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Automotive Industry

Market structure, Performance, Key players

Although the automotive industry is an important sector in Eskişehir, it is not a developed sector compared to cities such as Bursa and Kocaeli. When we consider the automotive companies that have been diagnosed with this study, it can be seen that these companies do not have Tier 1 automotive supplier characteristics. They have all Tier2 supplier characteristics. While Tier1 companies supply the parts or services directly to OEMs(Original Equipment Manufacturers), Tier2 companies supply their products to Tier1 companies. Tier2 companies work in many other sectors besides automotive but Tier1 firms are specialized in their main subject, automotive. If we consider the automotive companies that have been diagnosed in Eskişehir we see that all of the companies work for different sectors such as machinery, white goods, railway, defense and aviation etc besides automotive except only one company. This feature is also the same as the Tier2 firm feature. The fact that they do not work directly with OEMs has not made these companies specialize in the automotive sector. Accordingly, except for a few companies, they failed to establish the technological infrastructure and systems required by the automotive industry. For instance, only two of them have 16949 certificate, which is one of the most important quality management systems of automotive (Arslan Mold and Das Lager). To be able to work with OEMs like Ford, it is necessary to implement much more complex and advanced systems - such as Q1 - than 16949. Most of the companies interviewed do not use such advanced systems. We found that only a few companies invest in technology. However, these companies had to improve themselves by working in the aviation and defense industry.

The companies that have been interviewed are not a homogeneous group and have different manufacturing methods and different engineering structures. While one company has an integrated facility that can carry out design+casting+molding+machining under the same roof, the other is an engineering firm that has outsource all production processes outside. Despite all these differences, their most important common feature is their ability to produce all kinds of products in line with the demands and needs of the customer. All the companies interviewed defined themselves as a company that produces fast and flexible solutions specific to the customer. Since this skill is the most fundamental factor of competing and surviving in the market, they focused and specialized on this subject.

One of the remarkable common aspects is that all companies interviewed, except for a few companies, attach importance to R&D studies. Even SMEs that have never conducted R&D projects have stated that they aim to establish an R&D centre in the future. SMEs of Eskişehir seem to understand the importance of R&D and innovation in order to compete in a very competitive industries.

Key players are Karcan as Turkey's largest manufacturer of cutting tools and having Karcan Academy and R&D centre, Secant Technology that established to reduce imports in the sector, Arslan Mold who have invested heavily in automation and advanced engineering, Modoya that plans to be the first in the field of intralogistics.

Technical support and technological development tools required by SMEs

The interviewer had made preparatory introductions with each company so that the company would have the relevant information at hand during the structured interview.

It is important to note that the meetings were all undertaken by way of internet exchanges via the Zoom facility as a result of the physical constraints imposed by the covid virus pandemic, meaning that conventional face to face interaction has been impossible. Whilst the author of this report does not





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sense that the accuracy of the responses is necessarily detracted by this, the (zoom) method has meant that it has been difficult to probe the recipients at greater depth on particular points of relevance.

The following is therefore a summary of the support and resource requirements and needs of those companies that have participated in meetings. These are not in any specific order.

- Design software
- 3D Metal printer
- 3D Plastic Printer
- Reverse engineering equipment
- CNC
- Qualified staff
- Staff retention
- Automate welding process.
- High tech mill machines, equipment and methodologies to develop the grinding sectors
- Simulation software for casting
- Ansys program
- Software which can calculate and measure the cutting forces.
- Design
- Tests
- Training on design, R&D and innovation, state funds etc.
- Guidance for using government incentives and managing R&D projects
- Netsis and PDMS programs

Placing industrial SMEs in Eskişehir's innovation eco-system

It is recognised that attracting highly qualified technical staff is a difficulty effecting a wide range of sectors as technology becomes the main driver of economic activity and mechanical engineering is possibly at the forefront of that difficulty. In Eskişehir, research reveals that vocational and technical high school students who study in the city preferred to study further at universities or to work in the service sector as a follow-up for their studies. This is in preference to working in manufacturing companies which is seen as 'dirty' and unrewarding financially. This perception is not uncommon in developed economies.

It is widely considered that the basis of any innovation eco-system, is a well-trained workforce that has advanced technical knowledge and commensurate skills to also develop creativity. When there is a lack of such specialists with the requisite skills then development in key support activity, notably R&D and innovation is severely impeded.

There are clear positive evidence pointing to a desire to participate in R&D and innovation activity emerging in the Eskişehir region.

This is further reinforced by an increase in collaboration between among commercial organizations, Professional Chambers, Public Institutions, Universities, Clusters and Research in regions of Eskişehir that providing the foundations for further cooperation.

There are 21 R&D centres in Eskişehir, demonstrating that it is one of the most innovative cities of our country with many R&D personnel employed throughout the province. Evidence exists that industrial property rights and scientific publication numbers are above the country average.

Current academic and R&D support situation in Eskişehir :

Anadolu University



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Eskişehir Osmangazi University (1993)
Eskişehir Technical University (2018)
Technology Research Parks
Technoparks
TUBITAK
BEBKA
KOSGEB
21 R&D centres (as of November 2019)
Advanced companies
2 Design centres

The above does reflect a low level of competition and innovation capacity in the private sector in comparison to large city areas. Research relating to this situation SMEs operating in Eskişehir revealed there is potential to establish many more R&D centres.

Difficulties experienced by SMEs in R&D and Innovation

One handicap of being an automotive supplier working for OEMs, though not directly in our sample group, is that OEMs send ready-made product designs to their suppliers.

This fact is an obstacle for companies to design their own products and destroys the ability of suppliers to design. Companies that produce mold and/or fixture can be considered lucky in this regard, as they usually design the mold and fixture themselves. Thus, their chances of developing R&D projects increase by improving their design skills.

All companies interviewed stated that one of their most critical problems is finding and retaining qualified personnel. Since highly qualified technical personnel especially engineers and technicians gain importance in R&D and innovation, more problems are experienced in these areas in Eskişehir. Engineers and university graduates studying in Eskişehir leave the city for bigger cities according to company officials.

Companies with good financial resources such as Karcan Cutting Tools tried to solve this problem by establishing their own training centres. Since most of the companies do not have such an opportunity, there are those who have been looking for different solutions. İŞKUR-supported on-the-job training program, KOSGEB's qualified personnel support, the use of senior university students as interns, and university-sponsored doctoral and master's programs are successfully implemented by some Eskişehir SMEs.

Each of the companies interviewed stated that their personnel leave them for better companies after they become qualified. SMEs are aware that the reason they cannot retain the qualified personnel is due to their low wage policy.

In this diagnostic study, it has been determined that one of the biggest problems of Eskişehir automotive SMEs is their inability to access sufficient finance resources. This problem brings along many difficulties. SMEs with limited finances hesitate to invest in high technology, automation and advanced engineering.

In automotive, which is one of the sectors with very rapid changes, not investing in technology and automation is considered to endanger the future of the company.

In fact, the transition to automation is the solution to many problems for an SME. Some companies who are aware of that and switched to automation clearly stated this fact during the interviews.



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In addition, some companies stated that they prefer product development over R&D since product development is commercialized in a shorter time compared to R&D.

The commercialization of R&D studies in the long term was stated as the reason why many SMEs are reluctant to conduct the R&D studies. While some companies use government support in this regard, others complain that the procedures of state funds are long and slow that make the process inefficient.

One of the difficulties faced by the companies we interviewed is the lack of a culture of cooperation.

Summary of Insights and Conclusions

There is a lower number of R&D centres in Eskişehir compared to other provinces however by defining the specific requirements and justification for a new resource, EDIC should become the benchmark Design and Innovation Centre for the Eskişehir region. Crucial to achieving this will be recruiting high calibre staff and a state of the art equipment resource that at least 90% of companies will regard as essential to their business.

The following summarises the intra-sectoral conclusions and recommendations resulting from company research findings.

R&D Centres numbers are low in Eskişehir relative to the number of companies which design their own products. An increase of such centres with more effective support to existing centres will contribute to the better designed products and greater profitability.

The amount of applications and approvals (success rate) of industrial companies in Eskişehir within the scope of Tübitak - TEYDEB program is at a low level. Supporting the drafting/creation of applications will have a positive impact on the competitiveness of companies.

Companies benefiting from R&D-related Tax Allowances in Eskişehir province decreased by 33% between 2013 and 2015, stabilising during 2015 and 2017. Support for exploiting tax efficiency opportunities will be an effective incentive for companies.

In terms of the ratio of entrepreneurship and property rights, Eskişehir companies are below far in comparison to other regions/provinces. Support for negotiating this technical barrier has potential for an increase in private sector development.

In the last decade, auto suppliers gained an important experience on how to develop products and vehicles. Furthermore, the industry already achieved standardized quality levels. By choosing the right partner for joint ventures, auto suppliers can aim for extending their product portfolio to technology-intensive products.

To attract global auto suppliers looking for cost reduction, the Turkish -relatively Eskişehir- labor market has a lot to offer. On average, a Turkish engineer with the similar skill set costs up to 66% less compared to its peers in EU. Additionally, Turkish workers are not reluctant to work overtime and have better absenteeism rate compared to Europe that makes hourly labor cost very competitive.

Government and companies should work together to set up the value chain positioning and organize division of tasks in order to prevent «everyone-fighting-with- everyone» industry model.

Firms should be open to new partnerships with digital/technology companies, learn from them and update their cultural mindset accordingly.

Firms should engage in roadmap planning, setting target levels and implement commitment to these levels. The measure of success should be clear. (E.g. investing significant part of the sales revenue in R&D, while maintaining the level of the international competitors in terms of EBIT margins).



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A highly advanced innovation centre in Eskişehir province with competencies in Engineering, Prototyping and Design will undoubtedly be supportive and incentivising project development for all SMEs. In the form of the proposed EDIC, it will provide the full range of resources to meet critical needs that may be encountered during the project process. Innovative solutions offered by EDIC such as additive manufacturing and prototyping will be beneficial in terms of developing innovative projects. It will be the launch pad for the increase in the number of projects that are initiated in Eskişehir.

The promotion of its successes will be vital to attract those companies that are already utilise advanced technology and also to persuade those companies that may have had unrewarding experiences with existing business/research agencies.

Cooperation of such a design and innovation centre with SMEs and knowledge institutions in higher added value-oriented projects will attract the attention of incentive institutions, and it will be easier for projects to reach a competitive quality of industrial projects to receive financial support for key sectors. It will contribute to the increase in the number and total gain of financial incentives for companies in Eskişehir, that are very low compared to other cities.

In the diagnostic study, it was understood that EDIC should develop and implement some strategies besides the services that will benefit SMEs. These strategies will guide SMEs in the issues they need such as design, R&D, innovation, additive manufacturing and engineering.

First of all, EDIC must be well introduced to SMEs in order for future services to be successful. It is essential that SMEs understand EDIC's purpose well. By discussing with companies and all stakeholders under the title of different studies, both EDIC will be promoted and the needs of the companies will be determined. The fact that SMEs consider EDIC as an institution that will increase their capacities in design, engineering, prototyping and their confidence in this regard will affect the success of EDIC.

The fact that the main services, training and mentorship are provided by qualified experts of EDIC is one of the important factors affecting the sustainability of EDIC.

EDIC should be a reference point for SMEs with its systems, qualified employees and high quality services.

Future application service offerings may include:

- Find technical solutions
- Check technical feasibility
- Build product prototypes for SMEs and new businesses
- Design & Implement R&D projects
- Networking activities
- Access to finance service
- Technology/product commercialization service
- Intellectual Property Management
- Modelling
- Simulation
- Data Management
- Training and consultancy services
- Mentoring services
- Consultancy services
- R&D project development and implementation
- Technical Proposal writing services for EU funded projects



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Internationalization services

Support the development of new start-ups and encouraging new idea generation, e.g. incubation and acceleration services

The sub-objectives of a possible future cluster in automotive industry should include;

Analysis of the situation in cooperation between subcontractors , universities and other R&D institutions

Identification of best practice in the different aspects of cooperation

Promotion of automotive industry at universities and in other R&D or innovative institutions

Realization of pilot cooperative projects

Identification of the available ways for the further development of cooperation, through Research, Development & Innovation programmes or national programs.

And objectives may include;

Improve effective cooperation between R&D, education and private institutions in automotive industry

Develop strategies and partnerships to increase amount of highly qualified work force in the region

Improve the degree and intensity of transnational cooperation as well as to promote pilot joint research & development projects



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