

SME GROWTH NEEDS REPORT

TURKEY

SME
CLUSTER
GROWTH
EMPOWERED ENGINEERING



CLUSTERS
IN THE REGION

Role of
ENGINEERING
SMES
within the Regions



THREATS TO
TURKISH SMES



CONTENT

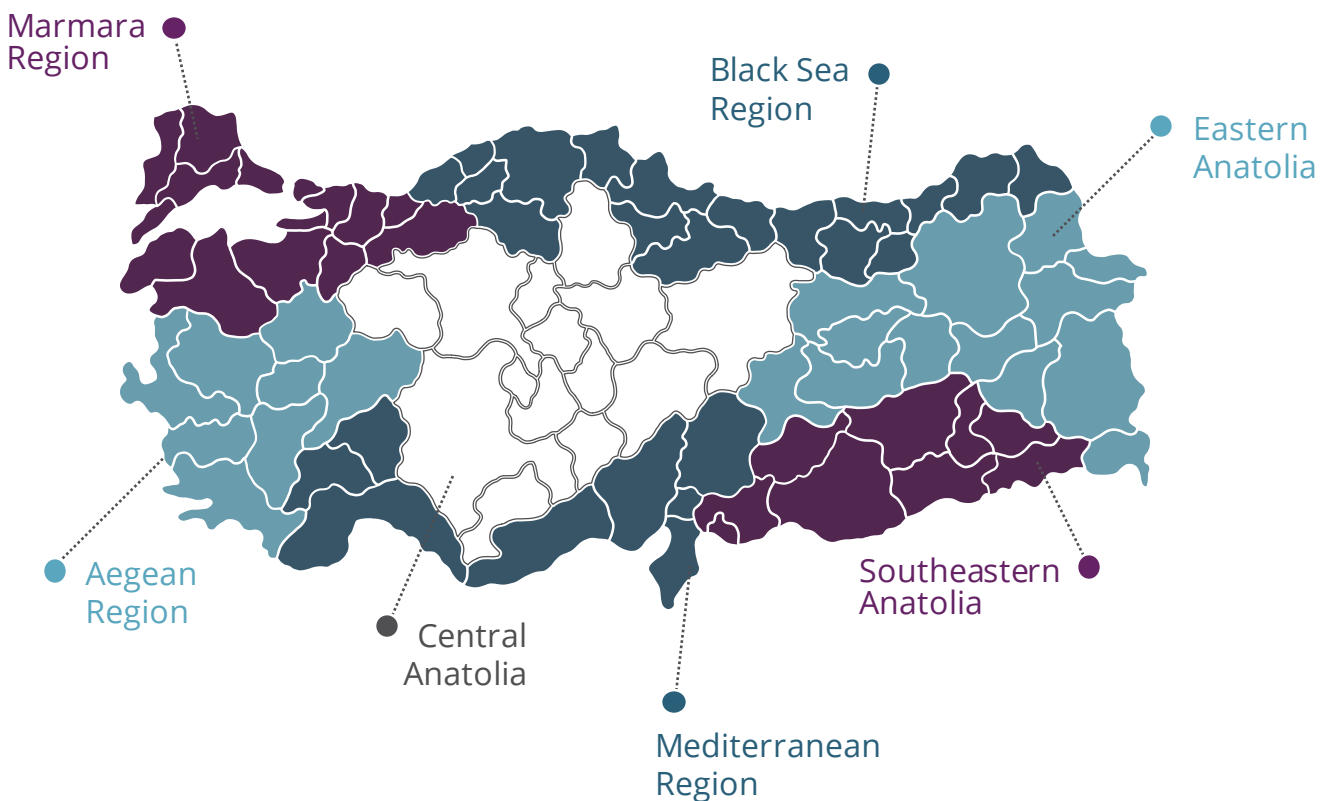
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NATIONAL CONTEXT

The Turkish business context is dominated by SMEs. According to Turkstat (2020), enterprises with fewer than 250 employees are classified as SMEs in Turkey. With the total number being around 3.2 million, SMEs in Turkey account for 99.85% of all companies, 76% of all workers, 63% of total turnover, 38% of capital investment, 54% of all investment, 38.9% of all industrial research and development, 59.2% of all total export, and 25.9% of total bank loans (KOSGEB, 2014), therefore play an important role in the Turkish economy (Demirbaş and Demirbaş, 2018). The size, added value, and

number of jobs resulting from Turkish SMEs show differences along the sectors. Turkish SMEs account for 40% of total output, comparable to other countries, with manufacturing accounting for 13% and construction accounting for 5% (Ministry of Industry and Trade, 2010). In this report, Turkish SMEs will be discussed in terms of several aspects, such as growth management, SME support systems, SME clusters, policy and finance systems, internationalisation, knowledge and innovation management, business ownership, and interactions with higher education.



Turkish Region Source: (WDC, 2019)

CLUSTERS IN THE REGION

Michael E. Porter (1990) presents clusters as regional populations of integrated enterprises and organizations in a given sector including a range of related industries and other competitive entities. Clusters are part of a broader context to consider the drivers of competition at state and national levels. Based on Porter's (1990) study of the Competitive Advantage of the Nations, this paradigm establishes a relationship between micro-based business activity and macro-economic policy. The principle of clusters reflects on the profits made by companies because of their links or their closeness to other companies. These gains come from teamwork, industry relations, waste and, in certain situations start-ups. Most of the processes, particularly spillovers and an increased number of start-ups are much more efficient locally (Brenner, 2005).

Parallel to the acceleration of regional growth in the world, especially after the 2000s, the recent emergence of cluster politics in Turkey is primarily due to the European Union accession process (Dulupçu et al., 2015). Specifically, clustering started in Turkey in 1999, under the direction of Michael Porter Middle East Strategy Center and the Turkish private sector along with the founding of the Competitive Advantage of Turkey (CAT) network. These were later converted and institutionalized into the National Institute of Competitiveness Research. The number and growth of clusters were

accelerated by the allocation of EU funds following the stage of early analysis and exploratory study. Specifically, the first regionalization was performed in 2004-2006 by the Preliminary National Development Plan, which was prepared for the sake of the EU. The legislative structure for setting up Regional Planning Agencies numbered 54-49 was adopted on 25 January 2006. In March 2007, the 'Developing National Clustering Policy' project was launched with financial assistance from the European Commission and has become one of Turkey's most prominent clustering projects. The initiative was intended to make Turkey a country with a national clustering strategy. The national institutional and constitutional capability for clustering was established in this context and the project outcomes have included a national strategy. In the framework of the initiative, an interinstitutional working group was established to cooperate with seventeen partners from political, research and academic institutions. The mission of SME clustering centers in Turkey is to acquire technological knowledge for export, ease control over foreign markets, provide technical assistance for product and service differentiation, inspire creativity and personal growth, stimulate knowledge exchange through opportunities for cooperation with domestic and foreign businesses, and facilitate entry into overseas markets and infrastructure monitoring opportunities to sustain export volume (Celik, Talas, and Akbaba, 2013).



ROLE OF THE ENGINEERING SMES IN THE REGION

SUPPORTING MECHANISMS

Structures that support SMEs

Supporting SMEs with suitable initiatives is essential for developed countries. Following the liberalization of the Turkish economy in the 1980s, Turkish firms encountered intensified external competition, stressing the value of innovation and university-industry collaboration (Pamukcu, 2003). Numerous organizations were established in the mid-1990s to promote innovation, including the Directorship for Small and Medium-Sized Enterprises (KOSGEB), the Directorship for Technology and Innovation Assessment (TEYDEB), and the Technology Development Foundation of Turkey (TTGV) (Temel et al., 2013). KOSGEB is the largest supporting agency in Turkey. According to Demirbaş and Demirbaş (2018), SMEs' inability to obtain external financing

has an impact on their ability to acquire properties, inputs, and operating performance, which has an impact on other functions such as production, marketing, and training. The Turkish government has launched dedicated investment credit initiatives to help SMEs resolve credit constraints in recent years, but these schemes have struggled to alleviate the financial disadvantages faced by Turkish SMEs, with 30% of companies reporting that accessing external finance is difficult (Kaygin et al., 2008, p. 4632). These institutions are intended to assist and direct businesses in implementing their own innovation strategies by receiving financial assistance through different programs.

Policy and Financing ecosystem

According to Beck and Demircuc-Kunt (2006), SMEs have restricted access to capital markets, regardless of whether they are located in developed or emerging economies, a situation known as the "financing divide." Many organizations, like the OECD, have looked into the 'financing gap,' and they too say that a significant number of SMEs are unable to raise sufficient funds to function effectively and are unable to obtain external financing from banks, capital markets or other financial institutions. According to the OECD (2006), the finance gap restricts an economy's growth, causes unemployment, reduces agility, and raises debt costs, all of which affect the capital structure's optimality.

Following the final domestic crisis in the economy in 2001, the economy expanded strongly and slowly, but a range of problems relating to management expertise, financial and human resources, and the innovativeness of Turkish SMEs emerged as significant factors challenging the SMEs role as the economy's backbone status. After the 2001 banking crisis and the implication of recovery policies, access to funding has increased with banks entering the SME market, and larger companies have started to take more direct loans outside of Turkey, increasing in rate from 2004 to 2008. Turkish SMEs had decent access to financial

organizations, and many businesses had credit, but when assessing the size of loans used in the country, Turkey's private sector takes less when compared with other countries even though the commercial bond market remains stagnant (World Bank, 2011). The small and medium-sized companies represent just 20% of total bank loans but represent 57% of GDP.

Despite the fact that KOSGEB actively engages with SMEs and develops strategies to improve Turkish SMEs' competitiveness and reduce their financial problems, Turkish SMEs continue to face numerous obstacles when it comes to obtaining financing (Demirbas and Demirbas, 2018). In contrast to bank financing, private equity and venture capital funds are comparatively negligible in Turkey. A number of Turkish private equity firms have been founded since 1996, but their size and participation in the sector are still small. The numerical insignificance of venture capital companies can be deduced by looking at Istanbul Stock Exchange (ISE). Just five venture capital investment trusts were listed on ISE in 2014, with a market valuation of US\$480 million. Venture capital, on the other hand, has limited significance for a vast number of SMEs due to the scope of loan sizes permitted and legal issues (Demirbas and Demirbas, 2018).



In Turkey, there have been several ambitious government measures to alleviate SMEs' financial problems. Following the financial crisis in 2009, the ISE created the Emerging Companies Market to support SMEs. SMEs are exempted from the quantitative provisions of exchange trading in order for them to access this fund. Furthermore, the Capital Markets Board of Turkey (CMB) and the Central Securities Depository of Turkey (ISE and CRA) cut their fees to encourage and fund SMEs. Financial companies are becoming more likely to issue debt financing. Ninety-eight financial institutions sold debt securities and instruments worth more than \$2 billion in 2013. In addition, 11 non-financial companies released bonds totalling \$490 million (KOSGEB, 2014). Despite the initiatives and developments listed, SMEs' financial problems remain as a major concern for the entire sector due to systemic and institutional reluctance and rigidities.



CHARACTERISTICS OF SMES IN THEIR EFFORTS TO GROW

GROWTH MANAGEMENT

Since the 1980s, the importance of SMEs in the economy has received a great deal of attention for two primary reasons (Özar, Özertan, and İrfanoglu, 2008). The first explanation, which is particularly important in developing countries, is that SMEs have the potential to generate jobs and alleviate poverty in a world with increasing unemployment and growing income inequality. The second explanation is that, especially since the late 1970s, emerging technology and transformation of manufacturing processes in the world have favoured small businesses over large enterprises. In this sense, there is an increasing awareness of small businesses' innovative nature, versatility in responding to unstable and volatile circumstances, and willingness to fit into global supply chains. As a result, small businesses are seen as generators of economic development. This viewpoint is also consistent with the value placed on SMEs by international organisations such as the OECD and the European Union (EU).



Company growth has been examined in the literature by emphasizing the significance of particular external and internal factors. Significant factors of the growth potential of SMEs are the entrepreneur's socioeconomic background involving their experience, education, and training, and the features of enterprises involving operation in a certain industry, being located in a particular cluster, being officially registered with a public institution, the availability of external finance and subsidies, and an entrepreneurial mindset (Özar et al., 2008). SMEs' growth performance has a direct relationship with domestic economic factors in Turkey. Specifically, Erzan and Filiztekin (2005) noted that exchange rates, inflation fluctuations, nominal interest rate volatility, and shifts in domestic demand have a negative impact on both SME value-added growth, nominal interest rates, as well as real wages. Additionally import penetration has a

positive impact on SME growth capacity. Moreover, the authors also emphasized that the sensitivity of SMEs to macroeconomic conditions should be understood as a result of their flexibility rather than their weakness. According to Özar et al. (2008) growth management of Turkish SMEs are highly related to the capabilities of the owner. Specifically, the authors noted that Turkish entrepreneurs have 8.6 years of formal education, and only 10% have received formal technical and vocational education. In addition, Turkish entrepreneurs primarily develop their talents by on-the-job learning. As a result, most entrepreneurs lack innovative and management skills, as well as the expertise and experience needed to grow their businesses. Also, according to Özar et al. (2008), Turkish SMEs perceive growth in terms of eliminating uncertainties related to survival and increasing their sales turnover.

KNOWLEDGE MANAGEMENT & INNOVATION MANAGEMENT

According to Bascavusoglu-Moreau and Colakoglu (2013), Eurostat data shows that Turkey, with a 0.59% and 0.85% share of R&D expenditures in GDP in 2005 and 2009 respectively, compared to 1.82 percent and 2.01%, ranked as last in the EU-27. In terms of invention production, Turkey has 2.31 (3.82) EPO (USPTO) patents per million individuals, compared to 113.8 (119.5) in the EU-27. Turkey is among the countries with the greatest improvement in the Global Innovation Index, despite results being significantly lower than those of the EU (INSEAD, 2011). R&D spending almost tripled between 2002 and 2007, and overall R&D spending has increased by 50% between 2003 and 2005, far more than EU-27 spending (9%) (Bascavusoglu-Moreau and Colakoglu, 2013).

The Turkish government owned KOSGEB has established policies to help SMEs improve their competitiveness by allowing them to expand their

research and development and innovation capabilities. There have also been steps taken to increase SME collaboration, promote new entrepreneurial efforts, and improve access to finance (KOSGEB, 2014). These goals will be achieved by improving information flow, financial education among SME owner-managers, and solving information problems through SME owner-manager training. KOSGEB has contributed to an increase in the share of SME loans through these programs.

In 2019, the total gross domestic R&D of financial and non-financial businesses accounted for ₺8 billion 984 million for SMEs. This is 31% of R&D spending for financial and non-financial firms—a total of 112,338 workers in full-time equivalent (FTE) R&D employed in financial and non-financial firms (FTE). SMEs hired 47.1% of those workers in terms of FTE. The number of patent applications and registrations by size group is given in Figure 1.

Size Class	Number of patent applications						Number of registered patents					
	2015	2016	2017	2018	2019	2020	2015	2016	2017	2018	2019	2020
Total	3 188	3 834	5 537	4 458	4 511	4 631	1 161	1 146	1 294	1 775	1 396	1 680
Micro	258	293	294	478	491	557	63	76	66	146	75	76
Small	297	286	336	424	461	436	128	118	108	192	113	94
Med.	356	305	345	406	464	570	174	137	134	206	137	162
SMEs	911	884	975	1 308	1 416	1 563	365	331	308	544	325	332
Large	2 277	2 950	4 562	3 150	3 095	3 068	796	815	986	1 231	1 071	1 348

Source: TurkStat, Small and Medium Sized Enterprises, 2020

Figure1: Number of patent applications and registrations by size groups

Patents by size class , 2015-2020

(Except programming and broadcasting activities, financial and insurance activities)

“Knowledge management serves as an organizational infrastructure that captures and leverages existing information and knowledge assets of the organization, facilitates information and knowledge dissemination across boundaries, and integrates the information and knowledge into day-to-day business processes” (Liebowitz and Beckman, 1998, p. 20). Because of the unique features of SMEs, such as their compact size, versatility, and informal environment, knowledge management is carried out differently than in larger corporations (Temel and Durst, 2018). In general, SMEs benefit from the implementation of knowledge management compared to big companies in terms of their organization. With more and better employment and greater social stability, the Lisbon Strategy states that the EU is the world's most diverse and efficient knowledge-based economy capable of sustained development (Apak

and Atay, 2014). However, according to Kahraman and Bozbura (2007), a large number of small to medium-sized enterprises in Turkey are family businesses, and they do not want to recruit the leading roles outside of the family, sometimes resulting in not hiring experts for managerial roles. Senior managers agree that exchanging experience are not essential to the success of SMEs in Turkey, and they there is reluctance in creating and reporting company knowledge. This places strong hurdles to organizational learning and makes knowledge transfer more difficult. On the other hand, according to recent research (Metek and Belgin, 2021), Turkish SMEs have been improving their knowledge management processes, especially in the sectors where internationalisation and competitiveness are high such as the automobile industry.



BUSINESS OWNERS

The most important problem in SME management, according to Kaya and Alpkın (2012), is non-professionalized management, which arises from the fact that in SMEs, business ownership and management are carried out by the same individual, and the business owner is the only person allowed to make decisions. Specifically, Kaya and Alpkın (2012) noted that SMEs in Turkey are generally family-businesses, run and owned by family members, especially males. In terms of leadership styles, paternalistic leadership and transformational leadership are among Turkish SMEs' most common leadership styles (Özer and Tinaztepe, 2014). The effectiveness of relational-based leadership styles among Turkish SMEs is consistent with the collectivistic nature of the Turkish business environment.



HEI ROLE

University-industry collaboration is a popular topic in developing countries. Specifically, the effect of innovation policy and university partnership on the success of SMEs is a chief concern of emerging economies' technology and innovation strategies (Temel, Scholten, Akdeniz, Fortuin, and Omta, 2013). The underlying premise is that a stronger emphasis on an innovation-based approach and university cooperation would increase SMEs' information assets, giving them a competitive advantage. Consequently, emerging economies like Turkey have devoted policy initiatives to foster SMEs' innovative competitiveness and create incentives for them to engage in partnerships with university institutes (Temel et al., 2013).

Turkey is one of the developing countries seeking to close the gap between academia and business to increase the competitiveness of SMEs. Some support programs allow businesses to collaborate with universities and educational institutions to qualify for additional subsidies. The overarching goal of these support programs is to improve firms' innovation potential and, therefore, their competitiveness. The growth of Turkey's innovation

infrastructures has been significant thanks to support programs that were launched later in comparison with other European countries (Temel et al., 2013).

The recently implemented financial innovation funding schemes allow businesses to partner with universities in their innovation efforts, and this collaborative approach is almost the only way for firms to obtain access to the majority of the financial grants. For example, the 'Industrial Theses-SanTez' innovation support scheme necessitates the development of collaborative research ventures leading to postgraduate degrees. Since universities are among the main organizations in the Turkish National Innovation System (Arikan, 2009), more businesses are searching for ways to establish long-term relationships with academia to obtain access to various funding schemes and other financial rewards for innovation (Temel et al., 2013). This is mirrored in the levels of R&D-oriented firms, which has been steadily increased from about 1% to 1.4 % in 1995, and public R&D funding funds, which increased significantly to 2.1% in 1997 and 2.5 % in 2000. (Taymaz, 2009).

GO INTERNATIONAL



Johanson and Vahlne's Uppsala Internationalization Process (UIP) model is the most common standard theory of SME internationalization and demonstrates that companies are steadily and progressively internationalized due to high volatility, lack of information about global markets and high risk (Karabulut, 2013). The entry and expansion of international markets is a risky practice, as the UIP model emphasizes. In order to minimize the probability of loss, a company must gain information and awareness of target audiences. Johanson and Vahlne (1977) suggest that companies can learn more about the competition by enhancing their business engagement (Boehe, 2009). Hallen and Wiedersheim-Paul (1979) propose that the UIP model argues that companies are faced with global market barriers as a result of the 'psychological gap' that blocks or disturbs the exchange of knowledge between companies and markets (differences in language, culture, political environment, etc.). The model states that the lack of expertise is a major impediment to foreign operations, expertise that can mainly be gained by activities outside. Gradual information learning raises external contributions. The paradigm consists of a self-intensifying period of accumulation of expertise, risk avoidance and greater business engagement (Karadeniz and Göçer, 2007).

Turkish SMEs are gradually internationalizing, as Uppsala Theory has stated (Karabulut, 2013). They do not use information technology in their internationalization process, rather they depend on exports and earn a minimum of 20% of their revenue from export sales. The owners of these SMEs are well educated, can understand at least one foreign language and have previous experience but have no previous knowledge of the foreign sector. Turkish small business entrepreneurs do not have sufficient global market experience prior to internationalization and they do not concentrate on finding overseas partners or extending their external transactions by using FDI.

In addition, Karadeniz and Göçer (2007) also found that Turkish SMEs' internationalization process has a strong association with the age and scale of companies. They argue that Turkish SMEs follow the pattern of the Uppsala paradigm, which proposes that international interaction would build awareness and further internationalization information. By expanding, companies will be able to invest more money in foreign business and eventually boost their international revenue share. The bigger the company, the more money available for the foreign operations of the company.

Moreover, according to Turkstat (2020), 36.6% of total exports and 21.5% of imports for 2019 in Turkey were carried out by SMEs. Specifically, 58.4% of the exports of SMEs were realized by the enterprises operating in the commercial sector and 37.5% by the enterprises operating in the industrial sector. Export and import values of SMEs between 2013 and 2020 are given in Figure 2.

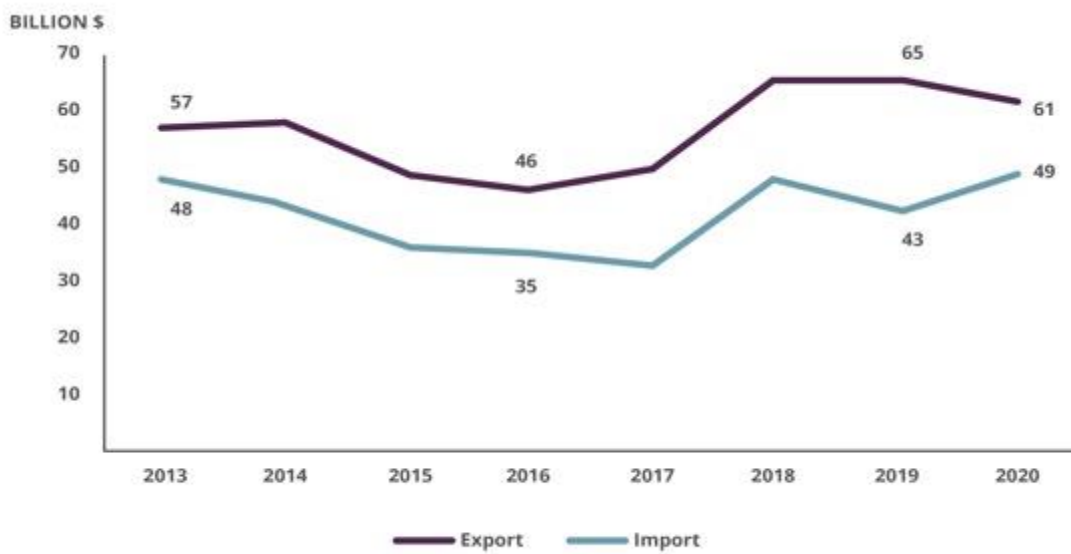


Figure 2: Export and import values of SMEs (Billion US \$), 2013-2020

Source: Turkstat (2020)

According to Figure 2, the export value of SMEs, which was \$57 billion in 2013, increased to \$65 billion in 2019. In imports, the value, which was \$48 billion in 2013, decreased to \$43 billion in 2019, with an increase to \$49 billion in 2020. The following Figure 3 shows export-import values of SMEs by country groups.



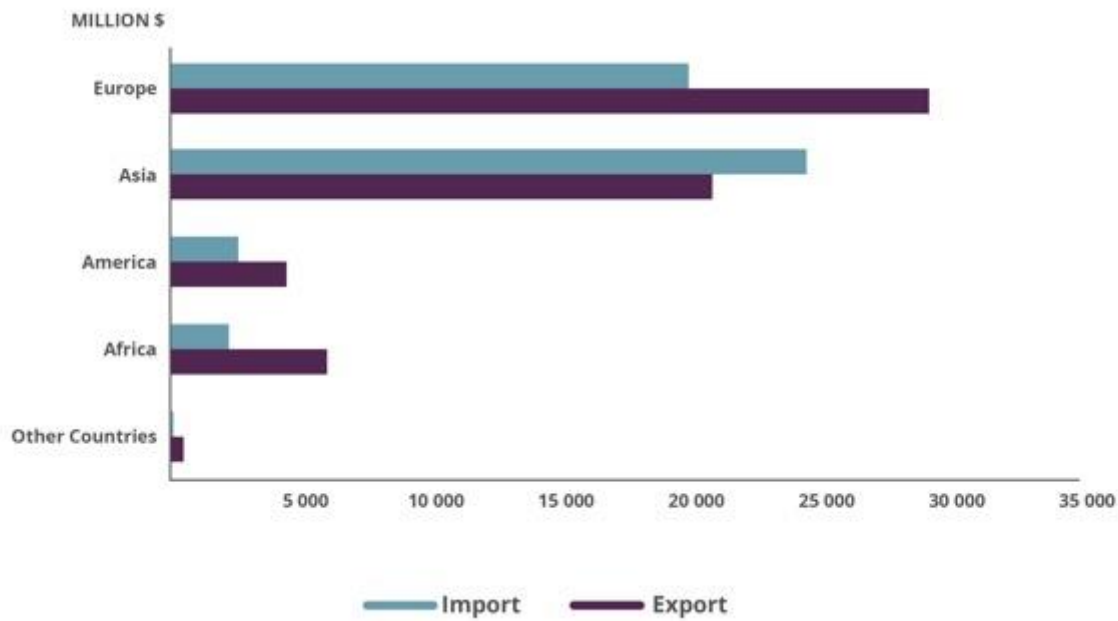
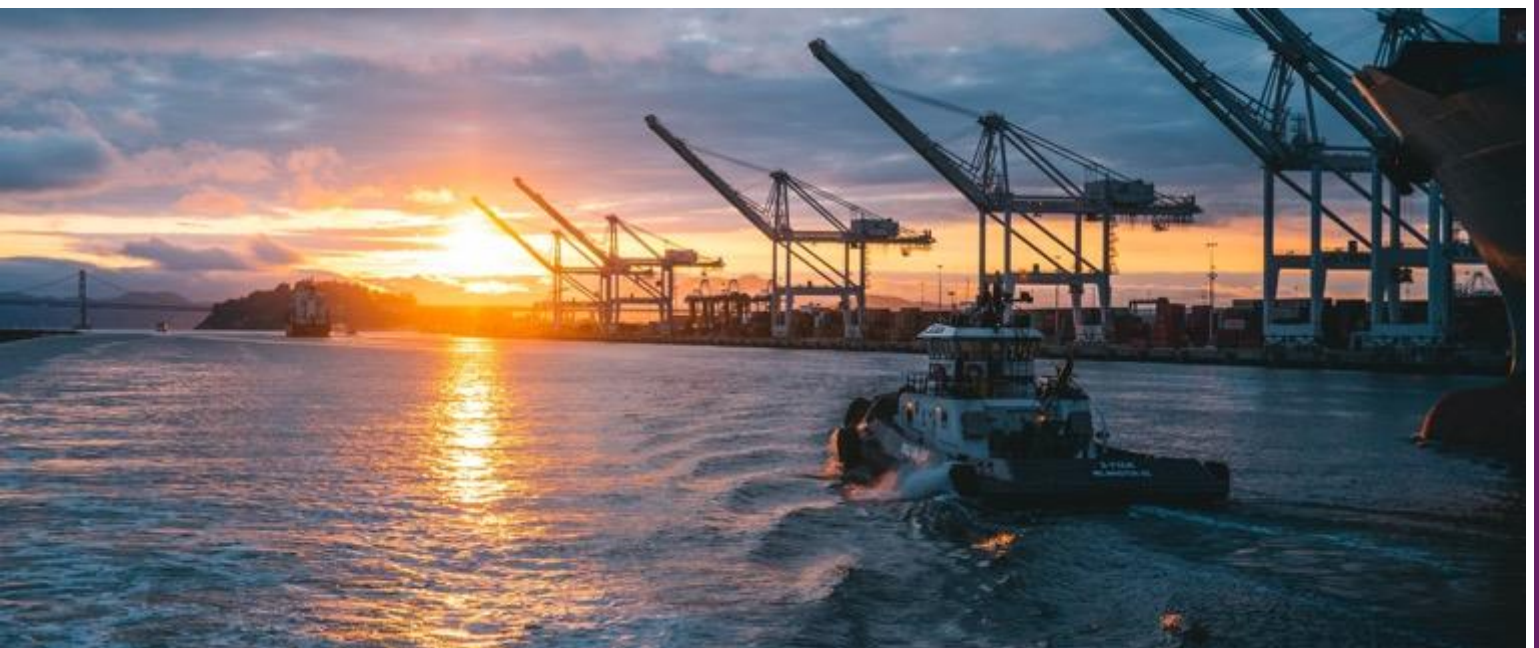


Figure 3: Breakdown of export and import values of SMEs by country groups (Million US \$), 2020

Source: Turkstat (2020)

According to Figure 3, 46.1% of the exports made by SMEs in 2019 were made to European countries and 36.5% to Asian countries. SMEs made 42.9% of their imports from European countries and 47.0% from Asian countries. In 2019, exports of small and medium-sized businesses represented 14.4% of the garment industry, 10.2% of apparel goods, and

10.1% of machines and appliances not otherwise listed. The most notable import goods in 2019 for SMEs were base metals with 20.1% of imports, chemicals and pharmaceutical products with 16.8% of imports, machinery, equipment not categorized elsewhere with 10.8% of imports, farm, and hunting products with 6.5% of imports.



CLUSTER COUNCIL MEETING

TURKEY, 28TH SEPTEMBER 2021 1ST MEETING ACCOUNT

PARTICIPANTS

Firstname	Surname	Position
Cengiz	Bıçakçioğlu	Sistem Global Consultancy Regional Partner
Cem	Duran	Teknopark İstanbul Vice Director
Cem	Soysal	İTU Alumni Association Board Member
Ercan	Çitil	İstinye University, TTO General Manager, formerly İTU TTO General Manager
Hale	Karakaş	İTU Textile Engineering Faculty Member
Hilal	Gerçek	Habitat Association Deputy General Secretary
Oktay	Taş	İTU Management Engineering Faculty Member
Selma	Bahçivanoğlu	İTU ARI Teknokent Incubation and Acceleration Programs Manager
Şafak	Tercan	İTU Alumni Association Board Member
Yakup	Hacıyakupoğlu	Işık İnşaat Taahhüt Kimya San Ltd Owner
İTU	GİNOVA	Şebnem Burnaz-Zeynep Erden Bayazıt-Alper Yurttaş

AGENDA

1. Presentation of the European project Growth of SMEs Erasmus +
2. Presentation of the various members present at this first meeting
3. General vision and mission of the Board
4. First topics: European aspect of the programme and relations with universities as well as the first major topics that emerge from the interviews and use cases carried out within the framework of the European programme
5. Calendar of future meetings (quarterly)

CONTENT OF THE DISCUSSIONS

1. Description of “Engineering SME” – Engineering SMEs have been defined within the scope of the project and the following are the themes that emerged around this topic:
 - Focusing on a vertical where technology is used more, e.g. healthcare or deeptech
 - Focusing on digitalization for traditional SMEs. Following a needs analysis, coming up with solutions
 - İstanbul Teknopark may be a use case where there is a cluster of deeptech startups
2. “Growth” was discussed. Participants reflected on the field findings. The initial findings of not wanting to grow and the underlying factors were discussed. Due to difficulties of after-growth, ‘not growing’ can be a choice rather than a capability problem.



SUMMARY OF DISCUSSION:

- There is no barrier to reach the technology
- The problem of not having value added products and not exploiting engineering skills
- The pain of growing, stemming from legislations such as tax on raw material, syndication over 50 workers
- Limited support from the banks/problem with capital
- SMEs being family businesses and succession problems
- Resistance towards internationalization
- Lack of successful UBC examples
- Need for Academic Incubation Centers
- Outside of major cities such as İstanbul, Ankara, İzmir, there is a high potential of commerce leading to little of technology

SOME PATHWAYS:

- Showing “Best practices”
- Reaching out to founders with limited management education
- Showcasing successful UBC practice
- Focusing on certain industries and cross industry joint projects
- Focusing on digitalization
- Building relations with public institutions who are in similar Erasmus+ projects

NEXT STEPS:

- The SME Growth report will be shared in the next meeting
- The next Council Meeting is planned for the end of November. In the meantime, the participants in this first cluster council meeting will recruit new members.

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