renewing business processes (53.3%) and redefining existing jobs (40.0%) and increasing wages (33.3%). Some of them mentioned outsourcing of some tasks (26.7%).

**Figure 112 – Coping strategy to decrease impact of hard-to-fill positions in the Finance and Banking sector (%)**

Source: TAT Elaboration

According to decision makers and sector experts Artificial Intelligence (AI) and machine learning should be a core part of any forward-thinking digital business strategy in all sectors but especially in banking and finance sector. So that majority of decision makers, sector experts (82.1%), employers and managers (80.0%) stated that artificial intelligence (AI) would be the most prominent area in the banking and sector soon. They reported that the second important area would be the robotic process automation (RPA), and the third-one would be data science and data analytics. Decision makers mentioned about advanced human-machine interfaces (51.3%), ability to use VR (48.7%), cloud computing (48.7%), data science and data analytics for fraud detection (46.2%), internet of everything (IoT) (43.6%) and so on. However, employers and managers were more on data science and data analytics for fraud detection (63.6%), cloud computing (56.4%), blockchain/ digital ledger technologies (56.4%) and 5G (40.0%).

**Figure 113 – Digital technologies be more prominent in the Finance and Banking sector (%)**

Source: TAT Elaboration

Sector experts and decision makers stated that artificial intelligence mostly used in cyber security (69.2%) and information technology automation (53.8%). They also stated that AI can be used in customer service as virtual assistants (48.7%) and risk management (43.6%). According to sector experts/ decision makers the AI helps increasing performance and efficiency (33.3%), management of equipment and devices, predictive analytics (33.3%), and decision support (30.8%).

**Figure 114 – Areas which artificial intelligence applications used in the Finance and Banking sector (%)**

Source: TAT Elaboration

The most common skills that exactly two-thirds of sector experts and decision makers agreed on that digital marketing, analytical thinking and innovation, and use of artificial intelligence. They have also added that data science and data analytics for fraud detection and ability to serve through digital channels would be the skills needed in the future. Employers agreed with the decision makers on digital marketing skill, however, they differed on ability to serve through digital channels and digital business analysis skills.

**Figure 115 – Skills to be stand out in the Finance and Banking sector (%)**

Source: TAT Elaboration

### Training, workforce development and upskilling for new technologies and digital adaptation

Training for staff is a powerful tool in allowing employers to cope with skills shortages and skill gaps within their workplace, and to develop their workforce to compliance with requirements by the new and/or digital technologies and to increase productivity and expertise.

Majority of decision makers/ sector experts (89.2%) claimed that existing staff in the finance and banking sector needs training for adaptation to new and digital technologies.

**Figure 116 – Need for training of existing staff in the Finance and Banking sector (%)**

Source: TAT Elaboration

Employers/managers take action to cope with skill shortages of their employees. Majority of employers/managers indicated that they have either provided/funded or planned skill development training programmes for their employees (94.3%). As another action, they reported that they have reorganized business processes according to employees’ skills (51.4%). Close to half of them reported performance evaluations to understand lack of skills needed (42.9%). Some of them reported that they recruited staff more efficiently and received coaching/mentoring services for closing skill shortages and gaps.

**Figure 117 – Employers action for coping skill shortages of employees (%)**

Source: TAT Elaboration

Almost all of employees in the finance and banking sector reported that they develop their skill by participating in in-house training. They indicated that they followed the relevant portals, blogs, and forums on the web to improve their skills and knowledges (50.0%) Some employees reported that either they benefit from online or distance education programs (42.3%%) or get help from their colleagues (41.0%).

There is no statistically significant difference between female and male staff except getting help from their colleagues. Male employees reported this option more frequently than female employees. Male employees in the banking sector also mentioned that they receive training out of working hours by their own means and learn from kits or handbooks.

**Figure 118 – Employees skills and knowledge development ways (%)**

Source: TAT Elaboration

However, only 81.5% of employers reported training needs analysis to understand what exactly needed.

**Figure 119 – Conduct TNA to determine training needs (%)**

Source: TAT Elaboration

Majority of employers and managers reported provision of occupational health and safety training (74.0%), any job specific training (72.0%) and onboarding / orientation training (70.0%) packages to their available staff. These are followed by training for new products or services (52.0%), management training (46.0%) and distance training on some professional subjects (44.0%). Close to a quarter mentioned about hardware and software training.

**Figure 120 – Training provided in the Finance and Banking Sector (%)**

Source: TAT Elaboration

Most employers reported that their employees demanded training (79.2%)

**Figure 121 – Training demand for skill development in the Finance and Banking Sector (%)**

Source: TAT Elaboration

Most of employees in the finance and banking sector confirmed that they have participated in training. There is no statistically significant difference by gender in training participation (p>0.05). Close to half (41.7%) reported that they demanded exactly some of training provided, however only 1.4% reported that training provided was exactly they had requested. Although, 87.2% of female and 76.0% of male employees reported satisfaction about training packages provided for them to close their skill and knowledge gaps.

**Figure 122 – Participation in training in the Finance and Banking Sector by gender (%)**

Source: TAT Elaboration

Female employees reported that time of training is the most important factor about their satisfaction (36.1%). They do not like training could be conducted out of working hours, especially on holidays. However, male employees indicated that the duration should be proper, and it should impact the income at the end. Male employees also mentioned that practical exercises are important for effectiveness of training.

**Figure 123 – Factors affecting satisfaction from training in the Finance and Banking Sector by gender (%)**

Source: TAT Elaboration

Exactly half of employees in finance and banking sector reported no expectation apart from training helps closing their skill gaps and increase their knowledges related with their tasks at the workplace. However, one third mentioned about their expectation of promotion within their companies. Male employees expect more promotion and wage increase within the sector.

**Figure 124 – Change in expectation after training in the Finance and Banking Sector by gender (%)**

Source: TAT Elaboration

Majority of employers (71.5%) reported equal opportunity for skill development in the finance and banking sector. In parallel female employees (73.5%) claim the same. Although it is higher, exactly three quarters of male employees (66.7%) reported equal opportunity in skill development. There is a statistically significant difference between female and male responses (p<0.05).

**Figure 125 – Equal opportunity for skill development in the Finance and Banking Sector by gender**

**(%)**

Source: TAT Elaboration

### Gender and disability perspective in the Finance and Banking Sector

Close to half of the sector experts and decision makers (48.6%) believe that development and increase of use of new and digital technologies will facilitate women’s participation in the employment in the finance and banking sector. However, a quarter (25.7%) of still thinks negative in the same issue.

**Figure 126 – Effect of new and digital technologies on women ‘s participation in the employment and in the Finance and Banking Sector (%)**

Source: TAT Elaboration

Employees reported a 52.7% probability that a woman could be a manager in the finance and banking sector. Female employees claimed that the likelihood of being a manager in the finance and banking sector is 57.0%, but male counterparts claimed a 44.0% probability that a woman could be a manager.

According to sector experts and decision-makers the two important reasons are that a male-dominant culture in working life (61.5%) and long working hours (42.3%). Decision makers also mentioned about preference of women to give more importance to family rather than advancements in the business world and lack of role models in the sector.

**Figure 127 – Reason for lower number of women managers in the Finance and Banking sector (%)**

Source: TAT Elaboration

In order to increase the number of women managers in the finance and banking sector, more than half of the sector experts and decision makers proposed increasing nursery facilities (55.0%). Nearly half recommended provision of coaching and leadership training, psychological support for working-life balance and supporting postpartum part-time work opportunities.

**Figure 128 – What can be done to increase number of women managers in the Finance and Banking sector (%)**

Source: TAT Elaboration

As can be seen in the figure below, both sector experts and decision makers (61.8%) and employers and managers (79.5%) stated that new forms of employment and developments in the technology will support employability of People with Disabilities (PwDs) in the finance and banking sector.

**Figure 129 – New forms of employment and new technologies support increase in the participation of PwDs in the Finance and Banking sector (%)**

Source: TAT Elaboration

Majority of decision makers and sector experts (63.2%) and employers (73.1%) reported that assistive technologies will support PwDs to be in the labour market and the finance and banking sector. However, employers also mentioned that technological transformation will also support participation of PwDs in the employment.

**Figure 130 – New forms of employment and new technologies support increase in the participation of PwDs in the Finance and Banking sector (%)**

Source: TAT Elaboration

# Information and Communication Technologies

### Number of interviewed people

The main element of the field study for Information and Communication Sector was a total of 172 face-to-face interviews with sector experts, decision makers, employers, managers and employees in Information and Communication Sector, conducted in Ankara, Bursa, Izmir, Adana and Istanbul, to gain an understanding of the current situation and the future trends in respect of jobs and skills requirements. For this purpose, three different questionnaires were prepared (Annex X), one for decision makers/sector experts, one for employers and one for employees with questions influenced by feedback from stakeholders during the stakeholder meetings and the Pre-Study Workshop. The field study was conducted during March 2022.

The questionnaires consist of subjects below:

1. General information about the respondents

2. Decent work concept, flexible and remote work

3. Digital technologies and adaptation

4. Bottleneck jobs, future skills and qualification needs

5. Workforce development and upskilling

6. Prominent professions, lost professions

7. Gender dimensions, opportunities for PwDs

Table 18 presents the number of surveys conducted in each province by respondent type.

**Table 18 - Number of surveys conducted by respondent in each of the provinces**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sector** | **Decision Makers/Sector experts** | **Employer** | **Employee** | **Total** |
| Adana | 8 | 11 | 11 | **30** |
| Ankara | 11 | 12 | 21 | **44** |
| Bursa | 13 | 9 | 13 | **35** |
| İstanbul | 10 | 9 | 12 | **31** |
| İzmir | 9 | 8 | 15 | **32** |
| **Total** | **51** | **49** | **72** | **172** |

Source: TAT Elaboration

### Awareness about decent work concept, flexible and remote work

Decent work is defined as “productive work for women and men in conditions of freedom, equity, security and human dignity”.[[12]](#footnote-12) In general, work is considered as decent when: it pays a fair income. it guarantees a secure form of employment and safe working conditions. A quarter of respondents stated that they heard the concept and knows what it covers. There is a statistically significant difference between sector experts, employers, and employees in terms of awareness about the concept (p<0.05). Exactly half of the employees claimed that they never heard the concept. Awareness of female employees (44.0%) about the concept is less than awareness of male employees (53.8%). However, the awareness about the exact definition ratio is higher if female respondent stated that she heard the concept.

**Table 19 - Awareness about decent work concept in ICT sector**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Sector Expert (n=51)** | **Employer (n=49)** | **Employee (n=72)** | **Total (n=172)** |
| Yes, I heard, I don't know the definition | **31.4** | **26.5** | **30.6** | **29.7** |
| Yes, I heard, I know the definition | 27.5 | 30.6 | 19.4 | 25.0 |
| No, I didn't hear | 41.2 | 42.9 | 50.0 | 45.3 |
| Total | 100 | 100 | 100 | 100 |

Source: TAT Elaboration

Working conditions associates new business models to the future of work. According to ILO flexible and remote work is expected to become more prevalent in the near future by the help of the new and digital technologies and emerging business tools.[[13]](#footnote-13) These new business models will also allow marginalised workers to join the work force, as well as workers with family responsibilities. However, without rules and regulations, such new business models may be abused by two sides of the labour markets.

Most of the respondents (92.9%) indicated that flexible and remote work arrangements are available in ICT sector mainly with unwritten rules. Even two-third of employers indicate that flexible and remote works arrangements with unwritten rules are available in the ICT sector.

**Table 20 - Flexible and remote work arrangements in ICT sector**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Sector Expert (n=51)** | **Employer (n=49)** | **Employee (n=70)** | **Total (n=170)** |
| Yes, but there are no written rules | **60.8** | **67.3** | **50.0** | **58.2** |
| Yes, it is implemented with written rules | 33.3 | 18.4 | 22.9 | 24.7 |
| No | 5.9 | 14.3 | 27.1 | 17.1 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |

Source: TAT Elaboration

Respondents in ICT sector are generally agreed and happy that flexible and remote working arrangements allow employees to fulfil family responsibilities and to participate in family and social activities. They also claim that flexible or remote work do not affect work performance negatively. Only one fifth of the respondents claims that flexible or remote work arrangements are cause of early leave from the job or employee turnover. They also state that flexible or remote work do not disrupt business processes in the sector. Most of the respondents do not agree with people who use flexible or remote work arrangements are generally less committed to work. They believe that this work modality does not affect focusing on the meetings thanks to web conferencing tools. However, very few of them indicates that work related expenses are covered if the employee work flexible or remotely. As an interesting finding a quarter of employees stated that they feel like they constantly work because of such work modality.

**Table 21 - Percentage of participants agree with the statements about Flexible and remote work arrangements in ICT sector (%)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Statements** | **Sector Expert** | **Employer** | **Employee** |
| **Flexible or remote working arrangements allow employees to fulfil their family responsibilities.** | 63.3 | 63.6 | 62.9 |
| **Institutions/organisations/workplaces can monitor their employees' flexible working hours or remote work.** | 63.0 | 69.8 | 69.6 |
| **Flexible or remote working arrangements help employees participate in family and social activities.** | 59.0 | 56.1 | 61.4 |
| **Other employees who do not work in this way react negatively to people who work according to flexible or remote work arrangements.** | 43.9 | 34.0 | 44.0 |
| **Employees can focus more on their work with flexible or remote working arrangements.** | 39.1 | 32.0 | 49.8 |
| **Within the scope of flexible or remote working arrangements, employees' work-related expenses (food, electricity, internet, heating, etc.) outside the workplace are covered.** | 26.9 | 25.3 | 0.0 |
| **In ICT sector, customers or the serviced audience cannot adapt to the implementation of flexible or remote working arrangements.** | 24.8 | 24.9 | 28.6 |
| **People who use flexible or remote work arrangements are generally less committed to their role at work.** | 24.7 | 21.8 | 16.7 |
| **Flexible or remote working negatively affect performance** | 22.6 | 10.9 | 0.0 |
| **Flexible or remote working arrangements cause employees to leave the workplace.** | 20.1 | 29.0 | 13.6 |
| **Flexible or remote workers often miss or are unable to focus on in-house meetings.** | 19.8 | 18.0 | 13.4 |
| **People who use flexible or remote work arrangements often disrupt their business processes.** | 17.2 | 21.0 | 24.4 |
| **Flexible or remote working negatively affects occupational health and safety.** | 15.7 | 28.4 | 0.0 |
| **Feel like I'm constantly working because of flexible or remote work arrangements.** | 0.0 | 0.0 | 24.0 |

Source: TAT Elaboration

Majority of the sector experts and decision makers reported that the new forms of employment and employment relations that have emerged with the use of digital technologies in the ICT sector is not sufficient.

**Figure 131 – Sufficiency of the new forms of employment and employment relations that have emerged with the use of digital technologies in the ICT sector (%)**

Source: TAT Elaboration

### Digital technologies and adaptation

Sector experts and decision makers claim that digital infrastructure in the sector behind the new technologies used in the developed countries (54.1%). However, close to half of the sector experts and decision makers also thinks differently. They say that the technology either same or ahead of the similar technologies used in developed countries (45.9%). Employers’ perception about digital infrastructure used in their institutions are relatively positive. They claim that their organisations’ digital infrastructure close to the newest technology used in developed countries (7.8 out of 10). If they want to adapt their technology to the newest technology, they assume that transforming their technology to the newest one is not difficult.

**Figure 132 – Comparison of digital infrastructure in ICT sector with similar technologies used in developed countries (%)**

Source: TAT Elaboration

As a support of the above-mentioned finding, decision makers stated that lack of technical infrastructure (56.5%) and difficulty accessing qualified personnel (54.3%) are two major barriers for technology adaptation. These two are followed by the cyber security concerns (45.7%) and high application costs (45.7%).

**Figure 133 – Barriers to new and digital technology adaptation in the ICT sector (%)**

Source: TAT Elaboration

Employers stated that the first difficulty in adapting existing digital technology infrastructure to the newest technology is the lack of trained human resources (61.2%). Close to half of employers claim that modernization is not cost-effective (44.9%), and they have budget constraints (30.6%). One-tenth stated that access to the new technology is not that easy in the ICT sector (10.2%), and their customers do not demand new technology use in products (10.2%).

**Figure 134 – Difficulties for adaptation of existing digital technological infrastructure to the newest technology (%)**

Source: TAT Elaboration

Decision makers (78.5%) think that most of the companies in the sector invest in the new technologies, however the investment is not sufficient for digital transformation (51.0%).

**Figure 135 – Investment to the new technologies in the ICT sector (%)**

Source: TAT Elaboration

Almost half of the sector experts (49.0%) and employers (51.0%) stated that technology obsolescence risk is higher especially in new technologies for ICT sector. Hence, they think that transformation is not cost-beneficial (47.1%). Additionally, a third of the sector experts/decision makers stated that there is a lack of experience, relevance and industry related information also affects their decision to invest in the new technology.

**Figure 136 – Effects on investment decisions in ICT sector (%)**

Source: TAT Elaboration

The majority of employers in the ICT sector evaluated that their institution’s technological/digital infrastructure greatly impacts the quality of the services produced (89.8%).

Figure 137 below shows how new or emerging technologies affecting employment in ICT sector. Most of the sector experts and decision makers are agree that there is a need for education for available labour in the sector (58.8%). They also confirm that number of bottleneck professions (43.1%) and open jobs (37.3%) is increasing parallel. On the other hand, they claim that both number of qualified staff (37.3%) and their qualifications (21.6%) of existing staff also increased since employees want themselves to be adapted to the sector needs. Additionally, some of them claimed that new and emerging technologies affects participation of women (31.3%) and people with disabilities (9.8%) to the employment in the sector. Surprisingly more than a quarter states that new technologies or robots will replace workers (27.5%).

**Figure 137 – How new or emerging technologies affect the labour market/employment (%)**

Source: TAT Elaboration

According to nearly two thirds of sector experts/decision makers (62.0%), trainings are provided in order to overcome the difficulties and increase compliance with new and digital technologies in the ICT sector. Additionally training needs are analysed to improve curricula in training institutions. Specifically Digital Transformation Office of Presidency leads the transformation in public. Hence, some of them also refer that digital compliance centres are established, and existing ones are strengthened (30.0%). Some of them mentioned about university-industry cooperation (30.0%) and digital strategies and action plans development (28.0%).

**Figure 138 – Actions done to increase compliance with new and digital technologies in the ICT sector (%)**

Source: TAT Elaboration

### Prominent professions, lost professions in ICT sector

Decision makers/sector experts stated that digital technologies would replace employees (58.8%) and employment will be decreased due to new automation technologies.

**Figure 139 – Expected effect of new technologies in employment in the ICT Sector (%)**

Source: TAT Elaboration

Some decision makers who were not agreed with statements given above stated that the ICT sector is a sector that is thought to be one of the most popular sectors of the future. It has been stated that although there will be no loss as a profession in this sector, the lagging or unqualified personnel may be eliminated.

The ICT sector stands out as one of the sectors most prone to working remotely. Some of decision makers stated that when remote work increases, supportive professions such as services used for transportation to the workplace, food and cleaning workers may disappear. During face-to-face interviews it has been stated that software other than artificial intelligence in the industry may disappear in the future.

Although they had stated that robots will replace the human employees soon, they also conflicted with themselves in terms of a need for new personnel in your institution due to innovations in technology and developments in the ICT sector. More than half (57.1%) of employers reported that there is a need for new personnel at their workplaces due to innovations in technology and developments in the sector.

**Figure 140 – Need for new personnel due to innovations in technology and developments in the ICT Sector (%)**

Source: TAT Elaboration

According to the employers and managers in the ICT sector, due to technological innovation and developments and innovations in the ICT sector, in their institutions or the sector, computer engineers, software engineers, game designers, business analysts and data scientists are specifically needed. In addition, they stated that creative industries and design-oriented business lines would come to the fore in the sector.

Employers/managers stated that computer engineers, software engineers, game designers, business analysts and data scientists could be count for hard-to-fill positions in the ICT sector.

When employers struggle to fill vacancies, this is often due to a lack of the required skills, qualifications, or experience among applicants. Collectively, these are known as skill-shortage vacancies. Vacancies in establishments were proving hard-to-fill due to difficulties in finding applicants with appropriate experience (75.0%) and knowledge and skills (60.7%). These reasons were followed by lower wages (32.1%) or lack of social opportunities and rights (17.9%).

**Figure 141 – Reasons stated by employers/ managers for struggling with hard-to-fill positions in the ICT Sector (%)**

Source: TAT Elaboration

Sector experts also evaluated the reasons for hard-to-fill positions in the ICT sector. Most of them stated that wages and social opportunities are insufficient in the sector (60.0%), hence they could not retain qualified personnel (56.0%) and brain drain higher in the sector especially in hard-to-fill positions (40.0%). They also claimed that there is a failure to set wages fairly by considering qualifications (46.0%) and failure to reward performance (38.0%).

**Figure 142 – Reasons stated by sector experts/ decision makers for struggling with hard-to-fill positions in the ICT Sector (%)**

Source: TAT Elaboration

Figure 143 shows the impacts reported by employers who had difficulty filling their vacancies because of skill shortages. Most of decision makers stated that there are delays in new products and service development (60.8%). The second commonly the impact is felt on others in the workforce through increased workloads (49.0%). Employers also reported delays in delivering services or production (49.0%).

Other medium-term impacts, are especially on the quality and standards of the final product, include having difficulties meeting customer services or production standards (43.1%) and decreased satisfaction of customers or service users (41.2%) and inability to provide service or production at the expected quality (39.2%).

**Figure 143 – Impact of hard-to-fill positions to the ICT Sector (%)**

Source: TAT Elaboration

Slightly more than half of the employers/managers (53.6%) reported that they provide more training to existing staff. The latter coping strategies are stated as developing new recruitment strategies (46.4%) and increasing wages (39.3%) to attract the positions for labour market. A third of employers indicated that they outsource such tasks (32.1%) or renewed business processes (32.1%).

**Figure 144 – Coping strategy to decrease impact of hard-to-fill positions in the ICT sector (%)**

Source: TAT Elaboration

Both sector experts (92.2%) and employers (79.6%) stated that artificial intelligence would be the most prominent area in the ICT sector soon. They reported that the second important area would be the robotic process, and the third-one would be data science and data analytics. Employers stated that cloud computing would also be one of the prominent areas in the near future (51.0%).

**Figure 145 – Digital technologies be more prominent in the ICT sector (%)**

Source: TAT Elaboration

Sector experts and decision makers stated that artificial intelligence mostly used in information technology automation (60.8%). They also stated that AI can be used in customer service as virtual assistants and in cyber security (45.1%). According to sector experts/ decision makers the AI helps increasing and efficiency, management of equipment and devices (39.2%), decision support (33.3%) and quality control (31.4%).

**Figure 146 – Areas which artificial intelligence applications used in the ICT sector (%)**

Source: TAT Elaboration

According to majority of sector experts/decision makers the most common skill that employers felt to be stand out in the ICT sector would be the “reasoning and innovation” (70.6%) and artificial intelligence usage skills (68.6%). More than half of the sector experts/decision makers) mentioned digital project management (54.9%), data science and data analytics (52.9%), and creativity and originality (51.0%).

Employers first option for technical skills to be stand out in the near future is ability to use of artificial intelligence (53.1%). Surprisingly, employers mentioned about practical and personal skills such as communication (49.0%), reasoning, analytical thinking and innovation (40.8%), time management (38.8%). Employers stated about some technical skills such as digital marketing (36.7%) and technology design and programming (34.7%).

**Figure 147 – Skills to be stand out in the ICT sector (%)**

Source: TAT Elaboration

### Training, workforce development and upskilling for new technologies and digital adaptation

Training for staff is a powerful tool in allowing employers to cope with skills shortages and skill gaps within their workplace, and to develop their workforce to compliance with requirements by the new and/or digital technologies and to increase productivity and expertise.

Majority of decision makers/ sector experts (80.0%) claimed that existing staff in the ICT sector needs training for adaptation to new and digital technologies.

**Figure 148 – Need for training of existing staff in the ICT sector (%)**

Source: TAT Elaboration

Employers/managers take action to cope with skill shortages of their employees. Majority of employers/managers indicated that they have either provided/funded or planned skill development training programmes for their employees. As another action, they reported that they have reorganized business processes according to employees’ skills (56.5%). Close to half of them reported performance evaluations to understand lack of skills needed. Some 4.3% said that they recruited foreign workers who have special skills.

**Figure 149 – Employers action for coping skill shortages of employees (%)**

Source: TAT Elaboration

Almost 77.8% of employees in the ICT sector reported that they develop their skill by following the relevant portals, blogs, and forums on the web. Two thirds of employees reported that either they benefit from online or distance education programs (65.3%) or receive training outside of working hours (62.5%). Half of them indicated that they participate in the relevant in-house training (51.4%). One third also participate in training outside workplace but funded by their company (29.2%). Cooperation between friends and colleagues was observed at the high level in the sector, half of employees reported support from friends to increase their skills and knowledges (50.0%). Although the first three development ways are common for both male and female employees. There are statistically significant differences between female and male employees in the first three knowledge development ways. Male employees stated more than female employees than they follow relevant portals, blogs and forums and receive training outside of working hours with their own means. However, female employees reported that they benefit from online or distance education programmes more frequently.

**Figure 150 – Employees skills and knowledge development ways (%)**

Source: TAT Elaboration

However, only 51.0% of employers reported training needs analysis to understand what exactly needed.

**Figure 151 – Conduct TNA to determine training needs (%)**

Source: TAT Elaboration

Employers mainly reported skill and knowledge training on software (63.4%) or any job specific training (61.0%) provided to their employees. Half of them declared onboarding / orientation training given to employees (48.8%). These are followed by hardware training (36.6%), training for new products or services (31.7%), and training on new technologies (29.3%). Employers also mentioned about management, and occupational health and safety training packages (31.7%) provided. Majority of employers stated that they evaluated training provided for skill development of their employees (71.4%).

**Figure 152 – Training provided in the ICT Sector (%)**

Source: TAT Elaboration

More than two-thirds of employers reported that their employees demanded training (69.4%)

**Figure 153 – Training demand for skill development in the ICT Sector (%)**

Source: TAT Elaboration

Slightly more than half of employees in the ICT sector confirmed that they have participated in training. There is no statistically significant difference by gender in training participation (p>0.05). Close to half reported that they demanded exactly some of training provided, however only 3% reported that training provided was exactly they had requested. Although, 85% of female and 77% of male employees reported satisfaction about training packages provided for them to close their skill and knowledge gaps.

**Figure 154 – Participation in training in the ICT Sector by gender (%)**

Source: TAT Elaboration

Female employees reported that time of training is the most important factor about their satisfaction (50.0%). They do not like training could be conducted out of working hours, especially on holidays. However, male employees indicated that training should include practical applications (45.8%), should contribute to the income (37.5%), and length should be proper (33.3%). Male employees also mentioned about content specific bottlenecks and quality, competence, and performance of trainers. Employees also mentioned they prefer face to face training sessions.

**Figure 155 – Factors affecting satisfaction from training in the ICT Sector by gender (%)**

Source: TAT Elaboration

Majority of employees, especially male ones, reported expectation of promotion within the company. Female employees expect more promotion within the company. The second expectation after training expectation of wage increase. Close to half of male employees reported no change in expectations. Transition to another company or sector is an option for very few employees.

**Figure 156 – Change in expectation after training in the ICT Sector by gender (%)**

Source: TAT Elaboration

Majority of employers (89.8%) reported equal opportunity for skill development in the ICT sector. In parallel male employees (92.0%) claim the same. Although it is higher, less than three quarters of female employees (72.3%) reported equal opportunity in skill development. There is a statistically significant difference between female and male responses (p<0.05). Majority of employers.

**Figure 157 – Equal opportunity for skill development in the ICT Sector by gender (%)**

Source: TAT Elaboration

### Gender and disability perspective in the ICT Sector

Exactly half of the sector experts and decision makers believe that development and increase of use of new and digital technologies will facilitate women’s participation in the employment in the ICT sector. However, one-fifth (20.9%) of still thinks negative in the same issue.

**Figure 158 – Effect of new and digital technologies on women ‘s participation in the employment and in the ICT Sector (%)**

Source: TAT Elaboration

Employees reported a 43.0% probability that a woman could be a manager in the ICT sector. Female employees claimed that the likelihood of being a manager in the ICT sector is 52.0%, but male counterparts claimed a 38% probability that a woman could be a manager.

According to sector experts and decision-makers, there are few or no role models in the sector (43.8%), so women have a low interest in the ICT sector (35.4%). The long working hours and the male-dominated culture in the sector also affect women becoming a manager.

**Figure 159 – Reason for lower number of women managers in the ICT sector (%)**

Source: TAT Elaboration

In order to increase the number of women managers in the ICT sector, more than half of the sector experts and decision makers recommend introducing role models (51.0%). They also propose support postpartum part-time work opportunities and increase nursery facilities. A third of them also suggest provision of coaching and leadership training package and increasing network may help women to become manager.

**Figure 160 – What can be done to increase number of women managers in the ICT sector (%)**

Source: TAT Elaboration

As can be seen in the figure below, both sector experts (83.3%) and employers (73.2%) stated that new forms of employment and developments in the technology will support employability of People with Disabilities (PwDs) in the ICT Sector.

**Figure 161 – New forms of employment and new technologies support increase in the participation of PwDs in the ICT sector (%)**

Source: TAT Elaboration

Majority of decision makers and sector experts (76.5%) reported that assistive technologies will support PwDs to be in the labour market and the ICT sector. They indicated that artificial intelligence applications will also support PwDs to be in the market. Decision makers suggest that facilitation of PwDs participation in education will also support them to be in the market.

**Figure 162 – New forms of employment and new technologies support increase in the participation of PwDs in the ICT sector (%)**

Source: TAT Elaboration

# Overall summary with sectoral comparisons

This chapter gives an overall overview and sectoral comparisons by the decent future of the work, new forms of employment, employment relations through the remote and flexible work concepts. Digital technologies and compliance, prominent, hard-to-fill and lost professions and positions, training, workforce development and upskilling for new technologies and digital adaptation and gender and people with disabilities perspective of the sectors are discussed overall and compared by specific sectors.

# The decent future of work

Decent work is defined as “productive work for women and men in conditions of freedom, equity, security and human dignity”.[[14]](#footnote-14) In general, work is considered “decent” when: it pays a fair income and guarantees a secure form of employment and safe working conditions. However, within this report, the decent work definition has been discussed along with the new forms of employment and employment relations. Since the sectoral study aimed to understand sectoral needs for future jobs and skills and make recommendations, during the fieldwork, questions were asked to understand the impact of technological transformations and digital technologies on the new forms of employment and employment relations.

“The (Decent) Future of Work” is an interdisciplinary topic that covers current and expected trends in the labour market of new and digital technologies in different sectors, including job automation and increasing skill and qualification requirements. New employment forms and relations emerging in this context require legal, business-oriented, and educational actions at all levels.

The awareness of the "decent work" concept was measured low amongst sectoral experts, employers, and employees in all five pre-selected sectors. According to the overall results of the survey, it was determined that approximately two-thirds of the sector experts/decision-makers (66.7%) and employers/managers (67.9%) heard the concept of "decent work". The percentage of managers who answered, "I heard, and I know the definition" (37.2) is slightly higher than industry experts (35.1%). Nearly half of the employees claimed they had never heard of the concept. About half of the employees (49.5%) have heard of this concept, but less than half (22.9%) know the definition. Generally, in most sectors, awareness of female employees about the decent work concept was measured as more significant than awareness of male employees regarding knowledge and understanding of the definition.

When the concept of "decent work" is analysed by sectors, it is seen that the participants who stated that they have not heard of this concept are primarily in the ICT (44.8%) and health (43.3%) sectors. Participants who say that they know the concept of "decent work" together with its definition are mostly in energy (35.1%), finance and banking (32.6%) and education (30.8%) sectors.

Working conditions associate new business models with the future of work. According to ILO, flexible and remote work is expected to become more prevalent soon with the help of the latest digital technologies and emerging business tools.[[15]](#footnote-15) These new business models will also allow marginalised workers to join the workforce, as well as workers with family responsibilities. However, without rules and regulations, such new business models may be abused by two sides of the labour market.

When flexible or remote working arrangements are analysed by sectors, it is seen that these regulations are mostly applied in the ICT sector without written rules. In the ICT sector, 60.8% of industry experts, 51% of managers and 50% of employees stated that flexible or remote working arrangements are implemented in their institutions or organisations, but there are no written rules.

The sectors in which flexible or remote working arrangements are implemented with written rules at the highest rate were the finance and banking, and education sectors. Almost half (47%) of sector experts and employees in the finance and banking sector say that flexible or remote working arrangements are implemented in their institutions or organisations with written rules. The managers who stated that these regulations are implemented with written rules in their institutions or organisations are in the education sector with the highest rate (37.8%).

**Most decision-makers and sector experts (86.6%) indicate that regulations related to the new forms of employment and employment relations created by means the new and digital technologies in working life are insufficient.**

The health sector participants expressed the highest rate that flexible or remote working arrangements were not implemented at all. While approximately 9 out of 10 employees in the health sector stated that they do not have flexible or remote working arrangements in their institutions or organisations, this rate was calculated as 75.6% for health sector experts and 60.5% for managers.

Respondents in the education sector are generally agreed and happy that flexible and remote working arrangements allow employees to fulfil family responsibilities and participate in family and social activities. All three groups (decision-makers, employers, and employees) of respondents think that highly flexible or remote working arrangements allow employees to fulfil their family responsibilities. According to two-thirds (61.4%) of the employees, flexible or remote working arrangements help employees participate in family and social activities. Sector experts (59%) and employers (56.1%) agreed with this proposition less.

Remote or flexible work is often preferred by women for work, as women believe that by working remote, they have more freedom and, therefore, more possibility to reconcile their professional life with their family life, and to use remote work as an instrument of conciliation, work, and family life.

Almost two-thirds of the respondents from each group think that institutions/organisations/workplaces can monitor their employees' flexible working hours or remote work. However, most sector experts (60%), employers and managers (70%) claim that employees could not focus more on their tasks with flexible or remote working arrangements. Nearly half of the employees claim to focus more on their job while working with flexible or remote employment arrangements. Nevertheless, according to 9 out of 10 managers and 8 out of 10 industry experts, flexible or remote working arrangements do not negatively affect performance.

Sector experts were also asked for their opinions on whether flexible or remote working arrangements in institutions/organisations affect sector workers' rights. When analysed by sectors, the sector experts who say that flexible or remote working arrangements in institutions/organisations will affect the rights of sector employees "positively" are in the health (48.8%), ICT (48.1%) and energy (41.9%) sectors, respectively. Especially the health and energy sectors are where flexible, and remote working practices are the least. It is seen that sector experts in these sectors have a favourable view of flexible and remote working arrangements, although they are not applied much.

Only a quarter of sector experts and employers indicates that work-related expenses are covered if the employee works flexible or remotely. A quarter of employees stated that they feel like they constantly work because of such work modality.

# Digital technologies and compliance

Digital technologies are increasingly being recognised as critical innovations to strengthen health, education, finance and banking services, and energy service delivery systems. Sector experts and decision-makers believe digital transformation is a crucial factor. Digital Transformation and emerging technologies in the form of artificial intelligence, deep learning, virtual reality, augmented reality, robotics, autonomous vehicles, fintech, facial recognition technology, big data analytics and, the Internet of Things (IoT) create immense and exciting opportunities but also present challenging risks. Especially, Artificial Intelligence (AI), cloud computing, 5G, and the Internet of Things (IoT) are some technologies businesses invest in to transform digitally.[[16]](#footnote-16)

According to sector experts and decision-makers, when the technologies used in the industry are compared with the new and digital technologies used in developed countries, the highest rate (36.9%) is the answer "The technologies used in the industry are at the same level as similar technologies in developed countries". Half of the respondents stated that the digital technologies used in sectors are behind similar technologies in developed countries.

According to sector experts, these five sectors can be ranked as the ICT, health, finance and banking, energy, and education, according to the use of digital technologies. In parallel to ranking, the sectors with the most difficulty adapting to digital and new technologies are the education, energy, and health sectors. According to the employers and managers, the most critical challenges in accessing the institution's technological/digital infrastructure to the latest technical/digital infrastructure in the industry are the cost-effectiveness factor (43%), lack of trained human resources (39.9%) and lack of budget (32.7%).

According to employers and managers, the effect of the technological/digital infrastructure of the institution on the quality of the services produced is relatively high (8.1 out of 10). In the ICT, finance and banking, and health sectors, it is seen that the technological/digital infrastructure of the institutions has a higher impact on the quality of the services produced.

According to the employers and managers, institutions should invest in digital transformation within the framework of their current situation and sector demands in the next three years. While the highest need to invest in digital transformation is expressed in the finance and banking sector, with a score of 9 out of 10, this sector is followed by the ICT and education sectors.

Only a quarter (25.4%) of sector experts state that institutions and organisations can make enough investments in new or digital technologies. Nearly half of them indicate (46%) that they invest, but this is insufficient with sectoral requirements. According to 21% of industry experts, institutions/organisations in all sectors cannot invest in new and digital technologies.

According to industry experts and employers, the factors that affect the investment decisions of institutions in digital technologies or transformation are expressed as the cost-benefit factor of the conversion, the obsolescence rate of the technology, and the general economy's uncertainties. According to the employers and managers, the availability of qualified personnel in the sector, the quality of academic education, the informatics skills of qualified personnel and their experience in the sector are also seen as influential in the decision to invest in digital technologies or transformation. According to industry experts, the most critical obstacles to adapting new and digital technology in the industry are the lack of technical infrastructure, high implementation costs, lack of technical knowledge of the existing personnel and difficulties in integration into the system.

Approximately 73.6% of the managers said there is an IT staff/digital works technician in their institution. About 80% of those working in their institutions' IT personnel/digital departments or, if these departments do not exist, as digital works technicians are male. The sectors with the highest rate of female IT personnel are the education, finance and banking sectors, respectively.

# Prominent professions, hard-to-fill positions, and lost professions in sectors

The impact of digitization on employment can have different dimensions. From an employment-level perspective, automation-related job loss is widely discussed when digital technologies or robots replace human input. At the same time, the emergence of new occupational profiles suitable for the use of new technologies and the increase in demand for technology-based products and services due to low prices or new markets, customer groups or demand areas trigger employment creation. There will be a loss of jobs of those currently performed by humans that can also be done through automation. However, there is no consensus on how many jobs will be lost.

According to sector experts and employers, artificial intelligence, robotic process automation, and data science and analytics come first among digital technologies that will come to the fore in their sectors in the future. They indicated that these technologies are followed by virtual, augmented reality, cloud computing and advanced human-machine interfaces. According to the employers, cloud computing, programming, web and application development, advanced human-machine interfaces and wearable technologies follow the top three rankings.

**Education sector experts and decision-makers stated** that software specialists and technical personnel are most needed within the scope of information technology personnel in their institutions or the sector due to technological innovations and developments. Managers stated that there are difficulties obtaining information technology personnel, software personnel and technical personnel positions in the education sector.

**According to the health sector managers**, there is a need to employ technical personnel, data science personnel and health personnel in the field of informatics and health.

**In the finance and banking sector**, it has been stated that most personnel are needed in the field of informatics. It has been stated that most software specialists, interface designers, mobile software developers and technical support personnel are required. In addition, it was stated that there is a need for personnel with data analysis expertise, artificial data expertise, marketing, and information security. This ranking is followed by personnel working in the technical field, personnel working in the operational field, branch employees and positions requiring a foreign language.

**The employers and managers in the IT sector** stated that computer engineers, software engineers, game designers, business analysts and data scientists are needed due to technical developments and innovations in the sector or their institutions. They stated that the most difficult profession to obtain is software engineers. In addition, it is thought that creative industries and design-oriented business lines will come to the fore in the sector.

According to sector experts and decision-makers, the most critical difficulties in employing qualified personnel are listed as the difficulty of retaining qualified personnel (52%), insufficient wages and social opportunities (44.5%), and inability to pay for performance (41%).

The sector that retains qualified personnel the hardest is the ICT sector. This sector is followed by the energy and education sectors. The problem of insufficient wages and social opportunities is one of the most frequently mentioned issues in the ICT, finance and banking and education sectors. The problem of not being rewarded for performance has emerged mainly in the health, education, finance, and banking sectors. The issue of brain drains in the professions that are needed by the sectors has been most intense in the education, ICT, and health sectors. The inability to discover talents due to weaknesses in recruitment systems, informatics, failure to persuade talented personnel, finance and banking, and the unsuitability of applicants' qualifications came to the fore in the energy sectors.

The most common coping strategy with the hard-to-fill positions is a providing training to existing personnel and renewal of business processes or work definitions. Training existing personnel as a coping strategy is the highest in the finance, banking, health, and ICT sectors. Besides, they increase the wages or provide more social opportunities to retain the existing staff. In the health sector, which is the only exception, it is stated that less qualified people are employed as technical personnel, and training packages are provided as coping strategies.

The development of new recruitment strategies in finance and banking, the redefinition of existing business processes or tasks in the education sector, and the active use of internships are used in the ICT sector as coping strategies. The renewal of business processes is another coping strategy and is mostly seen in the energy sector. This strategy is also used in the finance, banking, education, and ICT sectors.

The skills that will come to the fore in the sector in the future were asked separately from sector experts, managers, and employees. Sector experts indicate skills in using artificial intelligence, analytical thinking, reasoning and innovation, and data science/data analytics. Ranking of managers for skills is analytical thinking, reasoning and innovation, communication skills, and using artificial intelligence. On the other hand, employees think that analytical thinking, reasoning and innovation, communication skills, and using artificial intelligence skills will come to the fore in all sectors in the future.

**In the education sector, administrators generally think that crafts, art design or occupations that require intense labour/physical power will disappear**. It has been added that desk jobs will lose their existence, and support or ancillary staff may not be needed. On the other hand, some managers think that there will be no professions that will disappear in the education sector and that it will change its form in line with digitalisation. On the other hand, sector experts think that occupational groups that do intermediate-level jobs will disappear. It is widely believed that there will not be a need for personnel performing desk jobs such as school/department/faculty secretariat, student affairs, and archive recording.

**According to the managers in the health sector, it is thought that occupational groups such as patient counselling, assistant, secretarial, data entry/registration officer, administrative department officer, laboratory and X-ray technician will disappear with the technological transformation that is advancing in the health sector in the future.** On the other hand, industry experts think that desk jobs such as operational services and data entry in the health sector will disappear. In addition, according to industry experts, pharmacy is among the professions that are thought to disappear in the future. Additionally, according to the managers, it is challenging to supply technical personnel in the network and informatics, personnel working as operating room technicians and personnel who will work in the field of health in general.

**According to energy sector experts and managers, the occupations that are thought to be lost in the sector in the future are mostly, field staff, production technicians and energy data analysts.** While white-collar workers can be obtained more quickly in the energy sector, it has been stated that there is a shortage of technicians and workers. According to the managers, it is stated that the most challenging personnel are also sector-based software developers and qualified engineers. Since the software can now perform the task of the data analyst, it is thought that automation systems that make these calculations can replace the data analyst.

**Sector experts and managers in the finance and banking sector claimed that “All professions in classical finance and banking will disappear”**. According to sector experts in the finance and banking sector, the jobs that are thought to be lost in the sector in the future will be operations-oriented and robotised, requiring the physical presence of personnel and workforce. In this context, it is thought that paperwork/box office/office transactions and simple software transactions will be lost in the branch. When asked about the professions that are thought to be lost in the sector in the future, according to managers in the finance and banking sector, the most common answer was box office workers. In general, managers who think there will be a decrease in the number of employees for the bank or that there will be no personnel left stated that there will be a decrease in the number of officers working in the operations department. It is thought that since digital currencies are out, physical money business may be removed, and operational service may decrease. According to the managers who think there will be a general decrease in the number of physical employees, the idea is that artificial intelligence can come to the fore while the number of employees in the bank decreases. Additionally, managers in the finance and banking sector emphasized that it was most difficult to recruit personnel in the field of informatics. Finance and banking related software expertise was the most highlighted area within the scope of informatics. It is understood that there are also difficulties in recruiting mobile software developers and information and cyber security personnel.

**The IT sector is a sector that is thought to be one of the most popular sectors of the future**. It has been stated that although there will be no loss in a profession in this sector, the lagging or unqualified personnel may be eliminated. The IT sector stands out as one of the sectors most prone to working remotely. It has been stated that supportive professions such as services used for transportation to the workplace and food and cleaning workers may disappear when remote work increases. It has been stated that software other than artificial intelligence in the industry may disappear in the future.

# Training, workforce development and upskilling for new technologies and digital adaptation

Technological and digital transformation affects the concepts of work and employment. Digital transformation requires employees to have digital knowledge, skills, and education. To stay in employment and the labour market requires the ability to work with machines, robots, and algorithms. Therefore, digital skills need to be developed.

According to employers and managers, approximately 75% of the current qualified personnel can competently do what their job requires. This rate was found to be highest in the IT sector (79.7%) among the five sectors and the lowest in the energy sector (69.2%). According to them, the most important reasons for some of the personnel in the institution being incompetent are the use of new technologies (37.2%), the emergence of new products or services (36.7%) and the low motivation of the employees (33%).

The employees see their compliance with the industry's requirements at an average of 8.3 out of 10. In contrast, sector experts give the employees comply with the digital and technological transformation an average of 6.7.

Overall, only 22.6% of the employers and managers stated that they use indicators to measure the performance of the employees in the institution/organization/workplace. The sectors where indicators are used most intensively to measure the performance of employees are the finance and banking, health, and energy sectors. The sector in which performance indicators are used the least was determined as the education sector. They listed these indicators as manager observation, effective work, feedback, and positive feedback from service recipients. The first four rankings in the ICT and education sectors are the same. The number of faulty services and average work completion time in the energy sector, profit, number of customers per employee in the finance and banking sector, and the number of services provided in the health sector are also seen as important indicators.

According to the managers in all sectors, the most important reasons that reduce the competence of the personnel in the institution are the use of new technologies (37.2%), the emergence of new products or services (36.7%) and the low motivation of the employees (33%). The effect of the employees' skill deficiencies on the organisation's performance (1 = absolutely ineffective - 10 = very effective) is measured as 6.3. This score is highest in the health (6.8) and lowest in the energy (5.2) sectors.

About 7 out of 10 employers and managers said that they allocate a budget to fill the skill gaps of their employees. While 16.7% of the executives stated that they did not allocate a budget, 13.8% stated that they had plans in this direction even though they did not allocate a budget. The sectors that say they allocate a budget to fill the skill gaps of the employees the most are the energy, finance and banking and informatics sectors.

Approximately 70% of the managers stated that they conduct training needs analysis in their institutions. A training needs analysis was most pronounced in the health, banking and finance and energy sectors.

**According to the ICT sector managers,** the employees of any institution need training on adaptation to new technological developments to keep the personnel up to date, especially on digital technology, graphic software, communication techniques, new information and systems. Employees stated that they need more practical training instead of a theoretical one. Since time is an essential parameter for IT sector employees, they said they need more efficient training, which takes less time with more practical aspects. In addition, online education and courses were also mentioned as a source of professional development.

**According to the managers in the education sector**, employees in the education institution need training on the technology used in the education sector and new digital infrastructures supporting education processes. While vocational training is emphasized, communication, analytical thinking, and reasoning skills are also listed as areas where training is needed. In terms of employees, the training needs to focus on promoting and using new and digital technologies. The need for continuous training on software, the use of Microsoft Office programs, and innovations in the digital field were emphasized. It has been stated that applied vocational training and personal development training are within the scope of need.

**According to the energy sector managers and employees**, it is stated that the need for technical training is a priority for the employees in energy institutions. It is thought that training on orientation and the use of new and digital technologies are also critical. There is also a need for a specialized training program in the sector where production managers have an essential place.

**Managers stated that the employees of institutions/organisations/workplaces in the finance and banking sector need job-related and sector-oriented training**. In this context, within the scope of technical and technological training, it has been stated that there is a need for developing and changing digital applications, new products and applications, and training for digitalization. In addition, it was stated that there is a need for communication, legislation, and sales marketing training. On the other hand, considering soft skills, there is a necessity for training in psychology, motivation, stress/time management, problem-solving and taking the initiative was expressed. Managers emphasized that each unit should receive training within itself.

Identified skills needs are:

* + Analytical thinking, reasoning, and innovation
  + Active learning skills
  + Communication skills
  + Being able to teach and transfer knowledge
  + Creativity and originality
  + Ability to adapt knowledge and experience to work
  + Teamwork through digital channels
  + Ability to serve through digital channels
  + Taking initiatives
  + Stress tolerance and flexibility
  + Foreign language
  + Artificial intelligence
  + Data science and data analytics
  + Ability to use VR (virtual reality)
  + 3D printing capability
  + Use of wearable technologies

Most (81.6%) employers and managers stated that they have carried out any training activity in the last year, while 17.9% of them stated that they have carried out any training activities outside the institution. The rate of employees who say that they have participated in any training activity in the last year is 78%.

Half (49.2%) of the sector experts and decision-makers stated that trainings were provided to increase the adaptation of new and digital technology in the sector, 39.4% stated that the training needs of the sector were well analysed, and 33.1% stated that digital strategies and action plans were developed.

The employers and managers reported that job-specific trainings (66.6%), onboarding/orientation trainings (62.5%), occupational health and safety trainings (62%) were provided. Software training has been ranked fourth with 38% to increase the skills of their employees.

Majority of employers and managers (76.7%) indicated that the performances of the employees who receive training are evaluated. It is seen that performance evaluation is mostly done in the health, ICT, and energy sectors. It is observed that the employees are mostly satisfied with the training provided by the institution/organization/workplace.

Half of male employees (53.4%) and of female employees (48.1%) stated that there was no change in their professional career expectations after the training. For approximately 25% of women and 35% of men reported an expectation of a wage increase after the training. Approximately 36.3% of women and 32.1% of men stated that they expect to promote within the company/institutions after the training.

According to the employers and managers, the effect of the trainings received by the employees to increase their competencies on the performance of the organization is 7.8 on the scale (1 = absolutely ineffective - 10 = very effective). This effect was highest in the ICT sector (8.1) and the lowest in the energy sector (7.8).

Participating in in-house training (75%) ranks first among the activities carried out by the employees to increase their skills within the framework of individual professional development. This activity is followed by following the relevant portals, blogs and forums on the internet (60.2%), getting help from friends (46.4%), benefiting from online or distance education programs (45.3%).

Employees stated that they spent an average of 16 hours in the last month for the activities they carried out to increase their skills. It has been determined that female employees spend 2 hours less time than their male counterparts for these activities last month. Approximately 3 out of 4 employees stated that they would like to devote more time to the activities they carry out in order to increase their skills. It is seen that male employees want to devote more time to these activities at a lower rate than females. Employees who expressed that they want to devote more time to the activities they carry out to increase their qualifications and skills are mostly in the education, ICT, and health sectors.

Most female employees indicated intensive and long working hours prevent them spending more time on activities to increase their qualifications and skills. Male employees mentioned that they do not have spare time outside of the working hours for increasing their skills and qualifications. Male employees chose the options of social environment and family obligations and financial inadequacies at a higher rate than female employees.

# Gender and disability perspective

The gender distribution of the employees in the five sectors was calculated as 45% female and 55% male. The ratio of female managers is listed as health, education, finance and banking, ICT, and energy, respectively.

When the percentage distribution of managers (including mid-level managers) in the sector is examined in terms of gender, both sector experts and managers, employers reported a female to two male managers in 3 managers. The ratio of female managers is listed as finance and banking, health, education, ICT, and energy, respectively.

The most important reasons for the low number of female managers in the sectors compared to the number of male managers were reported as the male-dominated culture in working life at 50.3%, the few female role models in the sector at 36.7% and long working hours at 27.6%.

In order to increase the number of female managers in the sector, it is necessary to increase nursery opportunities (46.4%), introduce role models (44.4%) and support postpartum part-time work opportunities (37.2%).

According to all employees who responded to the survey, the probability of being a female manager in all sectors is 53.9%. The sectors with the highest likelihood of being a manager for women are the health sector (69.5%), the education sector (55.7%), and the finance and banking sector (52.7%), while the ICT sector (42.9%) is the lowest.

According to 54.2% of industry experts, the development and increase in the use of new technologies will positively affect the employment of women in the industry.

The majority of sector experts, decision-makers, employers and managers indicated that developing new, digital and assistive technologies would increase the employment of people with disabilities in all sectors. About 8 out of 10 industry experts and managers expressed their opinion.

According to sector experts, decision-makers, employers and managers, assistive technologies are at the forefront of the most important facilitators in the participation of disabled people in the workforce. Technological transformation and facilitating the involvement of the disabled in education took second place. In addition, the change in society's perspective on disabled people and artificial intelligence applications are also emerging as important factors.

# Recommendations

# All sectors (Common)

|  |  |  |
| --- | --- | --- |
| **RECOMMENDATIONS** | | |
| **Category** | **Sub-Category** | **Recommendations** |
| **The decent future of work** | **Awareness-Raising** | * Continue with the Awareness-Raising campaigns and events for “decent future work”. * Continue strengthening the unions’ capacity. * Increase social dialogue at sector and company level. * Use specific days such as Labour Day for awareness raising events about decent work. Develop and broadcast audio-visual guides for all cohorts. |
| **Occupational Safety and Health** | * Promote “Remote Work Regulation” and elaborate for Occupational Safety and Health for remote work. |
| **Remote and flexible working** | * Ensure that remote workers receive appropriate information on their employment and working conditions, in a language that they understand, is crucial for raising their awareness of their labour rights. * Facilitate the transition of remote workers and economic units from the informal to the formal economy, while respecting workers’ fundamental rights and ensuring opportunities for income security, livelihoods, and entrepreneurship. * Take measures to prevent the informalization of formal economy jobs by means of emerging technologies. * Facilitate registration of informal remote workers to the social security systems. * Ensure that remote workers, including those considered as self-employed and those in the informal economy, effectively enjoy freedom of association and the right to collective bargain. * Contribute to awareness-raising efforts among employers and provide them with support to help implement best practices in the employment of remote workers and increase decent work. * Adopt measures to monitor remote workers and work modalities and identify remote workers and sectors. * Collaborate with Labour Ministries of other countries to prevent informal work from Turkey. |
| **Digital technologies and compliance** | **New technologies and transformation** | * Conduct a large scale and representative qualification and skill survey covering all economic activities. |
| **Compliance with the new technologies** | * Accessible sectoral digital transformation platforms for available staff and new curricula in schools (including universities) can be introduced. Occupation specific skills shall be compatible and complementary to new technologies. |
| **Investment in the new technologies** | * Cooperate with the Ministry of Industry and Technology and Digital Transformation Office of Presidency to support employers for cost-effective technology adaptation. |
| **Lost professions** | **Obsolete occupations** | * Conduct gap analysis between existing competences and future competences for future jobs on the base of specific occupation. * Support upskilling mechanism in workplaces. Cooperate with sectoral committees of the chambers. * Provide innovative solutions for educational and vocational training systems. * Define indicators, monitor, and evaluate upskilling efforts for industries and obsolete occupations. |
| **Prominent professions** | **Data-related jobs** | * Data science; * Artificial intelligence; * Machine learning; * Cloud computing; * Block chain; * Programming; * Web and Application Development |
|  | **Skill gaps and shortages** | * Innovative funding opportunities or incentives can be provided to businesses for reskilling or upskilling:   + Wage subsidies;   + Funding online learning;   + Supporting free education portals such as “bilgeis platform” – <https://bilgeis.net> );   + Funding or incentives can be given against performance evaluation criteria. |
| **Future skills needed** | **Soft skills** | * Sectoral experts shall work on qualification for developing easily transferable cross-cutting skills across many occupations and roles. * Identified skills needs: * Analytical thinking, reasoning, and innovation * Active learning skills * Communication skills * Being able to teach and transfer knowledge * Creativity and originality * Ability to adapt knowledge and experience to work * Teamwork through digital channels * Ability to serve through digital channels * Taking initiatives * Stress tolerance and flexibility * Foreign language * Artificial intelligence * Data science and data analytics * Ability to use VR (virtual reality) * 3D printing capability * Use of wearable technologies |
| **Training, work force development and upskilling** | **Training needs** | * A general and sectoral training needs assessment is important to identify performance requirements and the knowledge, skills, and abilities needed by sectoral workforce to achieve the requirements. The training needs analysis can be conducted through a representative skill survey. |
|  | **Training to existing staff** | * Providing in-service digital trainings to increase the skills of experienced workers regarding the use of new technologies especially digital technologies. * Partnership of industry and TVET institutions (experts to contribute to the curriculum as well as deliver training digitally) + industry financing of TVET programmes. * Public-private partnerships for meeting sectoral labour requirements, promoting national skill standards, providing on-the-job training, and improving the quality of training overall. |
| **Gender perspective** | **Role modelling** | * Continue supporting women full and effective participation in the labour market with equal opportunities. * Increase nursery facilities and support postpartum part-time / flexible and remote work possibilities. * Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women. * Arrange working hours in some sectors if there is no flexible or remote work possibilities. * Promote the visibility of role model female managers by supporting women managers working groups or networking events. * Adopt measures to ensure and monitor that women employees’ participating in-house training equally. * Support businesses for gender-equality training. * Provide psychological support for work-life balance. |
| **Disability perspective** | **PwDs participation in Labour Force** | * Continue supporting PwDs through the development plans, national education and labour market strategies, especially through sectoral strategies. * Regulate remote work for PwDs, adopt specific measures to promote the employment of PwDs in different sectors. * Support the use of assistive technologies and applications for PwDs to take their places in the labour market. * Support developers of assistive technologies and applications for PwDs. * Strengthen statistics for disaggregating PwDs in labour force, develop indicators. * Monitor the implementation of disability inclusive labour policies by setting indicators, milestones, and targets. * Adopt measures to ensure and monitor that PwDs access equal pay for equal work. |
|  | **Increasing participation in education and renewing curricula for education** | * Renew curricula and training modes and modalities to include more PwDs in education. * Monitor and support the professional development of PwDs. * Develop modalities for PwDs adaptation to digital technologies and new business processes. |

# Sector specific recommendations

|  |  |  |
| --- | --- | --- |
| **SECTOR-SPECIFIC RECOMMENDATIONS** | | |
| **Category** | **Sub-Category** | **Recommendations** |
| **The decent future of work** | **Action Planning** | Make sector-specific action plans or update existing ones |
|  | **Awareness-Raising** | * Action Pans should focus more on «awareness raising» campaigns at employers and managers level in the Information and Communication Technologies (ICT) and Health sectors. * The education sector has duties to increase the awareness of those who use the services of the sectors and to train the users. It is recommended that the education sector take this into account. |
|  | **Occupational Health and Safety** | * Action planning should also consider the working conditions of health workers (wages, workload and time, and violence against health workers). |
|  | **Remote and Flexible Working** | * Take measures to prevent the unregistered work through new technologies, especially in the Information and Communication Technologies sector and popular jobs in all sectors (project writing, management, reporting, etc.). * Especially for the education sector, develop and expand new remote and flexible working practices and employment relations with rules and regulations. * Focus primarily on ICT and Finance and Banking sectors for remote working arrangements. It is recommended to discuss the good practices in the Finance and Banking sector, to carry out studies on regulations within the sector and adaptation to other sectors. * Detail the legal regulations regarding job descriptions, flexible and remote working and rights in the education sector. detail the legal regulations regarding job descriptions, flexible and remote working and rights in the education sector. |
| **Training, workforce development and upskilling** |  | * Give priority to the intersecting ICT and education sectors in terms of skills needed in the future and gaining these skills. * Support online training and teaching materials for all levels of education, vocational education and training, adult education and professional development. |
| **Gender Perspective** |  | * Encourage women's empowerment, it is recommended to increase and expand the use of facilitating technologies, especially information and communication technologies. * Focus more on the education of girls and women in the renewable energy sector, science, technology, engineering, mathematics. * Regulate the working hours of female employees in sectors where flexible or remote working opportunities are not available (especially in the health sector). * Increase the involvement of women in the renewable energy sector through improved workplace conditions, mentoring and professional development. |

# Recommendations by sector experts

Below recommendations have been collected:

# Education

The education sector experts stated that the new employment forms and employment relations that arise with the use of new and digital technologies in working life. According to them, legal regulations regarding job definitions, flexible-remote working and rights should be elaborated more. They indicated that all kinds of needs analyses should be carried out on a continuous and regular basis. Sector experts also noted that the arrangements for the training needs that would emerge because of this analysis should also be considered. It was stated that arrangements should be made for an employment model based on merit and constantly updating itself in the education sector.

# Health

Health sector experts stated that new employment forms and employment relations emerging with the use of digital technologies in working life should be organized for employers and employees related to education, budget, labour law and the scope of labour law. In addition, they stated that social regulations should be made, and business rules should be regulated according to the legislation.

# Energy

According to energy sector experts, the importance of education is stated in the first place in terms of new employment forms that emerge with the use of digital technologies in working life, employment relations and regulations that need to be made.

In the energy sector, it is recommended that the inspections be more stringent, especially in the field of automation. It was also stated that the problem of employment reduction that will occur after the automation should be well planned and that regulations should be made for people who will be unemployed for this reason.

# Finance and Banking

According to finance and banking sector experts, the answers to the new employment forms that arise with the use of new and digital technologies in working life and the regulations that need to be made regarding employment relations are mainly for training. Industry experts emphasized the necessity of focusing on in-sector training, digitalization, and regulations regarding the protection of personal data. The necessity of legislative regulations and legal regulations for business processes, especially remote working, is seen among the answers.

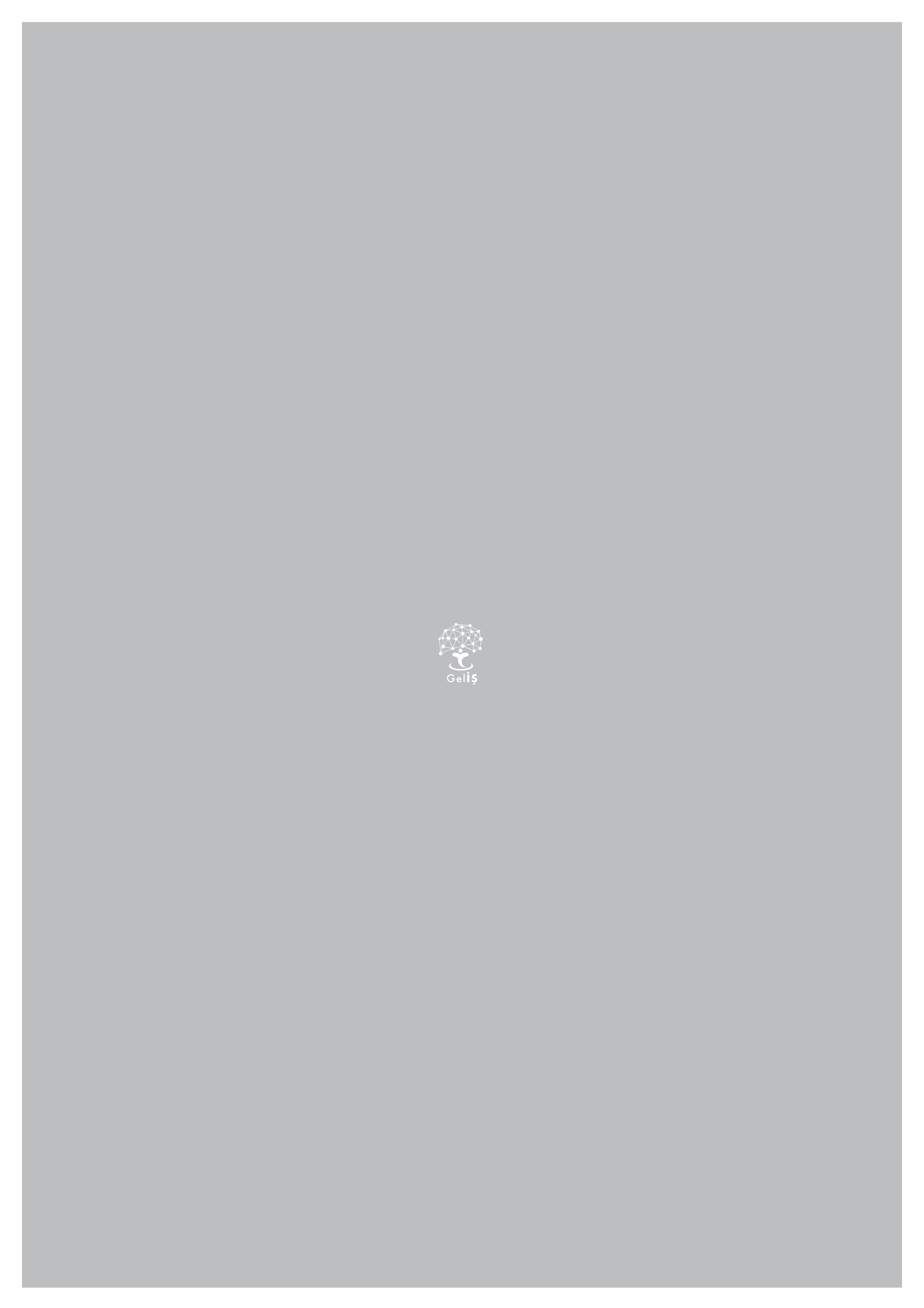
# ICT

According to ICT sector experts, new employment forms and employment relations that emerge with the use of digital technologies in working life

* Projecting state-supported trainings together with the private sector.
* Take measures to prevent the informalization of formal economy jobs, especially in the ICT sector, by means of emerging technologies.
* Facilitate registration of informal remote workers, especially in the ICT sector, to the social security systems.
* Sharing the necessary employment data with universities in an up-to-date manner,
* Continuing to give incentives to the ICT sector to increase qualified employment,
* The evolution and transformation of human abilities into many measurable parameters with technology, the writing of decision mechanisms suitable for the parameters, and the implementation of this mechanism by determining the ethical framework
* Carrying out studies that will adapt institutions to digitalization.

**FoW TAT**

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1. [↑](#footnote-ref-1)
2. https://www.researchgate.net/post/How-to-figure-out-an-appropriate-sample-for-the-pilot-study [↑](#footnote-ref-2)
3. https://www.ilo.org/global/topics/decent-work/lang--en/index.htm [↑](#footnote-ref-3)
4. https://www.ilo.org/wcmsp5/groups/public/---dgreports/---inst/documents/publication/wcms\_625866.pdf [↑](#footnote-ref-4)
5. https://www.ilo.org/global/topics/decent-work/lang--en/index.htm [↑](#footnote-ref-5)
6. https://www.ilo.org/wcmsp5/groups/public/---dgreports/---inst/documents/publication/wcms\_625866.pdf [↑](#footnote-ref-6)
7. https://www.ilo.org/global/topics/decent-work/lang--en/index.htm [↑](#footnote-ref-7)
8. https://www.ilo.org/wcmsp5/groups/public/---dgreports/---inst/documents/publication/wcms\_625866.pdf [↑](#footnote-ref-8)
9. Supervisory Control and Data Acquisition (SCADA) is **a combination of hardware and software used for industrial automation**. SCADA automation allows users to: Supervise and control industrial processes both locally and remotely. Acquire, process, and record data. [↑](#footnote-ref-9)
10. https://www.ilo.org/global/topics/decent-work/lang--en/index.htm [↑](#footnote-ref-10)
11. https://www.ilo.org/wcmsp5/groups/public/---dgreports/---inst/documents/publication/wcms\_625866.pdf [↑](#footnote-ref-11)
12. https://www.ilo.org/global/topics/decent-work/lang--en/index.htm [↑](#footnote-ref-12)
13. https://www.ilo.org/wcmsp5/groups/public/---dgreports/---inst/documents/publication/wcms\_625866.pdf [↑](#footnote-ref-13)
14. https://www.ilo.org/global/topics/decent-work/lang--en/index.htm [↑](#footnote-ref-14)
15. https://www.ilo.org/wcmsp5/groups/public/---dgreports/---inst/documents/publication/wcms\_625866.pdf [↑](#footnote-ref-15)
16. https://www.pwc.com/us/en/library/pulse-survey/executive-views-2022.html [↑](#footnote-ref-16)