European Training Foundation

THE FUTURE OF SKILLS

A case study of the Turkish automotive sector

Summary note

THE EU AGENCY SUPPORTING COUNTRIES TO DEVELOP THROUGH LEARNING

This note presents the main findings of an ETF study which focuses on the future of skills that will be needed in the automotive sector in Turkey. It is part of a wider investigation in ETF partner countries on how global trends are impacting developing and transition economies and what actions are needed to prepare people for a changing world. A mixed methodology was used for the study combining traditional research techniques with data mining and interviews with stakeholders and companies.

AN OVERVIEW OF THE TURKISH AUTOMOTIVE SECTOR

The automotive sector is an important driver of growth in the Turkish economy. This study includes the manufacturing of motor vehicles, trailers, and semi-trailers, as well as the wholesale and retail trade and repair of motor vehicles and motorcycles. The sector is well-organised in the production, distribution and trading segments. According to official statistics, the automotive sector employed a total of 812,000 people in 2019, making it approximately 2.9% of the total employment in Turkey. The manufacturing segment employs 34% of the figure and its workers are more highly skilled. The trading segment accounts for the rest of the workers which includes a majority that has not had an upper secondary education. The manufacturing segment creates relatively skilled jobs which ensure security, full-time employment, continuous training and above average salaries.

Turkey's production closely resembles that of European countries such as the Czech Republic or Slovakia, which also have developed car manufacturing industries. Moreover, Turkey's close trading partnership with major European economies has resulted in Turkish companies adopting European technical standards, from safety rules to environmental regulations, and closely following European market trends. The Turkish automotive sector gets most of its supplies from Europe, it then sells most of its automotive products back to Europe. Automotive products have been Turkey's number one export item since 2006, or 17% of the total value of exports. The manufacturing sector exports approximately 85% of its total production to international markets in countries such as Germany, France, and Italy.

The potential for retail trade in cars in Turkey's domestic market is high; Turkey is already a large importer of foreign-made vehicles and customers have an appetite for high technology cars. The Turkish state recently invested in a public-private partnership to develop and produce its own electric cars. Provisionally called TOGG, the company plans to begin mass production in 2023 which may also generate financial incentives to buy electrical cars.

The Turkish automotive sector has grown very rapidly over the past ten years resulting in a substantial growth in employment if compared with the increase of employment across the economy — since 2009 nearly 43% in the manufacturing segment and 31% in the trading segment. This shows the potential of the sector, even if it represents less than 3% of total employment in the country. As mentioned above, the quality of the jobs created in the manufacturing segment are higher, employing many more medium and high-skilled workers such as associate professionals, or technicians, and craft and related trades jobs.

We therefore see significant differences in the education levels of the workforce between the manufacturing and trading segments of the car industry. Using the International Standard Classification of Education, in 2019 it was estimated that 25% of all employees were high-skilled, 40% were medium-skilled, and 35% were low-skilled in the manufacturing segment; for the most part

concentrated in skilled manual work that includes a number of activities that will doubtless become automated. Since 2010, the share of high-skilled workers has indeed increased (8 percentage points), while there was 5 percentage points decrease in the medium-skilled workers. Workers in this sector will see their jobs change and will need to improve their skills or be reskilled to remain competitive in the labour market.

In the trading segment the workforce is largely low-skilled and medium-skilled, most with less than eight years of schooling. Only about 11% of all employees were high-skilled, 21% were medium-skilled and 68% were low-skilled in this segment. These figures fall far below the skill levels of total employment in Turkey which is 25%, 21% and 54%, respectively. A lack of functional core skills can be a disadvantage to new learning and improving soft skills, posing a risk of being one of the bottlenecks in the sector.

Interestingly, the automotive sector in Turkey has a high use of industrial robots, with factories fully in line with typical smart factories. Statistics from the International Federation of Robotics indicate that Turkey has become a promising emerging market for robot installations—it is ranked 20th worldwide in terms of use of industrial robots; 42% of all installations are used in the automotive sector. This also means that adaptations in labour and skill sets will need to be made, requiring increasing cognitive, digital and STEM skills.

These technological changes will doubtless see a shift happen, from blue to 'grey collar' jobs in Turkey, a similar phenomenon as in other countries. 'Grey collar' jobs will require blue-collar workers to have more technical expertise, which may oblige the vocational education and training (VET) and university systems in Turkey to rethink their future strategies.

Two further characteristics of the industry include the fact that it is male-dominated, and that the workforce is very young. Although women only constituted 31.8% of the total employment in 2019 in Turkey, in the automotive sector this figure dropped to 15.1% in the manufacturing segment, even if this has increased in recent years, and to a mere 6.1% in the trading segment. Comparative figures from the EU show that 24.7% of women work in the manufacturing segment, while 16.0% work in the trading segment.

As far as age groups are concerned, in the manufacturing segment of the industry, nearly 74% of the workforce was in the 25–44 age group, followed by almost 15% in the 45–59 age group, which translates to 85.7% of the workforce being under 44 years old. In the trading segment almost 25% of the workforce was in the 15–24 age group and 53% was in the 25–44 age group, coming to 77.7% of workers being under 44. By contrast in Europe, approximately 50% of the automotive workforce is below 44 years old.

THE DRIVERS OF CHANGE IN THE SECTOR

The sector is evolving swiftly, from changes in habits and much higher expectations on the part of customers, to a need for greater integration into global value chains. It is necessary for Turkey to develop long-term strategies both in recruitment and skills management in order to remain relevant within the industry.

The automotive sector will soon be transformed by a wide range of technologies. But non-technological aspects such as social, economic, and environmental factors are also part of the future

landscape with the emergence of new business models, increased integration and complexity of global value chains, and fierce international competition. Customers' expectations are changing as are the standards and regulations on safety, and privacy. There is the environmental impact, public policies and incentives, including economic and political cohesion, and finally, the Covid-19 pandemic. Turkey's erratic economic growth coupled with high inflation, a volatile currency and recurrent periods of instability over the past 30 years have had an impact on the sector, such as a higher cost of international loans for sector investment, possible withdrawal of foreign investments, or fluctuation of market prices and conditions affecting the domestic market.

Additionally, it is increasingly important for the industry that the country undergo a green transformation. The traditional market will be redefined as new types of vehicles are introduced, most often in the form of electric/hybrid cars and smart/autonomous vehicles, with driver assistance systems which will require digitalisation and smart factory systems with the skill sets that go along with them. Companies will need to innovate and adapt to keep up with the global value chains.

Turkey's participation in global value chains is below its potential for a variety of reasons, such as inefficient allocation of capital and labour, underdeveloped human capital and insufficient investment in innovation. But a number of positive trends are emerging, such as companies becoming more sophisticated with functional upgrading, an increasing level of R&D centres in the sector, and the appearance of innovative companies that are developing original products and components. Growing innovation in the sector can be seen in the increase of patent filing in the automotive industry over the last fifteen years, representing nearly 15% of all Turkey's patent filings. Turkey also has a competitive advantage thanks to its geographical proximity with Europe, which may give it a competitive edge over products coming from the Far East.

Some of the most dynamic fields of innovation in the sector include data processing, mechanical power transmission, wheel systems, internal combustion engines, sensor control systems, door systems, materials, seat systems, load-carry vehicles, structural parts, suspensions, braking systems and electrical systems. Some technologies have transversal applications in more than one of the fields listed above, with an added value compared to others that are used only in one field. Because so many technologies are inter-related, a variety of sectors and sub-sectors will use transversal or cross-sectoral technologies; skillsets that cover various technologies will be needed. Moreover, the integration of new technologies alongside older technologies will call for a complex set of skill demands.

The potential to create new jobs in the sector is certainly present and can be seen in Turkey's growing trend in innovation and the high volume of exported products that also bodes well for a greater integration into global value chains.

CHANGES IN JOBS AND SKILLS DEMAND

In a combination of findings from big data mining and bilateral interviews, two categories of job profiles that will be in demand are emerging: technical professionals and associate professionals such as science and engineering professions and ICT professions, both at engineering and technician levels, and low and medium-skilled blue-collar workers, such as craft and related trades workers and machine operators. Both of these categories are affected by technological changes in products and in production techniques.

As far as technical professionals are concerned, the industry will need engineers in various fields including electrical, mechanical, sensor, mechatronics, optoelectronics, or automation. Certain profiles, such as electrical and mechanical engineers have always been present in the industry and will continue to be so. Information and communications technology professionals are another sub-group that will be needed with jobs such as user interface developers, industrial mobile devices software developers, ICT application developers, ICT system developers, or ICT network engineers. Technicians and associate professionals such as robotics engineering technicians, industrial robot controllers and motor vehicle engine testers are increasingly needed for a third sub-group.

When it comes to low and medium skilled workers, there is a real need for so-called grey-collar workers—up-skilled blue-collar workers with more technical expertise. In line with increasing digitalisation, ICT-related competencies are also increasingly needed in this category of workers. In the future, the number of blue-collar workers is expected to decrease while the number of grey-collar workers will increase. Jobs on production lines will disappear, and will be replaced by technicians working on electronics, mechatronics, sensors, data programming, programming robots and cobots, or repairing cameras and sensors.

Worker skills will need to include the use of software, deep learning, and machine learning algorithms. All occupations from engineers to technicians will need to be open to changes, as resistance to change is a limiting factor, and become digitally literate in the basic principles of robotics and coding, a 'third language' alongside their native tongue as well as English. If blue-collar workers are up-skilled to become grey-collar workers, then collaboration with white-collar employees on design and innovation will be easier.

New jobs will also appear on the horizon that will consist of 'translators' between machines and people. These professionals will understand the logic of the machine/data/software process and will be able to interpret the user needs for technicians and developers. Understanding the process will entail translating the needs into robotic language.

Overall, discussions with stakeholders and companies confirmed two trends:

- a tendency to be vertically specialised in a specific technology or area but having the capacity to apply it transversally over different jobs, with a horizontal knowledge of many disciplines, a characteristic defined by companies as a 'T-shape' profile, or even a 'comb-shape' skills profile, with deep expertise on more than one subject;
- the level of competence required by each worker will increase and become broader, shifting the occupational structure towards more highly skilled profiles.

Finally, soft skills such as resilience, flexibility, problem solving and creativity are highly valued by companies and shareholders, an aspect that should be taken into account when policy makers and educational programmes are considering future skills. For companies involved in international transactions, the lack of or limited knowledge of English or German is a frequent problem; having a basic knowledge of English has become a necessary skill for all types of workers. The debate on future skill needs is therefore not just about technical skills, but the mix of technical and soft skills. Overall, companies expect a similar level of employment in the future, with a decline in labour-intensive occupations and an increase in higher added-value ones.

MEETING THE CHALLENGES IN SKILLS DEMAND

The information presented here on how companies devise strategies to address the new skills demands was gathered by conducting in-depth interviews and focus group discussions with companies and key stakeholders in the industry.

The shortage of skilled workers, both medium and high-skilled, was one of the main problems brought to the fore by companies. Educational institutions and programmes are not up to date nor aligned with the trends of new technologies and what the industry needs; in other words, the students coming out of these programmes are not sufficiently qualified. VET centres and universities are trying to update their programmes, but what would better prepare students for a future in the industry would be a closer collaboration between institutions and the private sector. Because of the speed of change within manufacturing, frequent exchanges between factories and vocational schools would help institutions understand what skills their students should be learning.

The shortage in the white-collar segment is exacerbated by a brain drain of skilled engineers seeking higher salaries abroad, while turnover of blue-collar manual workers is high, for the most part in agricultural areas, because salaries in both areas are often equivalent. Moreover, people with the most sought-after profiles, such as in ICT, data analysis, or data mining, are sometimes more likely to prefer to work in sectors which are perceived to have more stimulating environments than the automotive one, like IT, telecommunications, banking, or finance.

Despite the lack of sufficiently skilled workers, vocational schools, universities, academic and industry collaborations are all important sources where companies can find qualified employees. The fast pace of technological change means that for the moment, following recruitment, companies usually provide further internal training programmes for new graduates both in managerial skills and technical skills, but also in operational and focused skills. The interviews revealed that the adaptation time for a new recruit is too long and too expensive for companies. One company noted that ‘it takes approximately five years after graduation to turn a freshly graduated mechanical engineer into a real mechanical engineer’.

The most common solutions for training people and reducing the gap in skills are in-house or on-the-job training, outsourcing training from universities and research institutes to engineering consultancy companies, depending on the budget or on the topic. Another common practice, especially in original equipment manufacturers, is setting up own internal academia or training centres for the entire internal workforce. More than two-thirds of mid to larger size companies (including at least half of SMEs) organise internal training activities from on-the-job training to mentoring and internal courses. The smaller, less formal companies, however, need a more cost-effective solution which could be resolved with a public-private partnership approach.

Not all companies have optimal training strategies, however, and suggestions were made in interviews that training activities be seen as an investment in the future of the company. Fortunately, the automotive sector has strong and organised sector associations, such as OSD, TAYSAD, ODD, and OYDER, which play a vital role in the industry by holding frequent high-quality training programmes which are free and open to all members. The Automotive Suppliers Association of Turkey (TAYSAD), for example, organises training programmes on topics requested by their members and bi-annual meetings on the subject of improving skills within the industry which are attended by more than 400 companies.

CONCLUSIONS

There is a need to encourage and pursue a closer and deeper collaboration between companies and both VET and higher education institutions. Industry-based taskforces, for example, could give specific training certifications to teachers so that they can have a proper level of expertise.

Companies should also encourage their workers to pursue personal development on technical issues in order to make their work more efficient and creative. Key competences and soft skills are becoming increasingly important in relation to the adaptability and the willingness of people to learn. But these skills don't only depend on VET and higher education, but also on the access to and quality of basic education. In this respect, human capital development is key.

Although Turkey has made substantial progress in human capital development, wide gaps remain between Turkey and comparable countries in the EU and OECD countries. Studies show that at every level of education there is a need for a quality increase. This necessity, together with the results of this study and other similar ones, will fuel the debate about the changing skills needs in the Turkish manufacturing industries, including the automotive sector. It will hopefully raise awareness among policy makers and practitioners on how to prepare workers for the future, beginning with education and training systems. Suggested actions might include:

- a better quality of learning for basic sciences, in particular mathematics and physics, from the very beginning of the education system to the very end;
- the identification of specific gaps in the existing curricula of VET and higher education systems as well as an emphasis on core skills and soft skills within the general basic education;
- prioritising for students the acquisition of the most needed cognitive, digital, foreign languages and communication-cooperation skills;
- an increased focus on new emerging technologies and transversal technologies in the education and training system;
- the development of adult learning modules for up-skilling/reskilling professionals in a lifelong learning perspective;
- the development of specific curricula and upskilling mechanisms in the sector for the transition from blue-collar to grey-collar workers;
- the inclusion of work-based learning modules or initiatives across different educational levels in the sector;
- the adaptation of pedagogical systems that will enable students to 'learn to learn', conduct research and acquire lifelong learning skills;
- the development of new qualifications by the Turkish Vocational Qualification Agency in partnership with the universities, VET providers and companies in the automotive sector;
- better career guidance and information about job and career opportunities for students and families, considering sectoral specificities within the economy;
- specific support mechanisms to support transition of youth and workers from job to job, especially in the case of low-skilled workers;
- the systematisation of existing good practices regarding human capital development efforts in the automotive sector;
- the establishment of more concrete mechanisms to enhance the collaboration between enterprises and education providers.