İKMİB Media

Chemist

Free of charge İKMİB's magazine. July/August 2022 Issue: 69

The message of the president

EDUCATION AND FUTURE VISION!

One of the most important inventions of the 20th century is undoubtedly computers.

We can say that the thing that saves computers from being just a typewriter and a simple calculator is the internet, which is the invention that changed our lives completely.

Today, the main reason why we can talk about concepts such as dark factories, digitalization, Industry 4.0, and Society 5.0 is the internet.

Internet means technology, it means technological development.

One of the versatile changes that the internet has brought to our lives is that it has started to transform the world of education and training.

While conventional education teaches information whose accuracy and classification has been determined by others, the Internet offers opportunities that put the accuracy under our control and make our world of influence eternal rather than a few things affecting us.

The culture of education, which is usually given in schools, is that an assumption that is thought to be correct can be fed with another assumption and eventually a completely different correct result can be reached.

The Internet encourages all assumptions, thoughts, examples and judgments to be considered outside of conventional patterns.

The only way to get rid of the intellectual patterns that Edward de Bono calls "Arrogance woven by the established patterns" is to construct an inquiry and developmental education model in which our young people can develop their "multidimensional thinking" abilities.

Because only in this way can they develop new, original and different ideas that can change the world.

It should not be forgotten that 'Science develops with relations that criticize each other rather than relations that support each other.'

THE EDUCATION MODEL MUST BE REMOVED FROM ROTE LEARNING

So, we can say that our education model needs to be removed from rote learning and an interrogative transformation.

We must provide quality, inclusive and equitable education and promote lifelong learning opportunities

While we are building our future, we need young people who can manage people rather than those who manage the business.

Rather than seeing and raising our young people only as human resources focused on working life and managing the business; It is imperative that we see them as 'human values' that will nurture leadership characters, develop social intelligence and skills, and build an education model accordingly.

We can consider the strategy of this model in a framework that will enable young people to specialize in a certain subject in the field of education and business, allow them to improve their deficiencies, and choose the easiest one among them.

Unfortunately, unless we establish an education system that trains young people who work with each other instead of competing with each other, as long as we resist in an education system that teaches everything by heart and teaches nothing, unless we create a curriculum that develops talents, unless we train minds that can criticize and question, we will unfortunately raise young people who are not able to establish a system but only fit the system...

Stay safe and healthy...

Adil PELİSTER
Head Of İKMİB

Chemist

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Concessionaire
On behalf of IKMIB - İstanbul Chemicals and Chemical Products Exporters' Association - Aydın Yılmaz

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CHEMICAL INDUSTRY IS PROCEEDING TO THE CHAMPIONSHIP IN EXPORT

The chemical industry is on its way to the championship with its export leadership on an industrial basis, which it has maintained for 6 consecutive months in 2022. The chemical industry, which realized an export of 2.95 billion dollars in August, achieved a 44 percent growth compared to the same period of the previous year and tripled the overall export growth rate of Türkiye in this field.

According to the data of the Turkish Exporters Assembly (TİM), Türkiye realized 21.3 billion dollars of exports in August with an increase of 13.1% compared to the same period of the previous year, while the chemical industry was the industry with the highest foreign sales. The chemical industry also succeeded in achieving an increase of 44 percent compared to the same period of the previous year with its export of 2.95 billion dollars in August. On the other hand, when the eight-month period of the year is taken into account, the chemical industry, which reached a total of 22.6 billion dollars in exports, grew by 42 percent compared to the same period of the previous year.

Adil Pelister, President of İstanbul Chemicals and Products Exporters' Association (İKMİB), underlined the success of the chemical industry in exports and made these evaluations. Pelister, in his evaluation stated that "Our country has continued its strong growth with 7.6 percent in the second quarter after the first quarter. The contribution of net exports to growth has been 2.7 points in this period. As the export leader, our chemical industry is one of the industries that has contributed the most to growth. Our industry exported 2.95 billion dollars in August. In the eight-month period of the year, our exports increased by 42 percent and exceeded 22.6 billion dollars. At the beginning of the year, we revised our target of 28 billion dollars as 30 billion dollars. If we continue in this way, we believe that we will exceed this figure. Of course, on the other hand, we also have financial and supply problems, especially energy costs, supply problems, commodity prices and exchange rate volatility. In addition, the energy and

Monthly Basis Chemical Exports in 2022

MONTHS	2021 VALUE ($)	2022 VALUE ($)	DIFFERENCE (%)
JANUARY	1.638.159.997,39	2.130.501.821,43	% 30,05
FEBRUARY	1.676.254.152,25	2.441.646.513,64	% 45,66
MARCH	2.000.447.372,40	2.987.796.825,97	% 49,36
APRIL	2.172.248.718,71	3.309.494.517,12	% 52,35
MAY	2.143.403.710,57	2.766.974.153,79	% 29,09
JUNE	2.375.250.486,42	3.194.326.960,28	% 34,48
JULY	1.915.796.402,97	2.902.688.829,43	% 51,51
AUGUST	2.051.697.888,50	2.953.652.738,36	% 43,96
TOTAL	**15.973.258.729**	**22.687.082.360**	**% 42,03**

Countries with the highest chemical exports in August 2022

NO	COUNTRIES	AUGUST 2021 VALUE ($)	AUGUST 2022 VALUE ($)	CHANGE VALUE (%)
1	ITALY	68.118.349,68	201.023.929,32	% 195,11
2	RUSSIA	51.732.468,82	167.185.373,49	% 223,17
3	USA	110.133.235,16	145.255.214,85	% 31,89
4	HOLLAND	141.962.307,24	140.913.505,89	% -0,74
5	SOUTH AFRICA	9.477.396,15	131.166.754,16	% 1.284,00
6	IRAQ	97.903.589,32	114.980.171,59	% 17,44
7	ROMANIA	61.582.171,21	114.501.325,81	% 85,93
8	GERMANY	94.760.139,76	105.469.474,25	% 11,30
9	SPAIN	66.610.657,37	93.787.113,80	% 40,80
10	ENGLAND	79.203.545,78	91.505.541,83	% 15,53

economic crisis to be experienced in the European Union, where we export the most, poses a risk for us, especially in the last quarter and the first quarter of next year. Therefore, it is of great importance that investments are made quickly in our chemical industry, which will provide high added value, and that our companies scale up."

THE HIGHEST RATE OF EXPORT IS TO ITALY

According to the export data of İKMİB, the highest export was made to Italy in August with a value of 201 million dollars. This country was followed by Russia with 167 million dollars and the USA with 145 million dollars. Holland, South Africa, Iraq, Romania, Germany, Spain and England followed these three countries in August exports, respectively. On the other hand, it was observed that the highest increase in foreign sales among these 10 countries

was realized in South Africa with a rate of 1,284 percent. Considering the January-August period of 2022, the top 10 exporting countries are Holland, Italy, USA, Romania, South Africa, Germany, Lebanon, Spain, Iraq and Russia.

On the other hand, when the export of product groups is analyzed in the same period; exports of plastics and its products ranked first with 870 million 581 thousand dollars. This was followed by mineral fuels and products with an export of 819 million 769 thousand dollars. Then, inorganic chemicals with 308 million 714 thousand dollars, essential oils, cosmetics and soap with 157 million 590 thousand dollars, paint varnish, ink and preparations with 130 million 928 thousand dollars, and fertilizers with 128 million 855 thousand dollars were listed. The rubber and rubber goods industry ranked in the top 10 on a sectoral basis, with exports of 124 million 177 thousand dollars, pharmaceutical products with 106 million 294 thousand dollars, various chemicals with 96 million 480 thousand dollars and organic chemicals with 89 million 623 thousand dollars. Meanwhile, in August, the highest increase on a sectoral basis was realized by the glycerine, herbal products, degra, oily ingredients product group, which achieved a growth of nearly 1388,5 percent.

Pelister will represent the chemistry family as the vice chairman of the team

A great responsibility to Adil Pelister, the President of İstanbul Chemicals and Products Exporters' Association (İKMİB), after the distribution of duties in the Turkish Exporters Assembly (TİM). Pelister, in charge of the vice chairmanship of TİM, will represent the chemistry family at the highest level in his new position.

Adil Pelister, who has been successfully serving as the President of the İstanbul Chemicals and Chemical Products Exporters' Association (İKMİB), for two terms, will serve as the Deputy Chairman of TİM in the new board of directors of Mustafa Gültepe, who was elected as the President of the Turkish Exporters Assembly.

Pelister, with his strong management at İKMİB, has succeeded in bringing the chemical industry to the first place in exports on an industrial basis, and expressed that he will work to increase Türkiye's share in world exports in his new position together with the Turkish Exporters Assembly management.

"TOGETHER WE WILL WALK TO NEW TARGETS WITH OUR STRONG EXPORT FAMILY"

Making evaluations about his new duty, TİM Deputy Chairman and İKMİB President Adil Pelister stated the following views:

"First of all, I congratulate our President of TİM, Mr. Mustafa Gültepe, and wish success to our new board of directors. Our export family plays a very important role in the growth of our country's economy, the development of our industry and the increase in our employment. We are a strong and big family with 27 sectors and 61 exporters' associations under the roof of TİM. Especially in the last 2 years, while signing historical records in exports; We are working together to increase the quality of our exports, to carry the "Made in Türkiye" quality to all over the world, to increase our share in global exports and to maximize our export value per kilogram. I believe that by acting with the same common mind in the coming period, we will undertake projects full of vision that will cross the threshold in exports for Türkiye.

With the synergy we achieved with our chemical exporters in İKMİB, we have succeeded in carrying our chemical industry to the first place in exports. We continue to work with all our strength for the permanent first place. However, as we promised, we will represent our chemical exporters at the highest level in the TİM Board of Directors. As the export family, we believe that we will break new records under the leadership of TİM and move Türkiye to the next level in exports. I would also want to thank İsmail Gülle, who was our previous TİM President, for his devoted and successful work so far."

Turkish companies became prominent at PLMA fair

'PLMA's World of Private Label' fair was held in Amsterdam for the first time after two years due to the pandemic. In the fair that İKMİB organized the Turkish national participation organization, 139 Turkish companies from many sectors such as cosmetics, cleaning, plastic houseware and packaging became prominent.

Organized for the private label products industry, 'PLMA's World of Private Label' fair was held in Amsterdam, the Netherlands from May 31 to June 1 this year. Turkish companies showed great interest in the fair, which was suspended for two years due to the pandemic. At the fair that İKMİB has been organized national participation for the 12th time with the 75 participant, total of 139 Turkish companies exhibited their products.

At the 'PLMA's World of Private Label' fair, the cosmetics, personal care, cleaning, plastic household goods, packaging and food industries brought their new products to potential buyers. İKMİB Vice Chairman İmer Özer and İKMİB Board Member Uğur Adıyaman and Murat Öztürk participated to the fair. Ambassador of Türkiye in the Hague Şaban Dişli, Consul General of Türkiye in Amsterdam Engin Arıkan, Rotterdam Commercial Attaché Veysel Parlak, Assistant Commercial Counsellor in the Hague Aşkın Pekel, Secretary General of İMMİB Dr. Selahattin Armağan Vurdu and Deputy Secretary General Aydın Yılmaz visited and wished success to the participating companies.

"PRIVATE LABEL PRODUCTS INDUSTRY IS GROWING EVERY YEAR"

Adil Pelister, President of İKMİB, pointed out that the private label products market is growing every year and said, "The interest shown by the consumers in private label products in our country continues to increase every year. We can notice this from the figures announced by the PLAT Association every year. Private label products become attractive because they offer quality to the consumer at an affordable price. It is possible to come across these store products in many categories, from cosmetics to hygiene products, from plastic household items to cleaning products. PLMA's World of Private Label fair for this sector is the most important fair that brings together manufacturers and retailers. I wish all our participating companies to be productive and increase their trade volumes and exports with new business connections."

Sharing his views on the fair, İKMİB Vice Chairman İmer Özer said, "All of our 139 participating companies held a very productive fair. In this period of increasing global inflation, private label continues to grow all over the world. After two years, it was very good to be together with our potential and current customers at this fair. As İKMİB, we are working to increase the number of such qualified organizations."

“Georgian health sector excites us”

‘Health Sector Georgia Sectoral Trade Delegation’ İKMİB brought together 19 buyer companies and 9 Turkish company representatives and laid the groundwork for 55 bilateral business meetings. İKMİB President Adil Pelister said, “We are excited by the Georgian health sector,” and said that they attach importance to this country.

İstanbul Chemicals and Chemicals and Products Exporters’ Association (İKMİB), which aims at the Georgian market in the health sector, held 55 bilateral meetings with the “Health Sector Georgia Sectoral Trade Delegation” organized in this country. The sectoral trade delegation, which was organized for the entire health sector, especially drugs sold to end users in pharmacies and OTC products, was held in Tbilisi, the capital of Georgia, between 27-30 June 2022.

In addition to İKMİB TİM Delegate A. Altuğ Oğuz, 13 officials representing 9 Turkish companies participated in the sectoral trade delegation. Within the scope of the four-day event, meetings were held with the Republic of Türkiye Tbilisi Commercial Consultancy, Independent Industrialists’ and Businessmen’s Association (MUSİAD) Tbilisi, Georgia Turkish Businessmen’s Association (GÜRTİAD). In addition, GEA company, one of the largest importers and distributors of pharmaceutical products in the Caucasus region, was visited on its site. While briefing was given to the İKMİB delegation by the Ministry of Health of Georgia, a meeting was also held with Iraqi Margvelashvili, the representative of Association of Pharmaceutical Companies Representatives in Georgia (APCR).

During the event attended by 28 Turkish and Georgian companies, a total of 55 bilateral business meetings were held where new cooperation opportunities were discussed. During the bilateral business meetings, the leading Georgian companies and suppliers of the sector and Turkish companies came together.

GEORGIA IS AN IMPORTANT MARKET FOR THE TURKISH HEALTH SECTOR

Making an evaluation about the sectoral trade delegation, İKMİB President Adil Pelister pointed out that Georgia has an important market potential for the Turkish health sector and gave the following information: We learned that the market will open for quality Turkish medicines. However, we believe that the expected positive developments will be beneficial for our medical and cosmetic industries as well as the pharmaceutical industry.”

Reminding that while the export of pharmaceutical products was 1 billion dollars in 2019, it was 1.42 billion dollars in 2021, Pelister said, “This year, our exports of pharmaceutical products in the first quarter amounted to 347 million dollars. The share of the sector in chemical exports increased from 20 percent to 36.1 percent in 2021. Our pharmaceutical exports to Georgia, on the other hand, increased by 127 percent from $27.3 million to $61.8 million in the last 5 years. Therefore, we are excited about this potential in Georgia.”

Turkish economy continued to grow in the second quarter of 2022

The Turkish economy continued its growth trend in the second quarter after the first quarter of 2022. According to TÜİK data, expressing that exporters also contributed greatly to the Turkish economy, which achieved a growth of 7.6 percent in the second quarter of the year İKMİB President Adil Pelister said that production excitement increased with these developments.

Announced by the Turkish Statistical Institute (TÜIK), within the scope of the Turkish economy's growth data for the second quarter of 2022, sharing positive signals for the future gave hope to the country's production dynamics. Stating that exports also contributed significantly to the 7.6 percent growth in the second quarter within the framework of TÜİK data, İstanbul Chemicals and Chemical Products Exporters' Association (İKMİB) President Adil Pelister stated that the chemical industry also has an important role in this point and that production excitement has increased. Pelister, in his statement evaluating the second quarter data of TÜİK 2022, gave the following views:

"CHEMICAL INDUSTRY EXPORTS INCREASED BY 38.59 PERCENT IN THE SECOND QUARTER"

"After growing 7.3 percent in the first quarter of 2022, our country achieved a stronger growth of 7.6 percent in the second quarter. In sectoral growth, there is an annual increase of 7.8 percent in the industry in the second quarter. The export of goods and services increased by 16.4% in the second quarter. The contribution of net exports to the growth was 2.7 points.

As the export leader, our chemical industry grew by 38.59 percent in the second quarter compared to the same period of 2021 and exported 9.27 billion dollars. Compared to the first quarter of this year, there is an increase in exports of more than 23 percent. As the chemical industry, we are working to maintain a stable export performance. On the other hand, we closely follow inflation pressure, parity and exchange rate fluctuations, commodity prices and developments in the nearby geography. Our exporters have the highest expectations in terms of access to finance. Alternative market studies and high value-added production investments are important against the recession risk. The growth of our country will accelerate with the investments and incentives will be made in the chemical sector, which provides input to all sectors. For this reason, we, as İKMİB, continue our efforts to activate the Chemistry Technology Centre, which will build the future of our industry."

FOR STUDENTS' QUALIFIED LABOR PRACTICAL SKILLS MUST BE DEVELOPED IN ADDITION TO KNOWLEDGE

In order to develop the qualified workforce needed by the Turkish industry, in addition to the technological knowledge in vocational education, the individual abilities of the students such as quick thinking and practical skills must be updated in a way that is suitable for the era and can get ahead of the competitors.

With the rapid development of technology and the inclusion of the concept of Industry 4.0 in the production processes in the industry about 10 years ago, qualified workforce is among the most important needs of the industrialists. However, there are statements on many platforms that young people graduated from vocational high schools or universities have deficiencies in terms of qualified workforce and cannot meet the expectations. While updates are made in the vocational education curriculum in order to provide a qualified workforce, targets cannot be achieved in the face of rapidly developing production processes in terms of technology. For this reason, when young graduates enter the business life, time is spent in order to access new information and practices related to business processes in the relevant workplace. This time spent causes it to lag behind its competitors in the production processes that progress with very fast systems and methods.

Many chambers of industry and commerce, which are members of the Union of Chambers and Commodity Exchanges of Türkiye, and exporters' associations under the umbrella of the Turkish Exporters Assembly, are also taking important initiatives in many fields for qualified workforce in order to carry vocational education to better levels. Schools are supported both technologically and in terms of internship in order to enable the young people who receive vocational training to adapt better when they enter business life, while successful results are obtained. However, it is necessary to reflect this limited practice to all schools and to reach the target faster.

On the other hand, in a period in which technology is developing very rapidly, the education curriculum should include innovations not based on current technology, but also by foreseeing the future. In addition to technological knowledge, it is inevitable that students' individual abilities such as quick thinking and practical skills will be updated in a way that is suitable for the era and can get ahead of their competitors. The right steps to be taken regarding these developments and the right practices can support reaching the targets in the qualified workforce.

FINLAND OR SWITZERLAND MAY OFFER A ROADMAP IN VOCATIONAL EDUCATION

For right practices, examples of Finland or Switzerland, which are shown as examples for their achievements in the field of education, can be considered. While the practices in these countries are discussed in detail in

the following pages of the news, it can also offer a roadmap for Türkiye. In addition, in India, one of the countries that attracted attention in recent years, the problems of qualified labor in the chemical industry come to the fore, and at this point, the important determinations and solution suggestions of the experts draw attention. Among the practices of these countries and other successful countries, it is seen that university or vocational education institutions - industry cooperation is blended. With the cooperation established, the internship processes of the students are built entirely on practice within the industry. Thus, the student has the necessary equipment within the scope of the expectations of the industry before graduating. In this process, the student both secures his job if he graduates, and the industrialist has a qualified workforce. In order for the Turkish industry to increase and maintain its competitiveness in production, it needs to develop its qualified workforce in the axis of practice, as well as technology.

In the meantime, it is necessary to take into account the reports on the data on education. At this point, it is also important to examine the World Bank Human Capital Index data, which countries are at what level and how Türkiye can move its current situation forward on a global scale. Therefore, in order to have information on the scale of the data, the news content includes details from the Human Capital Index.

"SECTORAL VOCATIONAL HIGH SCHOOLS MUST BE EXPANDED"

Stating that the chemical industry includes 16 sub-sectors from cosmetics to plastics, from medical

Pelister, President of İKMİB, commented on the opinions they received from member companies on qualified workforce, "More emphasis should be placed on university-industry cooperation. In addition, it is foreseen that the expansion of sectoral vocational high schools and/or the establishment of specialized chemistry universities will be a solution to the problem of qualified labor in our industry.

devices to paints, from organic and inorganic chemicals to rubber and adhesives, İstanbul Chemicals and Chemical Products Exporters' Association (İKMİB) President Adil Pelister also touches upon the importance of qualified workforce. Underlining that the chemical industry generally provides significant employment as a capital and technology-oriented field, Pelister reminds that they increased the number of employees by approximately 7 percent in 2021. Stating that the chemical industry employs more than 402,000 people according to the latest data of SSI, Pelister shares the following views on the qualified workforce:

"The opinions we receive from our member companies, especially on qualified workforce in our industry; are united in giving more importance to university-industry cooperation. In addition, it is foreseen that the expansion of sectoral vocational high schools and/or the establishment of chemistry specialized universities will solve the problem of qualified labor in our industry. In accordance with each production sector, cooperation between vocational schools and manufacturing sector companies should be strengthened, and the number of qualified employees should be increased by providing long-term internship opportunities to vocational high school students. In addition, providing incentives such as insurance premiums or retirement benefits for young people who do internships in industry and production can contribute to the preference of working in the manufacturing sector instead of a desk.

Stating that İKMİB also works on the qualified workforce of the chemical industry, meeting young people at an early stage, and initiating industry-university cooperation at an early stage, Pelister said, "We established our 'Young Chemists' committee in 2020. In our committees, sectoral experiences and shares, as well as problems and solutions are discussed. Therefore, we expect our young people and entrepreneurs to join this committee for a qualified workforce."

QUALIFIED LABOR IS ON THE AGENDA OF İKMİB

Qualified workforce, which is of great importance for the Turkish industry, is an important agenda item in every sector, and is among the priority issues of the chemical industry. In this context, the opinions of the company representatives in the sector are as follows:

İpek Müstecaplıoğlu (Parkim): In order to eliminate the lack of intermediate staff in the cosmetics sector, schools such as the Cosmetics Institute for two years can be opened. The number of chemistry vocational high schools in this field can be increased. In addition, sector companies can help for internship opportunities.

Seda Ekşi (Merkez İlaç): The technician-technician departments of vocational high schools or colleges should cooperate within the industry. Internships, which are a part of education, should be taken very seriously and talented-skilled students should be encouraged in these internships. Professional competence should be supported in cooperation between school and industry and this practice should be put into practice. Thus, the students of high schools and/or colleges that graduate will have the opportunity to find a job in the sector very easily, and the sector will have access to qualified personnel. Since the personnel qualifications applied in recruitment will be experienced during the training phase, much more methodical progress can be achieved.

Cihan Tanık (İz Baskı): Since we are a production company, I had the chance to examine and see on site our machinery, mold, raw material suppliers abroad and the introduction of students in the countries where our customers are into professional life. The model that I find the most accurate and effective among these is the 'Apprentice' system implemented by Switzerland. I can summarize the system as follows:

"Vocational training takes three or four years. There are also a small number of professions with a two-year training period. Vocational education consists of two parts. First; practical work in a workplace, that is, apprenticeship training... Second; vocational theory and general education in a vocational school. Young people are given the opportunity to learn at the beginning in the practical training section, which is held 3-4 days a week in a small or large enterprise in industry, handicrafts or trade business lines, and they become productive in the company in the future.

In the first weeks of education, preparatory courses are given to young people. In these courses, young people are provided with the basic skills necessary for their chosen profession. The duration of the preparatory courses varies according to the chosen profession and can last up to 10 weeks. In large enterprises, preparatory courses are usually held in the company, in smaller enterprises they are given at the training centers of the professional associations, partly centrally in a certain region of Switzerland. What is learned practically in business is theoretically deepened 1-2 days a week in vocational school. Vocational knowledge, mathematics, language and sports lessons are given at the school. Especially successful ones can also get a vocational high school maturity diploma. Those who have difficulty following the lessons can take supplementary lessons."

As it can be understood from the information above, if the students practice at the workplace for 3-4 days of vocational education and receive theoretical education at school for 1-2 days, they will adapt to business life more quickly and their professional development will be much more efficient. This has a significant impact on the reduction of the qualified intermediate staff problem experienced by all sectors.

İsmail Darcan (Boytek Reçine Boya ve Kimya Sanayi): My suggestions on the subject are as follows:

- First of all, the 'unemployment benefit' paid as a requirement of unemployment insurance should be re-evaluated. Our unemployed citizen who applied to İŞKUR does not like the job or wants to work in another workplace without unemployment and without insurance, although there are many workplaces looking for workers. In other words, the worker does not like the job when he is invited to a job interview at the positions he wants through İŞKUR after leaving the job. In this case, the worker should be given three rights. If the job does not like the third right, unemployment benefit should be cut.
- If the interns continue after graduating in the places where they have done their internship, incentives should be given to the workplace and the continuing staff regardless of the number of employees in the workplace.
- In recent years, young people have come to prefer desk jobs instead of working in production and industry. Young people working in industry and production should be given additional insurance premiums or retirement benefits for incentive purposes.
- Some incentives may be given by the state for workers who work in industrial production facilities for a long time under the same employer. For example; There may be an increase in the premium multiplier coefficient, and thus the worker may be prevented from fleeing to another workplace with a surplus of 100 TL.

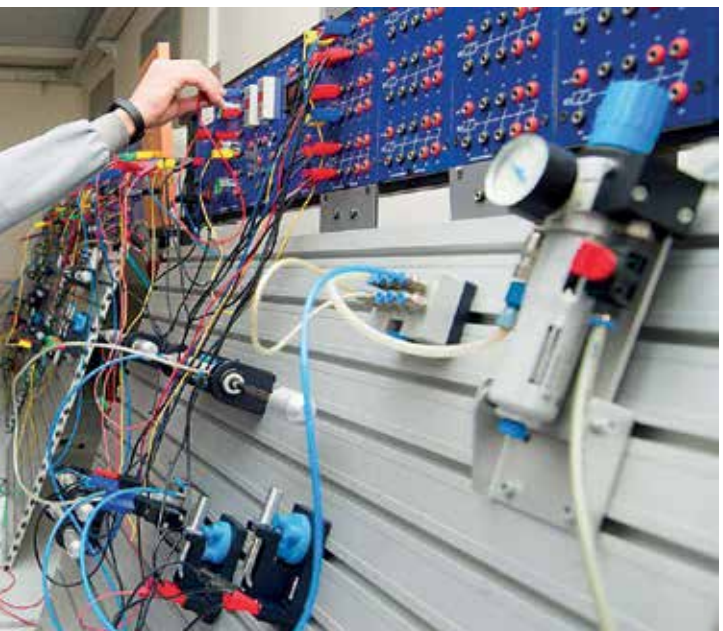
EVEN INDIA IS LOOKING FOR SOLUTIONS TO QUALIFIED LABOR

Jaydev Sanghavi, managing director of Aarvi Encon, which provides training and consultancy services in many sectors, including the chemical industry in India, made

evaluations about the qualified workforce in this country in an article in Chemical Today magazine. Stating that according to a report prepared by the India Brand Equity Foundation (IBEF), more than 80 thousand chemicals are manufactured in India and that the country is the 4th largest producer in the world with this power, Sanghavi said that the chemical industry is the backbone of the development of the industrial and agricultural sectors in the country. emphasizes. However, in order for the chemical industry to reach a more optimal output, Sanghavi pointed out that the gaps in workforce skills should be addressed, and draws attention to the importance of industry and academia cooperation.

In his article; "The chemical industry is skill-intensive and relies on knowledge of multiple technical processes. Over the years, technology evolves and these requirements change as well. It is therefore essential that employees are continually trained so that their skills are in line with industry requirements. The general problem in India; A large part of the current talent pool in the chemical industry lacks the understanding and experience of even the basic skills needed in the industry. This deprivation largely includes dealing with existing machines, software, chemical products and processes, safety regulations, even people management skills. The gap in these skills is largely attributable to the fact that the factor of specialized and/or standardized training for the workforce is often overlooked due to the focus on cheap labor. This results in a widening skills gap as large numbers of employees fail to meet current standards. Thus, the general productivity and output of chemical plants and production units are also hindered." Sanghavi also lists his suggestions for providing qualified workforce on behalf of the chemical industry in India:

"Training of qualified manpower in the chemical industry; Analytical chemistry should focus on soft and technical skills such as instrumentation development with a focus on advanced technology, simulating production processes, and effective communication and people management."



TÜRKİYE IS BELOW AVERAGE IN THE HUMAN CAPITAL INDEX

The World Bank, which has prepared the 'Human Capital Index' (HCI) report, which reflects sustainable growth targets such as education, knowledge, skills and health that people have accumulated throughout their lives, and which is the main driving force of poverty reduction in this context, reveals the position of countries in this field. While the effect of the pandemic was also discussed in the last report announced in October 2020, the values revealed include health and education data from 174 countries covering 98 percent of the world's population.

The Human Capital Index (HCI) highlights how current health and education outcomes are shaping the productivity of the next generation of workers and highlights the importance of government and community investments in human capital. Within the scope of the Human Capital Index, which is considered as an international measure that compares the basic components of human capital between economies, data about Türkiye are also reflected in the report. While the Human Capital Index is evaluated in the range of 0-1 points, Türkiye's score here is lower than the average of Europe and Central Asia. However, Türkiye, which scores higher than the upper middle income group countries, improves its Human Capital Index, albeit slightly, between 2010-2020. Accordingly, it is observed that Türkiye, which achieved 0.63 points in 2010, increased it to 0.65 in 2020. In the report, while a child who starts school at the age of four in Türkiye should receive 12.1 years of education until the age of 18, this period is reflected in the average as 9.2 years. On the other hand, while the advanced score in the harmonized test scale in education is 625, the minimum score is determined as 300. It is observed that Türkiye is still in the middle level with 478 points in this field.

Within the scope of the report, the expenditures of the countries for education and personal development from

SINGAPORE RANKS FIRST IN THE HUMAN CAPITAL INDEX SCALE

According to the Human Capital Index shared by the World Bank in October 2020, success is; It is evaluated on a 0 - 1 point scale. On this scale, Singapore ranks first with 0.9 points. Leading developed countries in Europe such as Finland, the United Kingdom, France, Germany, Sweden, Switzerland and the Netherlands draw attention with a score of 0.8. While countries such as S. Korea, Japan, Australia and Canada stand out with 0.8 points, the USA, Russia, Spain, Italy and Greece take place in the ranking with 0.7 points. In the report, countries such as Niger, Liberia, Chad and Mali draw attention with 0.3 points. While OECD countries are also considered in the Human Capital Index, Türkiye ranks among countries such as Mexico and Colombia with a score of 0.65 in this area.

their GDP are also included. While 2016 data is included in the report, it is stated that Türkiye allocates 2.8 percent of its GDP for education in this period. In the Human Capital Index, which emphasizes that this rate is 4.6 percent of the world average, it is pointed out that Türkiye is below the average. On the other hand, in the data on social aid expenditures, it is noted that while Türkiye allocates 1.2 percent of its GDP to this area, the world average is 1.8 percent. In the report, while the use of human capital is reflected as 52 percent in Türkiye, it is underlined that the world average in this field is 65 percent. Therefore, as the data reveal, it is observed that Türkiye's Human Capital Index remains below the world average.

"THE ONLY WAY AHEAD IS TO RENOVATE EDUCATION AND TRAINING"

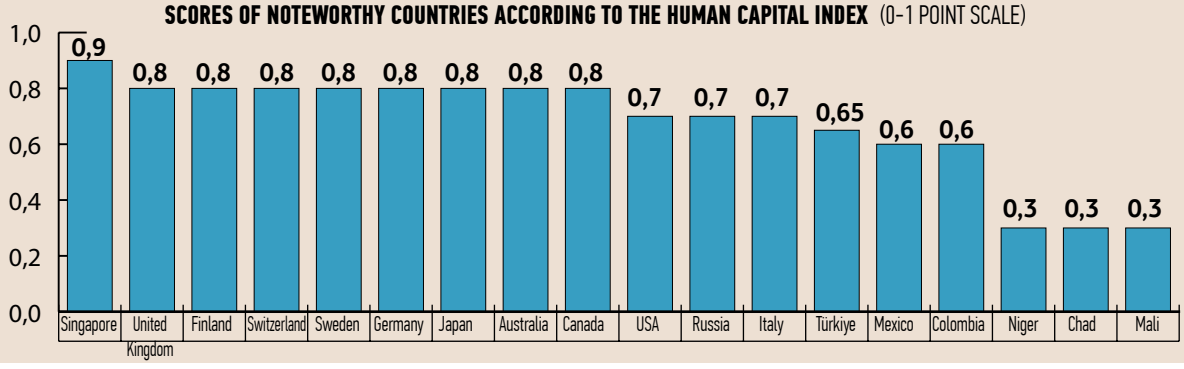
"Training of qualified manpower in the chemical industry; analytical chemistry should focus on soft skills and technical skills such as instrumentation development with a focus on advanced technology, simulating production processes, and effective communication and people management.

With emerging technologies today, there is also a demand for specialized skills related to processes such as 3D printing, automated tools and machine-to-machine systems. Therefore, the learning gap in qualified manpower, access to these processes and their implementation is due to the widespread lack of knowledge. To tackle this challenge, industries, academia and government will need to come together to create expertly designed specialist institutes and vocational courses. These should be at both the educational and professional level and focus on skills that meet the demands of the chemical industry today. There is also a greater need for these training centers to conduct hands-on training through simulation environments or projects that make a real-world impact.

Following this approach to developing workforce capabilities will help equip current and future chemical engineers with the skills and experience to become familiar with industry practices. This will give them the capabilities needed to adapt to industry dynamics for the foreseeable future, while helping them achieve optimum productivity levels to meet the required quality standards. In this way, the workforce will directly contribute to the long-term sustainable growth of the chemical industry and add consistent value to the industry."

Achieving higher scores than middle-income countries, Türkiye slightly improves its Human Capital Index between 2010-2020. Accordingly, it is observed that Türkiye, which achieved 0.63 points in 2010, increased its Human Capital Index to 0.65 in 2020.

SCORES OF NOTEWORTHY COUNTRIES ACCORDING TO THE HUMAN CAPITAL INDEX (0-1 POINT SCALE)



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Erdal Bahçıvan
İstanbul Chamber of Industry Chairman of the Board (İSO)

AS ISO, WE SUPPORT VOCATIONAL AND TECHNICAL EDUCATION

Our aim is to make our young people, who have passed a valuable education such as vocational high school education and who have gained work experience during this period, have a job and a profession in their own field of education in a way that they can be proud of their profession.

Qualified workforce is of great importance for the Turkish industry to develop and maintain its competitive structure. Innovations that continue rapidly and radically change our social and individual lives; It forces us to seek a more competitive education system to train the workforce that will adapt to the new developing conditions. In this context, qualified vocational high school graduates are needed in order for our industry to switch to value-added production and turn to high technology areas. At this point, as ISO; We attach importance to vocational and technical education, which is one of the issues that concern industrialists, and we carry out studies in this field.

Our aim is to make our young people, who have passed a valuable education such as vocational high school education and who have gained work experience during this period, have a job and a profession in their own field of education in a way that they can be proud of their profession. Today, qualities such as being an individual who is interested, curious and conscious of lifelong learning, knowing where and how technological information is used by researching different sources, and being aware of how technology makes life easier come to the fore. Being a person who can use this knowledge in the business world, do high value-added works and add value to people's lives with innovation, is the most important of all and these characteristics will carry our young people one step further. Therefore, it is very valuable to be able to increase the quality of the education given in our schools, to apply the curricula in parallel with the current developments and to strengthen our valuable teachers in this sense. In this context, opening the doors of industry to students, enabling students to witness the latest technological developments, and making factories one of the most important components of applied education are among the steps that strengthen vocational education.

"THE FUTURE IS AT VOCATIONAL HIGH SCHOOLS!"

It is essential that our vocational high schools educate our students in the quality and equipment to meet the needs of the industry. For this reason, we make the call for "Future Vocational High Schools" at every opportunity and experience that this slogan increases the interest in vocational high schools. Seeing the results of our cooperation with our vocational high schools with great interest gives us hope for the future. As long as this interest continues, the interest and support of our industrialists in these schools will continue to increase in the future. The motivation of the industrialists at this point will also open the doors of qualified and sustainable employment to our students in the industry.

With the work we have been continuing for more than three years, we have started a transformation process that will radically change the view of vocational high school graduates, and the first step of this was to bring our students to the level of 'wanted personnel'. The word 'intermediate staff' is an old-fashioned term for us... From this point of view, our main aim is; To include our industrialists in the management of vocational high schools, skills training/internship programs and curriculum studies in order to train the qualified technicians, in other words, the required personnel, and to ensure that they are a part of the solution. Because the permanent and long-term solution is to strengthen the industry-school cooperation. It is important to realize all kinds of projects and collaborations that will support vocational education by taking these important factors into account.

WHAT DO WE DO FOR QUALIFIED VOCATIONAL AND TECHNICAL EDUCATION AS ISO?

As ISO, we have been implementing our 'Vocational Education Cooperation Project' (ISO MEIP) since January

25, 2019, in cooperation with the Ministry of National Education (MEB), Ministry of Industry and Technology, İstanbul Chamber of Commerce and İstanbul Technical University. Within the scope of this project, we continue our activities in many areas of vocational education.
Our main purpose within the scope of the project; to attract qualified and enthusiastic students to vocational high schools, to train them in an employment-oriented manner in our schools and to ensure that they are employed in the industry, in their own fields, in good conditions and in a sustainable way. In this context, 40 Vocational and Technical Anatolian High Schools (MTAL), one Vocational Education Center (MESEM), 11 Fine Arts High Schools (GSL) and 23 Special Education Vocational Schools (ÖEMO) in Istanbul, with more than 130 of ISO's in various sectors. We manage it together with the professional committee member. With the project, we are carrying out activities involving approximately 50,000 students, 2,700 teachers, 220 school principals and assistant principals.
In the project we have been implementing for more than three years, we have been working on providing skills training and internship opportunities to field students in real production environments, and providing on-the-job training to field teachers. In addition, we carry out activities on subjects such as updating the framework curriculum, making project-oriented production of schools and supporting successful projects. We are establishing collaborations that will strengthen the revolving funds of our schools and position them as R&D and production centers.
To date, we have designed and implemented manager development programs for school administrators. We offered technical trainings to vocational high school teachers where they could see new applications in the industry. We provided employment, internship/skill training and technical trips to our vocational high school students in our most qualified industrial companies. We organized seminars on topics such as digital transformation and new technology trends that attracted students' attention.
Simultaneously with all these studies, we also started our studies for a Vocational and Technical Education Development Center Campus, which will be a first in Türkiye in vocational education. Our aim with this center; To strengthen the social status of vocational and technical education, to increase its quality, to improve the human and institutional capacity of the region by strengthening the education-sector relationship. This center, where trainings for managers, teachers and students of more than 300 vocational high schools in Istanbul will be designed, will also function as a knowledge production center in the field of vocational education.
Another important project we have implemented is to turn Mehmet Rıfat Evyap MTAL into Türkiye's first Software High School. Mehmet Rıfat Evyap MTAL, whom we wish to be at the top of the success list; We aim to be a star school that trains sought-after staff through excellent education, a project-based income model, and a brilliant career in software for its students. Our school has become one of the most preferred high schools in Türkiye by accepting students from 3.85 percent of the students this year.
Erasmus+ Vocational Education Mobility Accreditation is one of our works that we believe will make significant contributions to vocational education. Throughout the program, we ensure that students and teachers from schools within the scope of ISO MEIP participate in on-the-job training and courses to be held in companies and educational institutions abroad.
While we support students to meet with a quality education with the studies we implement, on the other hand, we attach great importance to raising our youth with production, innovation and entrepreneurship culture. In this context, we think that our ISO MEIP activities have the capacity to lead the steps to be taken in the field of vocational education. So, as ISO; We continued our 'ISO MEIP Project Supports', which we launched for the first time in 2020 in order to support the innovative work in our schools and to highlight the project development capabilities of our schools, in 2021 as well. In this context, our schools produced their own projects. We received a total of 79 project applications in 2021, and 31 projects of our 22 schools with a scale of 1.7 million TL were found eligible for support.

STUDENTS ARE EMPLOYED IN THEIR OWN FIELD

Within the scope of the Vocational Training Centers (MESEM) Program, which aims to meet the qualified workforce needs of the industry with the latest regulations made by the Ministry of National Education in December 2021, we, as ISO, hold launch meetings with industrialists on a sectoral basis, and try to bring students together with companies that are suitable for their fields. With this system, we care that the students who receive vocational education develop their skills in the industry 4 days a week starting from the 9th grade and that they are employed in the industry as a sought-after employee from the moment they graduate from the program. In this context, we continue to work on a digital employment matching platform together with the Ministry of National Education and the Istanbul Chamber of Commerce.

Pelin Karadeniz Kış
Vice President of TOBB İstanbul Young Entrepreneurs Board Executive Committee.

FINLAND'S EDUCATION SYSTEM MUST NOT BE OVERLOOKED!

While servants perform the duties at school in Türkiye, children fulfill these duties in Finland and thus become conscious of their responsibilities. In Finland, initial training is provided in vocational institutions and almost all in the form of apprenticeships.

The secret of success in education may be to move forward by taking good countries as role models in the field of education and modeling the ways they have experienced and achieved the goal... On such a discourse, I would like to continue with a few quotes from Grigoriy Petrov's book 'In the Land of White Lilies':

Snellman was happily telling his friends in the last years of his life: "Do you know what kind of country our Finland was in my childhood, and when I see the changes it is going through today, this scene comes to my mind:

There is a big old house, almost all the windows are closed. While no signs of life can be seen from the outside, the inside of the house is dark, damp, boring and stuffy.

But one day, young, vivacious and strong people came and set to work cheerfully, with smart expressions on their bright faces. The rooms were filled with sunlight, fresh air and the scent of live flowers. Everything in the house came alive and cheered. The exterior of the house has also been rejuvenated. People who used to be afraid of this house as if they were afraid of ghosts and did not even want to pass by it, this time approached and watched with admiration."

Snellman continued, "This kind of miraculous transformation is possible in any country and province, even in the most remote areas. For this, only magic hands, forward-thinking people and cultural workers who work tirelessly are needed."

"To be enlightened; Wearing a master's dress is not about wearing starched collars or wearing a fancy hat. You have to teach the masses how to build a better life, how to live better. "

"Such a miracle of transformation can be achieved in every country, in every region, even in the most remote corner," says Snellman.

HOW DID FINLAND ACHIEVE?

Looking at the existing sample countries in order to improve the qualified workforce, which is one of the most important problems of our industry, which has been talked about for a long time; I think that the most important milestone is to seek answers to the question 'how can we improve it' with a common mind with relevant institutions and to take action. In order to shed some light on this path, I would like to talk about a study I have done in the Finnish education system on what subjects they are good at.

First of all, Finland presents us with the signs of a process in the vocational education system that eliminates frequently asked questions such as "What will I do in real life with what we have learned" in the traditional system. The model that removes these question marks has many similarities in practice with the "Village Institutes", which marked the education system period of the 1940-1950s in our country and were unique worldwide.

If we proceed with an example; Agriculture is one of the areas that we need the most development in today's conditions. One of the aims of the 'Village Institutes' was to enable the villagers to learn alternative farming techniques. For example; beekeeping was taught in

villages where beekeeping was not known, viticulture was taught in villages where viticulture was not known. A teacher who graduated from the Village Institute was not only a primary school teacher, but also learned the subjects of agriculture, health, masonry, blacksmithing, tailoring, fishing, beekeeping, painting and carpentry. These successful institutes are the basis of competences learned in many fields today, and we can return to the Finnish example to continue this specialization in the profession. When we look at what Finland does better in education;

- While servants perform the duties at school in Türkiye, children fulfill these duties in Finland and thus become conscious of their responsibilities.
- In Finland, initial training is provided in vocational institutions and almost all in the form of apprenticeships. The initial professional qualification takes 2-3 years to complete and the training is delivered in a multi-disciplinary or specialized professional body. The 3-year vocational qualification ensures eligibility for all types of higher education.
- Teachers are highly valued in Finland. According to researches, teaching is at the forefront of prestigious professions. The foundation of the culture of cooperation, which is the most important element of working together, was laid in Finnish schools. They have a system in which students, teachers and schools are not distinguished and compared. The test method is not used, there is a personal evaluation system that all students are subject to.
- The principle of equality was prioritized. Education is used as a tool to balance social inequality. All students are provided with free meals, free access to healthcare, and free access to psychological support. They can also get free coaching.
- Both students and teachers allocate time for social activities in schools.
- According to OECD, homework is given at the lowest rate in Finland compared to other countries. Students are required to set aside half an hour to go over the topics when they get home.
- There are at least two language options within the education.

On the other hand, the quality of teachers is kept high. For example;

- Seeking work experience in the same field in the selection of teachers,
- Satisfactory salaries of teachers
- Such as having expertise in at least 3 fields in the selection of teachers...

I would like to complete my evaluations by supporting them with the words of Gazi Mustafa Kemal Atatürk. "The new generation will learn the greatest Republicanism lesson from today's teachers and the teachers they will train. We cannot close our eyes and think that we are living alone. We cannot enclose our country in a circle and sever our ties with the world, on the contrary, we will live above our civilization level as a modern nation that has risen and progressed. This life is only possible thanks to learning and science. We will proceed from whereever learning and science are. There are no requirements and conditions for learning and science.'

Cihan Tanık
İz Baskı General Manager

In Switzerland, 70 percent of students choose the apprenticeship model in education

The purpose of the apprenticeship system in Switzerland; is to provide quality education and to create productive, lifelong learners throughout society. While about 70 percent of Swiss students continue their school and business life with the apprenticeship model, only 30 percent choose a traditional university path.

At a time when our industrialists expressed that their expectations could not be met as targeted in the supply of qualified workforce; When we look at how this training is done in developed countries, we come across Switzerland's Apprenticeship Model. Therefore, I would like to share with our readers my assessments that I have observed and cared about in Switzerland for a qualified workforce. Accordingly, the vocational secondary education system in Switzerland is one that focuses heavily on career and technical education (CTE) with a high-quality apprenticeship model.

According to this model; many students spend a day or two at school and the rest of the week applying what they have learned at work. This ensures a healthy transition to work, as evidenced by the low unemployment rates. Thus, the Swiss model; It recruits 15 or 16-year-old students, preparing them for high-demand, high-skilled jobs with 21st century skills. In addition, these young people are given the opportunity to receive higher education, that is, university education, if they so desire.

To explain our subject further; The aim of the apprenticeship system in Switzerland is to provide quality education and to create productive, lifelong learners throughout society. While about 70 percent of Swiss students continue their school and business life with the apprenticeship model, only 30 percent choose a traditional university path.

Countries that want to implement the Swiss model should not only aim to reduce youth unemployment rates and attract young people from the streets to factories. In addition, the 'Apprenticeship Model' also creates the future of the next generation and creates an innovative life. Another purpose of this model is to create a safer and more sustainable future opportunity for students from lower socio-economic status. The key point here is; Apprenticeships are part of flexible pathways that accept and build on skills and allow for further education or higher education.

THE APPRENTICESHIP GIVES STUDENTS AN OPPORTUNITY TO EXPLORE POSSIBILITIES

Another important point to be understood here is that students should not be locked into the professional field they have chosen. An apprenticeship is a way to involve students in learning while giving students the opportunity to explore possibilities.

There may be some who think that many Swiss students, who continue their education with the apprenticeship system, chose this path because they were bored with school at the age of 15. However, after completing the apprenticeship and working for a year or two, it is seen that a significant number of students want to continue higher education and teaching in order to improve themselves further.

While research shows that vocational mobility is quite high in Switzerland, workers can change jobs and earn more money doing so as the skill demands required of them change. However, research also shows that Swiss students who go through a mixed academic and vocational education path earn more than those who go through a purely academic or purely vocational education.

CURRICULUM WAS RENOVATED WITH COMPETENCY AND PROJECT-BASED LEARNING

An apprenticeship is an ideal tool for teaching 21st century skills. This is because students apply what they learn in real-world situations that require communication, problem-solving, and teamwork skills. The Swiss took this as a direct approach, renovating their entire VET (Vocational Education and Training) curriculum in 2004 with a competency and project-based learning approach. This was a huge and important initiative, but in the following years they felt the need to modernize the industry and integrated the 21st century skills needs of each profession into this model. With this modernization, high expectations are set for all students, regardless of their profession. All stakeholders, including teacher trainers, businesses, government and educators, form the main framework for these professional skills needs.

When you meet with a student or employee who has been trained with the apprenticeship model in Switzerland, you can immediately notice the results of this training... These people have the opportunity to present their work perfectly, both in their mother tongue and in more than one foreign language. In their area of responsibility, they can easily tell you how they solve customers' problems or how they deal with difficult problems in the field.

Thanks to this model that Switzerland has developed and continues to develop, young people gain the skills and reflexes that will accompany them throughout their careers from the age of 15-16. While we are in search of our education models for qualified workforce in our country, I think we can open a window to these countries that are successful in practice.

Countries that want to implement the Swiss model should not only aim to reduce youth unemployment rates and attract young people from the streets to factories. In addition, the 'Apprenticeship Model' also creates the future of the next generation and creates an innovative life. Another purpose of this model is to create a safer and more sustainable future opportunity for students from lower socio-economic status.

Recai Ekenel
Director of Şeyh Şamil Vocational and Technical Anatolian High School

Vocational education is the 'most expensive' education system

In my opinion, employment of graduates in their fields is a necessity. Because the most expensive education is vocational education. In order for the investment made in this field to turn into production in accordance with its purpose, it is of great importance to employ vocational education graduates in their own fields.

For a qualified workforce, a very serious and planned career guidance related to vocational education should be offered, especially to secondary school students. The current understanding of "who cannot go to Anatolian high school goes to vocational high school"; It can be more successful if it can be transformed into "I preferred vocational high school to receive vocational education". This; A career model should be developed that will ensure that students who really want to do their job come to vocational high schools and that these students can direct them to their own fields after graduation. Here, students have important duties in terms of career plans for everyone, from their families to the public.

Another duty of the public is to provide real tangible incentives to the private sector for the employment of vocational education graduates and to take measures to increase the employment of graduates in their own fields. In my opinion, employment of graduates in their fields is a necessity. Because the most expensive education is vocational education. In order for the investment made in this field to turn into production in accordance with its purpose, it is of great importance to employ vocational education graduates in their own fields.

The most important task for the student is to make a correct career planning from the secondary school years and to focus on this field by determining the most suitable branch of vocational education. Another duty is to be absolutely very inquisitive! In other words, the more questions the student asks, the more the teacher works, the more the giver. In addition, we can expect vocational education graduates to take care to work in their fields and to have a career, considering the state's investment in their education.

TECHNOLOGY IS CHANGING SO FAST

On the other hand, I strongly disagree with the claim that education cannot raise a qualified workforce. Because when the student completes his/her education, which he/she started in the 9th grade, four years later, both production processes and technology change very quickly. For example, the Industry 4.0 model that emerged out of nowhere enabled the restructuring of all production processes. Devices, production stages and processes have differentiated and this change still continues. In such a case, the information of the existing employees in the companies should be updated again. Therefore, the education that students receive in the face of these rapid developments may lose their currency. In other words, the student who started education today and graduated as a qualified workforce may be inadequate in a production facility to be established with the knowledge and technology of 2026. In my opinion, the aim of vocational education should be to train individuals who can adapt to new technologies faster.

On the other hand, it is impossible for an intermediate staff to work at full capacity in any factory during the period of graduation! First of all, this graduate should adapt to the system with on-the-job trainings for a maximum of three months, and then turn into a staff working at full capacity. Such a transition process will be to the advantage of both the student and the industry. When this person leaves the factory where he works and moves to another factory in the same

line of business that does the same job in a different way, there may be inadequacies again. Because each company's working method and technology may be different. Therefore, there may be an internal training in question here as well. In other words, industrialists should also give opportunities to our graduates.

OUR SCHOOL IS SUPPORTED BY ISO

To give information on behalf of our school; I can definitely say that we have graduates who will meet the qualified workforce. Of course, I mean this in this sense; A graduate of our school graduates with an infrastructure that can complete the learning related to his/her field specific to the company he/she will work in. It also employs graduates from our school in businesses that look the same as us. In other words, I can say that we provide a kind of 'job-guaranteed' training. The majority of our students who want to continue their business life in their field continue to work after their graduation in the companies where they do internship.

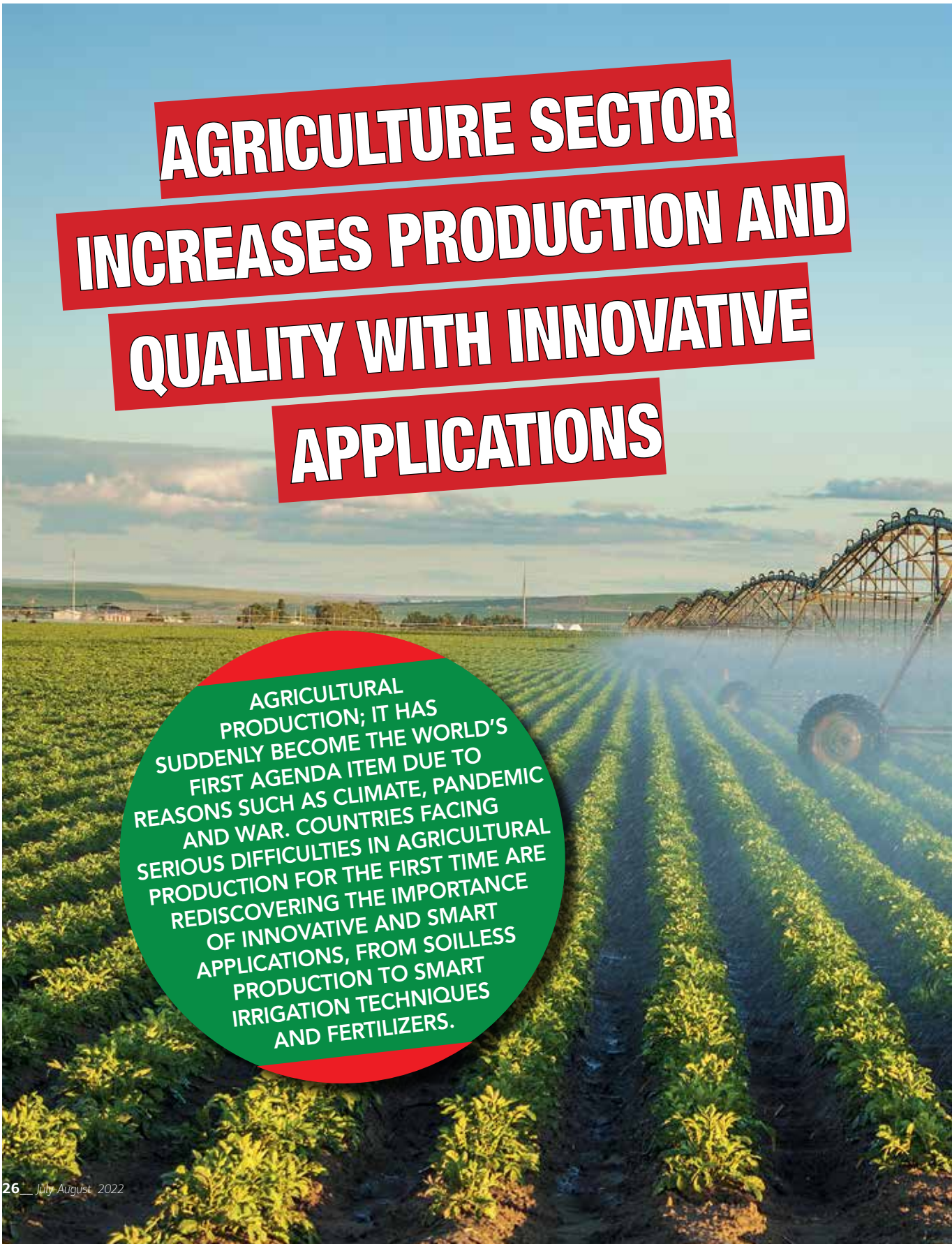
Behind my assertive speech is that we have been a 'Project School' supported by a protocol by the Istanbul Chamber of Industry (ISO) since 2018. Within the scope of this protocol, our students who meet the conditions with the accreditation of the Istanbul Chamber of Industry are offered a 2-week internship opportunity in European Union countries. In addition, as a school, we provide 72 students and 24 teachers the opportunity to take part in the project in European Union countries for a week within the scope of 3 ERASMUS+ projects that we are partners with. In addition, thanks to our 'Revolving Fund' business in the field of 'Chemistry Technology', our students receive education by 'living' and 'producing' at school.

In terms of school-industry cooperation, we also carry out very harmonious works with the three companies Merbolin Boya, Akçalı Boya and Kayalar Kimya, which are the supporters and patrons of our school, as well as ISO. The chairman of the board of directors of these companies allocate time for themselves among all their work, worry about the problems of our school and offer solutions. In addition, they personally come together with our students and provide all kinds of material and moral support to increase the infrastructure and production capacity of our school. Of course, the coordinatorship and unifyingness of ISO cannot be ignored. In addition, they carry out studies for the employment of our graduates and provide cooperation opportunities with other NGOs they are affiliated with, especially for employment. Already the biggest expectation of schools; employment of graduates and receiving very serious support from industrialists in this direction... We achieve this.

WE PROVIDE TRAINING ON CHEMICAL TECHNOLOGY

Our school was established in the 1977-1978 academic year and until 2010 it gave education under different names. In the 2010-2011 academic year, our school, which was named Şeyh Şamil Vocational and Technical Anatolian High School, provides training in the fields of 'Information Technologies', 'Map, Land Registry and Cadastre' and 'Chemistry Technology'. We are trying to contribute to the education of our students with 28 classrooms, 11 laboratories and workshops, a chemistry production workshop, a painting class, a music class, a library, a multi-purpose hall and a conference hall. The 'Map, Land Registry and Cadastre' area is the only area on the Anatolian side of Istanbul.

AGRICULTURE SECTOR INCREASES PRODUCTION AND QUALITY WITH INNOVATIVE APPLICATIONS



AGRICULTURAL PRODUCTION; IT HAS SUDDENLY BECOME THE WORLD'S FIRST AGENDA ITEM DUE TO REASONS SUCH AS CLIMATE, PANDEMIC AND WAR. COUNTRIES FACING SERIOUS DIFFICULTIES IN AGRICULTURAL PRODUCTION FOR THE FIRST TIME ARE REDISCOVERING THE IMPORTANCE OF INNOVATIVE AND SMART APPLICATIONS, FROM SOILLESS PRODUCTION TO SMART IRRIGATION TECHNIQUES AND FERTILIZERS.


%60,91
FERTILIZER EXPORT RATE IN 2021
303.258
MILLION $
2020 FERTILIZER EXPORTS
487.959
MILLION $
2021 FERTILIZER EXPORT

In the face of climate problems and population growth, the world has been searching for new ways in agriculture and food production in order to meet the nutritional needs of humanity for many years. Within the scope of smart agriculture practices, innovations were made in many areas for more efficient production, from soilless agriculture to plant production with LED lights, from drip irrigation techniques to fertilizer main materials developed with bacteria technology. However, the pandemic, which was unexpectedly effective in the world, disrupted production in many areas, while supply problems also caused problems in people's access to food. The war between Russia and Ukraine, which broke out afterward, increased the global problems in agriculture even more. When humanity came face to face with these two unexpected developments as well as climatic problems and population growth, the production and supply required for nutritional needs pushed the interest of countries in the field of agriculture to the fore. Within the framework of these developments, while a new awareness of agricultural production is being created, companies that see the needs in this field in Türkiye and develop products within the scope of smart agricultural practices have once again seen how accurate their investments are today.

While the world population was predicted to reach 10 billion in 2050, the decrease in agricultural lands and soil fertility showed that there would be a nutritional problem on the horizon. In addition, with the increase in temperature, the water problem and desertification came to the fore, and the scientific world was looking for solutions to prevent possible problems in agriculture. Non-governmental organizations also stepped in for smart agricultural practices, and campaigns were launched to raise awareness in many areas such as from farm to fork. Being aware of these developments, Türkiye brings improvement projects in the agricultural field to the agenda, while many companies turn to R&D-oriented studies and carry out studies to increase efficiency by using the resources in production optimally. For example, taking into account the decreasing resources, irrigation pipes with various functions, from the speed of water transmission to the prevention of loss and leakage, are being developed. On the other hand, with the hydroponic system, which stands out as soilless agriculture, production is carried out with LED lights. Thanks to this system, hundreds of products can be produced from tomatoes to cucumbers, from leafy plants to flowers.

FERTILIZER INDUSTRY INCREASES ITS EXPORTS ON VALUE BASIS

Considering the sectoral general situation of fertilizers, which have an important place in agricultural production, in Türkiye; An increasing trend is observed in exports. Despite the increase in exports, it is seen that production in the domestic market cannot meet the consumption and the necessary need is met through imports. Fertilizer consumption in Türkiye; Although it shows flexibility from year to year depending on the climate, plant species grown, alternation, irrigation opportunities and economic developments in the world, it is still used at an average level of 5-6 million tons. T.R. According to the 2021 data of the Ministry of Agriculture and Forestry, it is recorded that 6.3 million tons of fertilizer were produced in the country during this period and 6.5 million tons of consumption was realized. According to these data, it is observed that 200 thousand tons of fertilizer were imported last year within the scope of need.

Türkiye, on the other hand, has achieved an increase in fertilizer exports on the basis of value in recent years, while making the highest foreign sales to Romania, Ukraine, Morocco, the USA and Kenya, respectively. According to the data of the Turkish Exporters Assembly, the fertilizer industry, which made foreign sales of 303 million 258 thousand dollars in 2020, achieved an export of 487 million 959 thousand dollars in 2021 with an increase of 60.91 percent. While the sector was exporting 325 million 202 thousand dollars in the January-June period of 2022, it is observed that this figure has grown by 33.96 percent compared to the first six months of the previous year.

FERTILIZERS TRIGGER EFFICIENCY

Another method that stands out within the scope of new production technologies in agriculture is the production

of fertilizer main materials with completely R&D-oriented bacterial technology in order to encourage the growth of plants. Considering the climate, soil and water conditions of Türkiye, while crops are grown in many areas, they need to benefit more from new technologies that are on the agenda in order to increase their quality and productivity. With the success to be achieved in the production of fruits and vegetables, with the smart agricultural practices, on the one hand, the needs will be met without any problems, on the other hand, it will be possible to increase the export even more with the competitive approach to be put forward.

FERTILIZERS UNDER THE KKDIK REGULATION!

Regulation on Registration, Evaluation, Authorization and Restriction of Chemicals (KKDİK Regulation) If the annual amount is one ton or more for chemical substances manufactured or imported before 31 December 2020, pre-MBDF (pre-registration) and then final registration obligation by 31 December 2023.

As the deadline for completion of the registration obligation within the scope of KKDİK, regardless of any tonnage band, is getting closer, it is important that the chemical industry prepares for this process without delay. When we evaluate chemicals in the field of agriculture, we come across the primary KKDİK obligations in fertilizer production. In particular, it is seen that NPK fertilizers are accepted under the definition of 'mixture' in both REACH and KKDIK, and the REACH registrations of the substances used in production have been completed.

For NPK compound fertilizer, which can be considered as a mixture, the items that KKDİK registration obligations should be examined can be listed as follows.

- Ammonium Sulphate
- Diammonium Phosphate
- Monoammonium Phosphate

When we evaluate chemicals in the field of agriculture, we come across the primary KKDIK obligations in fertilizer production. In particular, it is seen that NPK fertilizers are accepted under the definition of 'mixture' in both REACH and KKDIK, and the REACH registrations of the substances used in production have been completed.

- Sulfuric acid
- Urea
- Triple Superphosphate
- Potassium Sulphate
- Zinc Sulphate Monohydrate
- Potassium Chloride

In this context, the annual production/import amount of the substances that make up the NPK compound fertilizer mixture;

• If it does not exceed 1 ton

or

• Annex IV, which contains the details of the KKDIK Regulation on Exemptions, in case it is exceeded. and V. Annexes, these substances will be exempted from KKDIK registration obligations.

On the other hand, the restriction calendar for chemicals that have a negative impact on the environment and human health is also in operation. In this context, restrictions on the use of ammonium nitrate in fertilizers have also come into effect.

While evaluating our companies in the process of compliance with KKDIK, it is of great importance that they evaluate all their inputs used in production within this framework and that they comply with restriction obligations outside the registration.

PromoSEED develops fertilizer materials with bacteria technology

The start-up company PromoSEED, which is fully focused on R&D in order to encourage the growth of plants, develops new products for the supply of fertilizer main materials from the soil and atmosphere with bacterial technology.

PromoSEED A.Ş., a start-up company that develops biotechnology-based products, produces bacterial metabolites to encourage the growth of plants. The products of the company, which bases the added value of the bacterial metabolites developed through R&D studies on biotechnological processes, can be used in health, food and many other fields, especially in agriculture. Aiming to ensure the production of these products, which are used in most of the developed countries, in Türkiye as well, PromoSEED A.Ş. anticipates both providing employment in this field and developing new products.

PromoSEED A.Ş., which started its activities in 2019 as a start-up, follows the developments in the world and aims to develop equivalent products that can compete with competitors by working with an R&D focus. The company, which has so far produced nearly 8 tons of added-value solids and 2000 lt liquids to the domestic market, is making calculations for further growth. The company, which continues its infrastructure activities in order to start production in its own facilities within the scope of Technopark, plans to complete these investments in the 2022-2023 period.

Expressing that they are working to ensure that the nutrients in the soil or atmosphere are available according to the needs of the plants, PromoSEED A.Ş. Founding Partner Semih Yılmaz reminds that most of the main fertilizer materials are imported. Emphasizing that it is foreseen that there will be significant problems in plant production in case such a supply chain is broken throughout the world, Yılmaz said, "In other words, it is important to develop products for the supply of fertilizer main materials from soil and atmosphere with smart bacteria technology. For this, we are working to increase the water holding capacity of soil and plants with bacterial proteins and enzymes. We carry out these studies with completely organic bacterial protein and secondary metabolites. In this context, we first focused on the production of bacterial metabolites such as protein and secondary metabolites for plant growth promotion. These products will increase growth and yield by enabling plants to absorb nutrients such as N, P, Ca, Fe and Mg more easily.

THE FIRST TARGET IN EXPORT IS TO SELL 50 TONS OF VALUE-ADDED PRODUCTS

Yılmaz also states that they plan to start the registration and production processes of the bacteria-derived metabolites they have developed for the control of insects that cause economic damage and the control of plant pathogenic fungi. Reminding that these products contain metabolites such as crystal proteins, fengicin, iturine, surfactin, zwittermycin and chitinase, and that they have specific insecticidal and fungicidal effects, Yılmaz continues his words as follows: "Producing pure products by using molecular and biotechnological methods in many cases, especially on bacteria, is the best option. is our main goal. Then, we plan to become a large and well-known company on a global scale with the R&D studies of the products we have developed and continue to develop in the fields of biofertilizers, bioinsecticides and fungicides, and we plan to sell to Central Asia, Africa, the Middle East and Eastern European countries. Our first target is to export 50 tons of value-added products."

Uptechlabs makes a difference in soilless agriculture

Thanks to the systems it has developed, Uptechlabs, which makes soilless agricultural production with LED light, can produce 101 plant species in a sweeter, juicy and aromatic form in a shorter time and with maximum efficiency.

Problems such as decrease in soil fertility, irrigation problems, increase in world population; brings innovative production approaches in the field of agriculture to the agenda. While there are different production techniques in this field in many countries, especially in the Netherlands and Belgium, Türkiye also participates in production with the innovative approaches of entrepreneurs and start-ups in order to keep up with the developments. Especially in recent years, when soilless production has come to the fore, Uptechlabs Bilişim ve Elektronik Teknolojileri Sanayi ve Ticaret Anonim Şirketi has also focused on led-light agriculture, growing many plants and contributing to production in the field of agriculture.

With this new generation production method with LED lights in agriculture, a global market exceeding 40 billion dollars is formed, while Türkiye is increasing its investments in order to get a share from it. While more vegetables such as tomatoes, cucumbers, peppers and flowers such as roses and tulips are produced in Türkiye without soil, with the LED light system, investments in this field are increasing day by day. Uptechlabs, which started its activities for equipment, production and plant growing within the scope of innovative approaches in agriculture, successfully carries out its activities in the field of medicinal aromatics and greens.

Süha Cem, one of the partners of Uptechlabs, says that with LED luminaires, they can produce in a shorter time compared to traditional agriculture, using 95 percent less water, and much more efficiently without using any pesticides. Cem gives the following information about his work: “There are many domestic and foreign companies working in the field of plant production with LED light. In this context, all kinds of plants can be grown with R&D studies. We are Uptechlabs and Cemdağ A.Ş. We are able to produce tree and shrub species with hydroponic and aeroponic, in other words, soilless farming systems, within the scope of R&D activities developed by our company. Since food safety is ensured in this area, we can easily produce the needed food with our new production methods.”

Cem also gives the information, “With the ‘Smart Led Lighting Systems’ we developed as part of our R&D activities we carried out in 2019 as Uptechlabs, we can grow the same seed in the desired aroma with different spectrum and photon algorithms.” In addition, Cem says that they can produce 101 plant species whose data are collected in a sweeter, more juicy or more aromatic form in a shorter time and with maximum efficiency, and that this system will develop further and will be a hope for humanity in agricultural production. The company also determines Russia, Northern Europe and Gulf countries as target markets for export and carries out studies in this field.

Superlit increases efficiency in agricultural production with grp pipes

Superlit Boru Sanayi, by producing 'Glass Reinforced' pipes and fittings, which are mostly used in agriculture, controls the future of water resources on the one hand and increases efficiency in agricultural production on the other.

Saving and efficient use of water within the scope of smart agriculture practices against the increasing population in the world is indispensable for developed countries, while production is carried out with increasing awareness in this field in Türkiye. Being aware of the importance of irrigation techniques in agriculture in this period when the importance of even a drop of water has increased, Superlit Boru Sanayi is trying to control the future of water resources with the 'Glass Fiber Reinforced' (GRP) pipes and fittings it produces. With the GRP pipes produced, water savings are achieved on the one hand, and agricultural production is supported on the other.

Pointing out that smart irrigation techniques have become standard in agricultural practices in developed countries in order to support agriculture and to use resources efficiently, Superlit Boru Sanayi Export Director Erhan Turan states that they are directing their production by seeing the trends in this field. Emphasizing that they have developed smart irrigation systems to increase productivity and profitability in agricultural areas due to the decrease in water resources, Turan said, "As Superlit, we produce solutions for all kinds of fluid transportation such as drinking, irrigation and sewage, together with the GRP pipes and fittings in our production. We manufacture four types of pipes and fittings: filament winding, centrifugal casting, helical winding and pultrusion methods. The pipe diameters in our production vary between 250 mm and 4000 mm and can reach very high pressure and rigidity values efficiently as per the project. Although these pipes are used in many areas, they are most commonly preferred as water transmission in agriculture. In addition, we produce sustainable products for industrial greenhouses, which have become widespread recently and are considered as the agricultural method of the future."

PRODUCTS CAN BE USED FOR 50 YEARS

Reminding that GRP products offer longer and more efficient solutions than different types of pipe alternatives, as they are not affected by corrosion, Turan says that the couplings they use in product connections also provide safer joint tightness and guarantee water tightness at high pressures. "While smaller-scale and soiled greenhouses were preferred until recently, hydroponic farming practices in industrial greenhouses have become more frequent in our country, especially in recent times, with the trends in the world, and therefore the importance of smart irrigation systems is increasing day by day. The losses that may occur in the irrigation line are minimized with GRP pipes and fittings. Our products; With the hydraulic advantages it offers, more fluid can be transferred within the same cross-sectional area, and while doing this, it provides great advantages in the amount of energy used. Our products are also preferred with a design life of up to 50 years", Turan emphasizes that they increase their sales volume every year.

Stating that they produce an average of 1,000 kilometers of pipes annually in their factories in Düzce and Malatya, Turan says that they export about 60 percent of this. Underlining that they export to 70 countries, primarily Africa, the Middle East and Israel, Turan says that most of these products are used in irrigation systems in agriculture.

World's preferred brand with its environmental approach: SUBOR

Subor Boru Sanayi, which produces 'Glass Fiber Reinforced' plastic pipes used especially in the field of agricultural irrigation, is accepted in the world due to the low environmental impact of these products as well as its quality and exports to 65 countries.

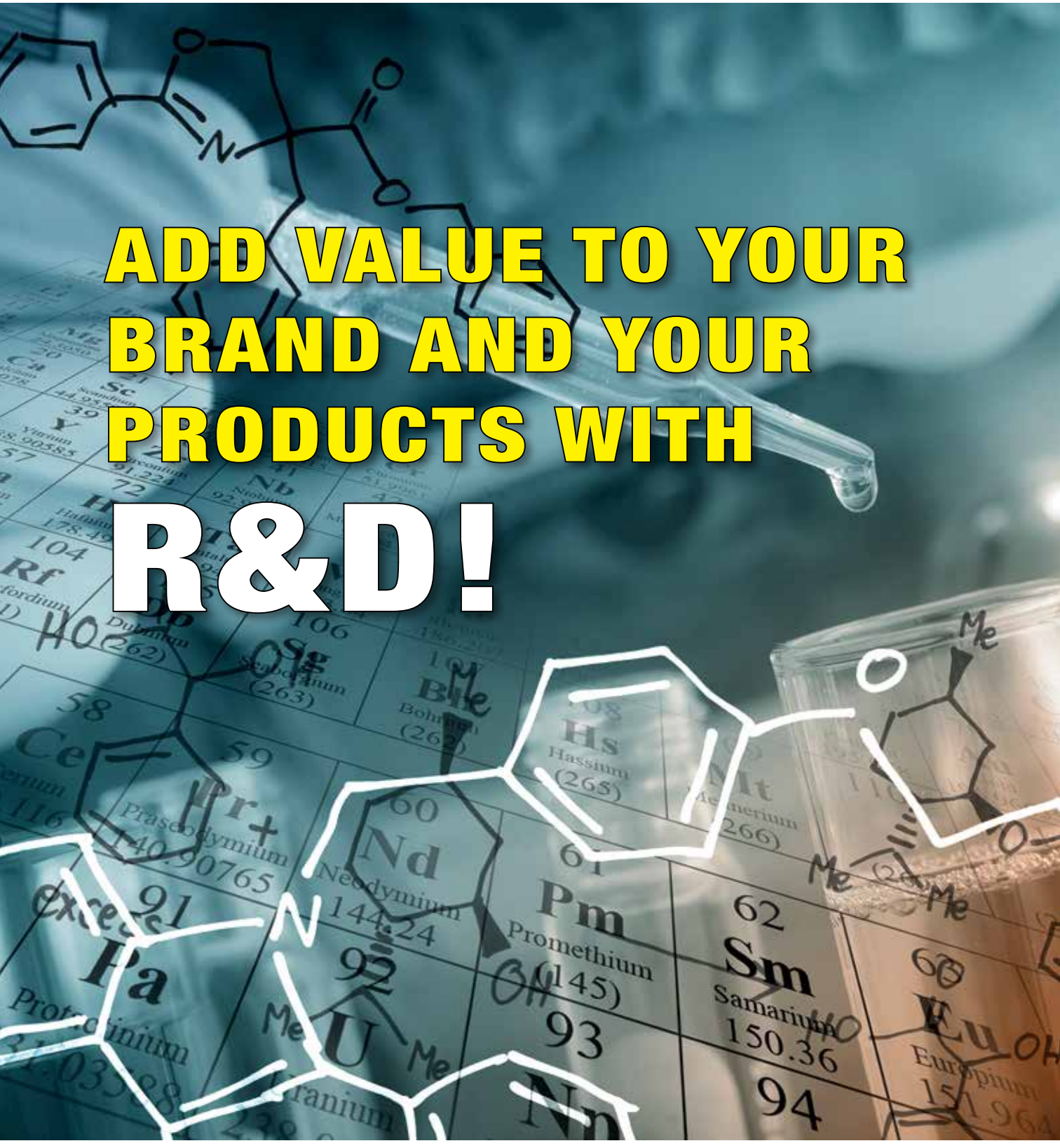
Subor Boru Sanayi produces 'Glass Fiber Reinforced' (GRP) plastic pipes with a diameter of up to four meters, especially for agricultural irrigation, in order to protect, transfer, separate, use and deliver water, the world's most valuable resource, to people. The company, which is sensitive to the issue of sustainability with its products and services, also draws attention with its environmentalist approach.

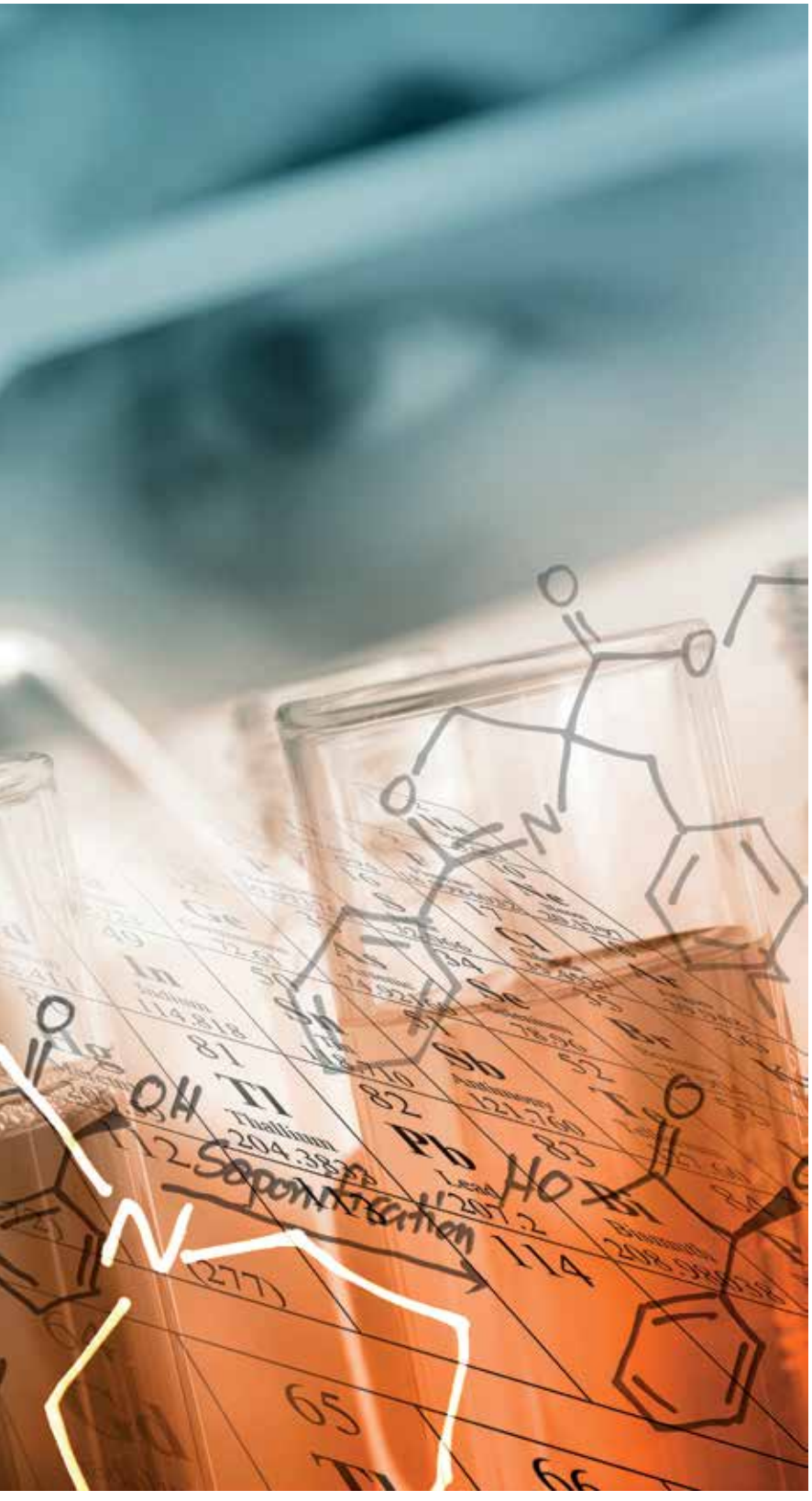
Pointing out that 70% of the world's water consumption is used in agricultural irrigation, Subor Boru Sanayi Deputy General Manager Murat Gökhan Hacıoğlu reminds that there was evaporation and leakages up to 50% in this area due to the transmission of water through open channels in the past. Stating that they have prevented such leaks with their products in agricultural irrigation, Hacıoğlu said, "We will do our best to keep the climate and water crisis, which has become more prominent in recent years and pose a serious threat to our near future, on our agenda globally, nationally and even personally, and to provide a solution to this problem. It is our duty to do this for the society and our future generations."

Stating that their products also have a very low environmental impact and therefore a low carbon footprint compared to other pipe technologies, Hacıoğlu states that GRP pipes are also more cost-effective, longer-lasting and operationally more efficient products than conventional pipes. When all these are taken into consideration, Hacıoğlu states that they also contribute to sustainability with their environmentalist approach, and notes that for this reason, they are the preferred brand globally.

70 PERCENT OF PRODUCTION IS EXPORTED

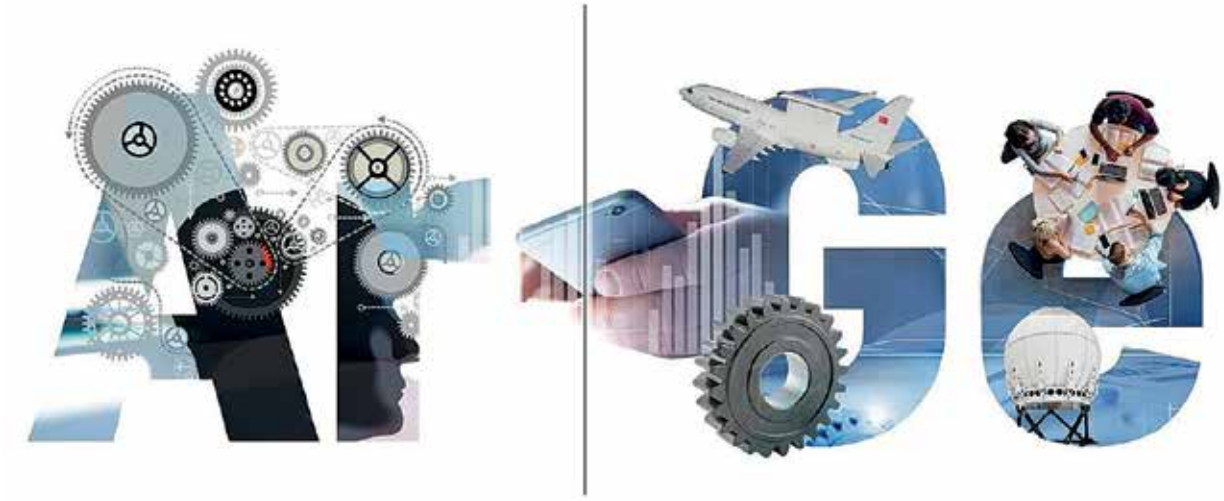
Emphasizing that they have 2 factories in Sakarya and Şanlıurfa in the field of CTB pipe production and trade and they have an annual pipe production capacity of 1000 kilometers, Hacıoğlu said that their products are in Şanlıurfa, Diyarbakır, Konya, Kayseri, Denizli, Aydın, Samsun, Edirne and Adana, where they have large irrigation investments. He says he is accepted. Noting that they export to 65 countries in 5 continents besides Türkiye, Hacıoğlu concludes his words as follows: "We have gained momentum in exports in markets other than Türkiye in recent years. Today, we export 70% of our production. We are a preferred brand not only in the field of irrigation, but also in drinking water, waste water, energy facilities and industrial projects. If we evaluate irrigation projects specifically, Subor pipes are preferred in agricultural applications in different geographies of the world such as the United States, New Zealand, Greece, Spain, Italy and Uganda.


ADD VALUE TO YOUR BRAND AND YOUR PRODUCTS WITH R&D!



CUSTOMER EXPECTATIONS, CLIMATIC PROBLEMS, RAPIDLY DEVELOPING TECHNOLOGY AND INNOVATIVE APPROACHES MAKE R&D ABSOLUTE FOR COMPANIES TO BE COMPETITIVE IN PRODUCTION. WHILE THE FUTURE OF COMPANIES THAT IGNORE R&D IS BEING DISCUSSED, THOSE THAT PRODUCE INNOVATIVE PRODUCTS IN THIS FIELD ARE ABLE TO CARRY THEIR BRANDS GLOBALLY AND ENSURE THEIR SUSTAINABILITY.

The greater the need for bread and water for people to survive, the more important an area in R&D is for companies to ensure their sustainability and competitiveness. In today's global production conditions, companies that cannot conduct R&D and innovate cannot compete against their competitors in terms of cost, competitiveness, and market efficiency and they may lose the potential of the growth in the long run by being disadvantaged in their share. In order to avoid such a situation, companies can allocate a certain amount of their turnover to R&D and have a chance to grow by developing products that are beneficial in product variety, cost-benefit balance, environment and climatic issues. Companies operating in Türkiye are also aware of R&D, and they have been carrying out very important works in this field, especially in the last 10 years. Companies operating in many sectors, especially in the chemical industry, gain a new vision by investing in the field of R&D, to which the



public also provides great support and they compete with their competitors in global trade. In the chemical industry, the İstanbul Chemicals and Chemical Products Exporters' Association (İKMİB) is taking important steps to activate the Chemical Technology Centre by giving importance to this field. On the other hand, many sectors, from petrochemicals to packaging, from medical to pharmaceuticals, from paint to plastic, focus on innovative products thanks to their R&D centres. It provides opportunities for the development of the country's economy and therefore opportunities in many areas from employment to value-added products. R&D, which also opens the door for Turkish companies' products to be preferred more globally, is among the indispensable investments of all companies.

Although R&D is seen as developing innovative products at first glance, there are many facts in the background. In addition to innovative products, giving importance to the preferences of the end consumer in order to meet customer expectations within the scope of R&D provides an advantage in the market for the company. On the other hand, companies that direct the production processes within the scope of R&D pave the way for fast and cost-effective production. In addition to these, when environmental factors are taken into account, the concept of sustainability comes to the fore in the management of related processes from energy to CO2 emissions, from global warming to water consumption. All these factors enable companies to stand out in every field in global markets and increase their brand value. Therefore, companies that manage their R&D processes well are preferred more by consumers and by providing competitive advantage; they both increase their chances of survival and strengthen their brands globally.

GLOBAL COMPANIES ALLOCATE 3 PERCENT OF THEIR REVENUES FOR R&D

While it is observed that global companies allocate an average of 3 percent of their turnover for R&D activities, this rate has not yet been achieved in Türkiye. While many institutions organize various events and competitions to encourage R&D, companies are trying to raise awareness through these events and competitions. In this field, İKMİB is trying to contribute to the chemical industry with the "Chemistry R&D Project Market" events it organizes. In the "Chemistry R&D Project Market", which was organized for the 8th time by İKMİB this year, many companies compete and carry out important innovative works. The contents of some of the projects that attracted attention in this event are listed below, while the activities of some companies that make important studies in the field of R&D are also shared in the following news.

Production of wood composite wedges from solid waste plastics going underground:

The scope of the project is to protect natural resources, to save energy, to facilitate solid waste operations by reducing the amount of waste, to help invest in the future and economy with recycling, to consume less petroleum resources and to extend the operating period of domestic waste storage facilities.

New generation and environmentally friendly 100% domestic fertilizer production:

In addition to the plant growth, yield quality and price advantage of the fertilizer produced within the scope of the presented project, the product also comes to the fore with its environmentally friendly feature. In this context, it was determined that the product made

a positive contribution to the treatment of diseases such as red spider mite, pine cone mite, vineyard scabies, vineyard aggregation, mildew, stone, powdery mildew and peanut leaf spot. In greenhouse trials, 80% reduction was achieved in the use of chemical drugs in the fight against diseases.

Purification of platinum metal and bringing it to the pharmaceutical industry:
It is not possible to fully recycle the noble metal in Türkiye. In particular, platinum catalysts used in the production of sulfuric acid in waste coating solutions, catalytic converters, waste metal-based teeth and platinum crucibles, platinum metal is sent abroad for purification without any processing. As it is known, this metal is used in the health sector. The goal of the project is to purify this metal with a high value (99.99 percent) in our country and to produce nano-platinum added chemicals with high added value and used in cancer treatment and platinum solutions used in prosthesis production.

Antibacterial Band-Aid from cocoon waste:
It is the design of tissue scaffolds from layered cocoon wastes (chitin-chitosan obtained from sericin and silkworm) to be used in the treatment of diabetic wounds that take a long time to heal themselves and severe burns. With its biometric approach, tissue scaffolds are expected to mimic the dermis and epidermis layers of the skin. For this purpose, firstly sericin-chitosan sponges with high porosity were produced by freeze-drying method representing the layer.

Air-purifying polyester:
In the project; It is envisaged to develop a CO2 absorber fabric that will prevent the accumulation of CO2 in areas close to the respiratory zone. It is planned to fix the CO2 adsorbent material on the polyester textile surface as a thin film. In the fabric to be developed, it is aimed to prevent the accumulation of carbon dioxide with chemical substances without changing the comfort, flexibility and usage properties that the textile product should have. Many chemicals for CO2 adsorbing have been synthesized or produced in the research data.

Development of intrinsically inflammable plastics:
Within the scope of the study, phosphorus-based polymers with self-inflammability were synthesized. Phosphorus-based compounds were chemically bonded to the backbone of the polymer. With the phosphorus molecule covalently attached to the main chain, polymers that do not oscillate and can provide flame retardant effect for a long time have been developed. By using the hydroxy and acid ends of these polymers, an additive that can react in today's general plastics such as polyester and polyurethane has been developed. Within the scope of thermo-mechanical analyzes of polymers, DMA and TGA analyzes as well as microcalorimetry, limiting oxygen index and UL94 values are still in progress.

SOCAR TÜRKİYE IS ONE OF THE INSTITUTIONS WITH THE MOST GROUNDED R&D CULTURE…

SOCAR Türkiye, which started its R&D activities in 1969 and combined it with SOCAR Global's modern knowledge and equipment in 2019, is one of the country's most entrenched institutions in this field.

SOCAR Türkiye, one of the leading companies in the country that attaches importance to innovative and high value-added products and environmentalist approach, begins its R&D activities with 'Petkim R&D' opened in 1969 at Petkim Yarımca facilities. The company, which made this center more active in 2019 by combining SOCAR Global's modern knowledge and equipment, is becoming one of the institutions with the most entrenched R&D culture in Türkiye.

SOCAR R&D and Innovation Inc. has a total of 30 employees, of which 20 are engineers, 30 percent of whom are researchers with a doctorate and 40 percent with a master's degree. This center, which has 6 laboratories as well as technical and administrative units in an area of 1,200 square meters, also includes a 400 square meter pilot production facility that will enable polymer processing, polymerization and catalyst test systems.

Providing information on R&D activities, SOCAR Türkiye R&D and Innovation Inc. Company General Manager Bilal Guliyev lists some of his innovative products as follows: "With the soft sensor optimization algorithm 'x-sensor' that we developed in 2021, we can make processes more efficient. In another project, we can detect the size distributions of granular materials such as catalysts with the 'imcube' device, using image processing technique. With this device, we can progress our business faster and without being dependent on foreign sources. We also have many projects on CO2 emission, which is one of the most important problems in the world. With the catalyst we developed, we aim to convert CO2 into dimethylether (DME) and turn the CO2 emissions generated in our factories into a product with high added value."

Guliyev stated that with the innovative products they developed, they both increased their operational efficiency in their group companies and reduced their dependence on foreign sources, adding, "As SOCAR R&D and Innovation, another important goal is to work for a sustainable environment and to contribute for a greener world with our catalysts and production technologies we have developed for this purpose. In this context, our Antiblock MB, Slip + Antiblock MB, PPA MB products, which we developed for use in the packaging industry and used in film production, have been successfully used by customers. We have developed a new special product type for "Extrusion Coating" applications, which are also used in the packaging industry and imported."

"PRODUCTS THAT WE CAN PRODUCE THE FIRST IN THE WORLD ARE COMING"

Guliyev, on the other hand, shares that they have developed the 'antigas fading' properties of the 'nonvowen' product, which is widely used in the hygiene sector, and that they have brought it to the commercialization stage, and continues his words as follows: "We are the first in the world, together with İzmir Institute of Technology, a bifunctional catalyst with a special recipe that produces DME from carbon dioxide. We produced and applied for a patent. At the same time, we made patent applications for our imcube device and biofuel production processes. We also have many other projects for which we can say that we produced this product for the first time in the world.

KAYALAR KİMYA IS ONE OF THE IMPORTANT MANUFACTURERS OF EUROPE WITH ITS R&D POWER…

Kayalar Kimya, which stands out with its innovative works in R&D activities and is one of the important manufacturers in Europe in the paint sector, also achieves firsts with many of the products it has developed.

Kayalar Kimya, which is one of the first companies to establish an R&D center in the paint industry, has achieved many innovations in its sector by obtaining the R&D Center certificate given by the Ministry of Science, Industry and Technology in 2011. Kayalar Kimya continues its activities in its R&D center on an area of 1800 square meters with a staff of 35 with doctorate and master's degrees. In the R&D center; Kayalar Kimya has 'Furniture UV System / Polymer Laboratory', 'Solvent Based Furniture Varnish - Paint & Water Based Furniture Paint and Varnish Laboratory', 'Water Based Construction Paint / Measurement and Test Laboratory' and 'R&D Application and Simulation Center' , with its innovative activities in this field, manages to become one of the important manufacturers in Europe.

Kayalar Kimya R&D Coordinator Ebru Ergüven, who draws attention to the fact that they keep customer expectations in the forefront by following the developments both in the world and in Türkiye, says that they have completed more than 100 projects, including TÜBİTAK projects. Ergüven said, "Considering our strategies to be a leader and followed company in new technologies and also an important partner in the global technology network, we attach importance not only to national projects but also to projects realized on international platforms. Our aim here; to create a global cooperation network and to make our company more known abroad, to increase our knowledge and experience, to expand our vision and to offer innovative products to our customers by including them in our portfolio."

Reminding that Kayalar Kimya is also included in the scope of the INOSUIT Program carried out by the Turkish Exporters Assembly, Ergüven said, "In this context, an innovation platform 'YOU'RE OPINION' was created in our company under the mentorship of our university professors. The purpose here is to encourage our personnel to share their ideas easily that innovation can take place not only in R&D and products, but also in processes, production and many different areas, and to develop innovative projects for our company by evaluating these ideas."

KAYALAR KİMYA MAKES INNOVATIVE PRODUCTS WITH R&D

Stating that they have also achieved firsts in many fields in their R&D centers, Ergüven continues his words as follows: "We are carrying out projects that will both ensure production efficiency and minimize the effects on human and environmental health in our center. At the beginning of these are polyurethane systems with low isocyanate requirements. These are 100 percent solids and water-based ultraviolet curing systems. On the other hand, we are the first company to offer the automatic coloring system developed for wood door paints and furniture paints to the furniture market in Türkiye. Within the scope of our sustainability policy, the 'min. Wood paints, in which 95 percent bio-based raw materials are used, is a consortium project in which our company is also included. When the project is completed, Kayalar Kimya will be the first to introduce the polymer and additives, which are all bio-based in the performance of the existing paint, to the world market for the first time."

NOBEL İLAÇ, CONTINUES ITS INNOVATIVE WORK IN THREE R&D CENTERS

While R&D is considered indispensable in the pharmaceutical industry, Nobel İlaç operates in three different R&D centres in this field with 140 employees and tries to make a difference in production.

The more R&D activities are necessary in global competition, the more important it is for the pharmaceutical industry. Nobel İlaç, which is among the companies that attach great importance to R&D, which is considered almost indispensable for the pharmaceutical industry, also carries out innovative activities in this field without compromising. Nobel İlaç, which has three separate R&D centres and employs 140 people, most of whom work in the branches of pharmacy and chemistry, launches many new products for human health.

Nobel İlaç Board of Member Numan Balki emphasizes that the annual total turnover of domestic and foreign companies in the industry is around 6 billion dollars and that more than one billion dollars is needed for the discovery of a molecule, and reminds that the cost of R&D is high. Balki said, "After R&D, every new drug you put on the market requires significant investment processes, from the formation of the file you will submit to the authority to serious accumulation, facility, equipment, equipment and staff. Therefore, it is difficult for a company from Türkiye to undertake such a work alone. However, despite the difficulties, very successful studies are carried out in our country in R&D activities."

Reminding that they allocate an average of 3 percent of the revenues of companies to R&D activities, whereas Nobel İlaç provides 5 percent of their own revenues, Balki said, "R&D activities in the pharmaceutical industry are a very long-term and costly area. As a company, despite the cost-price problems, we still allocate an important resource for R&D. This shows the importance we attach to R&D. Otherwise, not paying attention to this field will make it difficult to survive."

"WE ARE BETTER THAN MANY COUNTRIES"

Reminding that there are valuable companies in the sector that have the approval of many countries, including the European Union, Balki said, "I can say that we are at a better level than many countries in R&D. If you cannot meet a certain standard in both your R&D and production facilities, you cannot cross the borders of the tens of countries we are currently exporting to. Although it is never enough, I would like to state that we made an export of almost 2 billion dollars as an industry last year. However, this success does not mean that the R&D activities in our country are sufficient. We need to improve our competency in this field to move forward, including the discovery of new molecules. As I said, it is very difficult for companies in our country to overcome this path alone. This is a difficult and bumpy road that the public, scientific circles and private institutions must run together. I believe that we will successfully complete this arduous journey as long as we create the climate where all stakeholders will stand shoulder to shoulder."

Dr. Selahattin Armağan VURDU
Secretary General of İMMİB

The contribution of the chemical industry to global employment...

> *The total number of people employed in the chemical industry worldwide is approximately 15 million... When the indirect activities and effects of our industry are taken into consideration; it is clear that it has an impact on the employment of approximately 120 million people.*

While the chemical industry contributes to economic growth and development in the world in many ways, it also provides a significant increase in employment with the production and services performed. The research conducted by Oxford Economics on the impact of the chemical industry, which is in a very key position in achieving the global development goals, on global economic activities and employment reveals striking results. According to the calculations made within the scope of the study carried out using 2017 data, the direct contribution of the chemical industry to the global economy is at the level of 1.1 trillion dollars annually. Considering the expenditures and other indirect effects in the supply chains, the total contribution of the chemical industry to the global economy is estimated to reach approximately 5.7 trillion dollars. This amount corresponds to seven percent of the total global economy. Every $1 of added value produced by the industry provides an increase of $4.2 in the total global economy.

The total number of people employed in the chemical industry worldwide is approximately 15 million. The expenditures of this industry in supply chains also contribute significantly to the workforce. The products and services purchased by companies operating in the chemical industry support the employment of approximately 60 million employees. When the indirect activities and effects of our industry are taken into consideration, it is seen that it has an impact on the employment of approximately 120 million people. The employment of each person in the chemical industry, which has a high productivity structure, leads to the employment of 7 more people in the global economy. According to the data obtained in the research, while the total amount of salaries paid to the employees in the chemical industry has reached 313 billion dollars, it is estimated that the total contribution of the employees in this field to the economy, together with the expenditures they make in their daily lives, is close to 2 trillion dollars.

When evaluated regionally, it is stated that the largest participation in the workforce of the chemical industry is realized in the Asia-Pacific Region. On the other hand, investments and employment created within the scope of the research and development activities of the sector have reached serious dimensions. Within the scope of research and development activities in the sector, approximately 1.7 million people are employed in total.

CHEMICAL INDUSTRY, AN ESSENTIAL COMPONENT OF MODERN LIFE

These data indicate that the chemical industry, which is an indispensable component of modern life, makes a significant contribution to global employment. While recent developments, especially after the pandemic, have caused dynamics to change in international trade, supply chains and the labor market, we see that the chemical industry is becoming increasingly important for the world economy as well as for human life. There are many developments that may affect employment in the chemical industry in the coming period. It is expected that there will be an increase in the demand for chemical industry products in proportion to the increase in the average per capita income levels of developing countries. This situation is a kind of development that will have positive repercussions for the chemical industry labor market. Another important issue is the digital and green transformation process... As in all sectors, the digital and green transformation process is likely to trigger changes in many areas in the chemical industry and reveal new job opportunities... In this process, it is one of the determining factors that both companies and employees develop themselves with new skills.

BREATHE IN THE SMELL OF THE ROSEBUD IN ISPARTA!

THE ISPARTA ROSE GARDENS, A MAJOR TOURİST DESTİNATİON, AWAİT VİSİTORS DURİNG THE HARVEST SEASON THAT BEGİNS İN MİD-MAY. INHALE THE SMELL OF ROSES İN THESE GARDENS, AND ENJOY A DREAM EXPERİENCE.

The travel destinations have changed their shells in recent years! While historical and cultural centers invite their visitors to travel to the past by taking those centuries ago, the rose gardens of Isparta, which has been among the eco-tourism tours that have attracted attention recently, offer a different atmosphere to its guests. Especially during the harvest period, enthusiasts from Europe, Asia and the Middle East come to the tours, and they have pleasant moments alone with nature among the scents of roses. Those who want to visit the fascinating rose gardens in Isparta, where a natural studio environment is formed, can involve themselves in this magical environment.

Isparta, one of the most important rose production centres in the world, reflects its important natural beauty to eco-tourism and welcomes thousands of tourists every year during the harvest period including May and June. While the harvest becomes a feast in the tours organized for the rose gardens, the visitors can also picture the beauty of the roses in the photographs they take in these immense gardens. In these gardens, where beautiful memories are made, visitors also raise awareness getting a lot of information about roses in this area.

While the important places with rose gardens in Isparta are Milas, Gölcük, Yakaören and Gelincik Village, İslamköy of Atabey County, Güneykent Town of Gönen County, Senir Town of Keçiborlu County and Kılıç village, you can visit these regions beginning from April. However, if you want to witness the spirit of enthusiasm during the harvest season, you should visit this place after May 15. While the harvest lasts until the end of June, the tours to this region, especially on weekends, add a touristic atmosphere to the city.

FOLLOW THE FESTIVAL DATE!

It is useful to add another important note... In the festival, held on the first weekend of June, besides the rose harvest, you can also have the chance to participate in important and beautiful events from concerts to folklore shows and workshops. In addition, the experience, you will gain in this period when the streets turn into rose gardens during the harvest period, will be that the rose is not just a flower offered for love. Thanks to what you will feel here, you will witness that the rose is a breath, a colour and a source of healing for life in Isparta.

ROSE PRODUCTION IN ISPARTA STARTED WITH GÜLCÜZADE İSMAİL EFENDİ

While the history of the rose dates back to the past almost as old as humanity, the beginning of rose-cultivation in Isparta dates back to approximately 150 years ago. While there was no rose production in Isparta yet, this plant species was grown in Burdur, Denizli and Çal regions. İsmail Efendi, the son of Mehmet İzzet, one of the Meydanbeyoğuları, learned how to grow roses in these regions and what can be made from roses from a land registry officer who came to the region from Bulgaria, and started to grow this beautiful plant in Isparta. İsmail Efendi, who started to produce rose oil in time, became the person who made the blessings of the rose reach today. This entrepreneur, who took the name Gülcüzade İsmail Efendi in the following years, is recorded as the first person to lay the foundations of today's rose gardens.

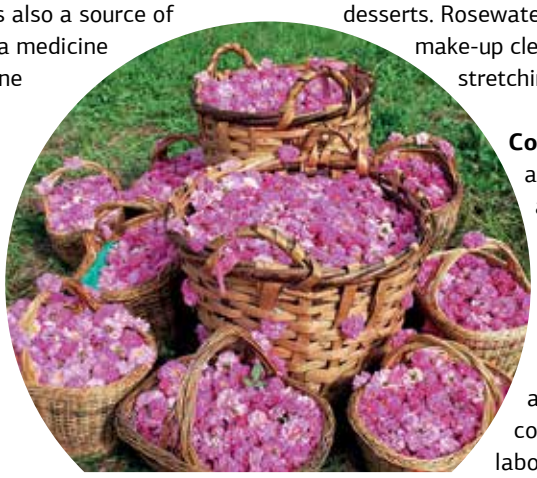
THE HOMELAND OF ROSE IS CENTRAL ASIA

The rose, which reached other parts of the world through trade from its homeland, Central Asia, has a legendary place among plants since ancient times due to its beautiful smell, medical value and nutritional place. According to the reports, which belong to the ancient periods, rose gardens were at least as important as the wheat fields and orchards for the Phoenician, the Greek and the Roman. While approximately 1350 rosa, or rose species, are defined in the world, 24 rose species are registered in the flora of Türkiye. The type used to obtain rose oil, 'Rosa Damascena Mill', is also known as 'Isparta Rose', 'Pink Oil Rose', 'Oil Rose', 'Gum Rose' and 'Damascus Rose'. This pink-colored, semi-double and strong-smelling species is cultivated primarily in Türkiye, Bulgaria, Morocco, Egypt, Iran, Syria, India and the Caucasus to obtain rose oil.

You can accompany this moment while the people of Isparta go to their gardens at 04:00 before sunrise to collect the flowers that bloom for the rose harvest. The harvest, which lasts until about 09:00 in the morning, continues in the same way every morning until the end of June. If you wish, you can also support the harvest. Therefore, you will learn the subtleties of this unique moment and the intensity of emotion you will feel among the scents of roses will not only stay in your photo frames, but you will also experience an important experience.

OVER 100 PRODUCTS ARE MANUFACTURED FROM GUL

Rose is a type of flower that is fragrant, beautiful-looking and well loved by women in general... However, behind these beauties, the rose is also a source of healing... Rose has been used as a medicine in the traditional world of medicine for centuries. Rose, which is also processed as rose water, rose paste and rose oil, is used in the treatment of ailments such as headache, fever, fainting, stomachache, eye bleeding, in these three different forms. This information, included in traditional medicine books, reveals that the blessings of the rose are not limited to this. Rose is also used in perfume and cosmetics, adding beauty to the beauties of women. While Gül is processed and commercialized in various fields, it also contributes to the country's economy with the employment and exports in this field. Many businesses that come together under the umbrella of Gülbirlik in Isparta produce more than 100 products by processing rose oil, rose concrete, rose water and cosmetics. In addition to the domestic market, these products, which are exported to countries such as Austria, Switzerland, Poland, Croatia, England, USA, China, Japan, Indonesia, Malaysia and Taiwan, contribute to the national economy of 50 million Euros, according to Gülbirlik statements.



ROSE IS PROCESSED IN FOUR WAYS

Rose oil: Rose oil, one of the most important and expensive raw materials of the perfume and cosmetics industry, is produced by boiling pink oil roses by steam distillation method.

Rose concrete: It is creamy, dark cherry red solid rose oil obtained from the processing of extremely fresh pink roses, which has not undergone fermentation, has not spoiled its colour and unique structure, by extraction method. Rose concrete is used in the production of absolute, one of the raw materials of the perfume and cosmetic industry.

Rosewater: It is rose-scented natural water obtained by mixing the oily water obtained during the production of rose oil, that is, yeast, with distilled, pure clean and hot water in a one-to-one ratio. Naturally produced rose water is filtered many times, filled into bottles, packaged and offered for sale. Since rose water is natural and does not involve harmful substances, it is also used as flavouring in some foodstuffs and desserts. Rosewater can also be used for body and make-up cleaning due to its nourishing and stretching effect for the skin.

Cosmetics: Rose is also produced as hand and skin cream, hand and body lotion, shampoos for different hair types, with formulations equivalent to the best quality products by processing. The products are released to the market after quality and health controls conducted in modern laboratories.

MELTEM KURTSAN

Is following the healing plants!

Meltem Kurtsan, who left the Chairmanship of Kurtsan Holding Board of Directors by saying, “Now it’s time to move on to the next stage,” has focused on her new business, which is essentially medicinal plants, with a sustainability understanding in recent years.

Protecting the Otacı brand and family business, which her father inherited, Meltem Kurtsan left the management to the third generation members of the family and professionals after growing Kurtsan Holding, one of the important institutions in the field of medicinal plants in Türkiye. After being the chairman of Kurtsan Holding's board of directors for about 10 years; saying that "It's time to move on to the next stage," Kurtsan answers Chemist magazine's questions.

Ms. Meltem, can we get to know you first? Can you tell us about your education, your first days in your business life and the excitement you experienced with them?

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Ms. Meltem, can we get to know you first? Can you tell us about your education, your first days in your business life and the excitement you experienced with them?

I am the daughter of a healer, researcher and entrepreneur family that values ancient knowledge very much. My father and mother are two idealistic pharmacists... I followed their path and graduated from Istanbul University, Department of Pharmacy and became a pharmacist. Later, I started to work as a second generation representative in our family company, Otacı – Kurtsan Group of Companies. After the death of my father, I was the chairman of the board of directors of the group between the years of 2004-2013.

You played an important role in the growth of a strong brand like Otacı. Can you explain the production power and brand value of this company through its role in the sector?

The foundations of the Otacı – Kurtsan Group of Companies were laid 65 years ago by my father, Niyazi Kurtsan, a young pharmacist, at Güneş Pharmacy in İstanbul. He was a successful entrepreneur, creative and productive scientist who made it his mission to develop medicines and healthy products from plants in the 1950s, when concepts such as natural life and alternative medicine were not common. The vision of Niyazi Kurtsan, who understood the importance of medicinal and aromatic plants a long time ago and directed his works in this direction, continues to develop with my 2nd generation me and my sister, my 3rd generation son and nephew and our valuable professional managers.

Otacı, one of the leading domestic industrial establishments of Türkiye with its new and original cosmetic products, medicines

and food supplements, by shaping and transforming the healing of medicinal and aromatic plants with science and modern technology, is one of the first brands that come to mind when herbal natural products are mentioned.

Kurtsan Pharmaceuticals, which is part of the group as Kurtsan Holding today; dermatology and cold medicines, and Kurtsan Medikal produces medical materials such as medical plasters and band-aids. With our Otacı brand, herbal lozenges, natural supplements, herbal hair and skin care products are produced and sold. Otacı products are exported to 25 countries including USA, Europe, Far East, Middle East and Africa.

So what are your criteria for success? Can we learn these?

Learning and self-development are the most important legacy we have inherited from our family... Both my mother and father were people who were devoted to self-improvement, valued ancient knowledge, believed wholeheartedly in the healing power of medicinal plants and conducted research on this subject. My mother is a hardworking pharmacist who entered the university and graduated from pharmacy while we were in primary school and supported my father in every way in life. He still continues to work every day at the Büyük Pharmacy in Sirkeci. The love of hard work and continuous learning is a very

KURTSAN LEADS THE FOUNDATION OF KAGIDER

After being selected as the Global Leader of the Future at the World Economic Forum (WEF) held in Davos in 1999; I received an invitation letter from the United Nations Economic Commission for Europe stating that I was awarded the Woman Entrepreneur of the Year Award and was invited to the meeting in Geneva. When I went there, I learned that eight more women entrepreneurs from Türkiye were selected with me. The biggest shortcoming I noticed was that we Turkish women are represented individually and in small numbers, while women entrepreneurs are represented by associations in other countries. Obviously, this situation both upset me and gave me a new idea. When I returned to Türkiye, I explained to my successful female entrepreneur friends the importance of supporting and guiding women entrepreneurs who want to start a business in Türkiye, and that women entrepreneurs who have done this job personally do it. The establishment of the Women Entrepreneurs Association of Türkiye (KAGIDER) was held in Istanbul in 2002 by 37 women entrepreneurs gathered under my leadership. After serving for 4.5 years as both the founding president and the two-term elected president of KAGİDER, I handed over the flag to my friends; As the Founding President of KAGİDER, my bond with the association and our projects still continue.

important value passed on to me from my parents...
After I started working in our family company, I thought it was very important to develop myself in areas such as management, finance, and human resources for a sustainable company management, and I received many trainings in this direction. I completed the Business Administration program at Istanbul University Institute of Business and Economics and then the OPM program at Harvard Business School. Along with all these, the most important factor in my success; I can say that I always continue to work and improve myself and I do not keep up with change.

SUSTAINABILITY IS A VERY IMPORTANT CONCEPT

We know that you are heading to different fields right now. You especially focused on natural living and healthy eating. What drove you to these fields?

I successfully continued my duty as the chairman of the board of directors in the holding for about 10 years, and now it was time to move on to the next stage. Sustainability is a very important concept for me... Therefore, I left the task to the professional management team and the third generation, and handed over the active management. Currently, my third generation son and nephew work with the company with professional board members.
During this period, I completed my master's degree in phytotherapy, which I could not find while my busy business life and social responsibility projects continued. As a pharmacist,

my love of learning continues; Phytotherapy, aromatherapy and homeopathy were the subjects I wanted to specialize in as our brand 'Otacı' in history meant a physician/pharmacist who treats with herbs.
On the other hand, I was looking for land because I wanted to grow medicinal plants and live a life in touch with nature. In the meantime, I found my land in the Bodrum Yalıkavak Mountains, where the natural flora is undisturbed, where medicinal and aromatic plants grow spontaneously, including centuries-old carob and olive trees, and I named it HerbaFarm. At the core of HerbaFarm; there are medicinal plants, natural products derived from plants and sustainability. We transform medicinal and aromatic plants, which we grow with organic and permaculture principles, into natural and healthy products and offer them for sale under the HerbaFarm Natural Products brand.
Again, at the HerbaFarm Academy, which I established on the same land, we provide trainings to share our experiences on natural and healthy life and the healing of plants, and we become a family that grows every year with our students. Aromatherapy, which is evaluated within phytotherapy, is one of our training topics. After completing my aromatherapy training at Bezmialem University, I became the Türkiye Regional Director of the international National Association for Holistic Aromatherapy (NAHA) in the USA in 2019 and our training gained momentum in this direction. As a pharmacist, I find essential oils obtained from medicinal plants and their use in aromatherapy very valuable and important.

These new areas are also associated with agriculture. Therefore, what would you like to say about your work in today's agriculture that comes to the fore? Are we rediscovering the importance of agriculture?

With the last pandemic in the world, people began to question their lives in the city. In recent years, although not so much, a change in the direction of returning to the countryside, natural life and holistic health has already been observed. However, with the pandemic, this change gained momentum and the state of being stuck in city life really led to radical decisions in

this direction. The result of the desire to return to natural life and healthy nutrition was to farm and to create a sustainable and self-sufficient life model.
In this process, the cultivation of medicinal and aromatic plants became popular, especially as food supplements and integrative treatments came to the fore. I find this development very exciting because medicinal and aromatic plants and essential oils and fixed oils obtained from these plants are used in many fields such as food, health and cosmetics. Such as foods, food supplements, traditional herbal medicinal products, medicines, cosmetics, aromatherapeutic products... In addition, the flora of our country has a rich nature that contains approximately 12 thousand different plants. About 3500 of these plants are endemic, that is, they can only be grown in Türkiye's natural conditions.

"DEVELOPMENT OF THE CHEMICAL INDUSTRY MUST BE PRIORITY"

Could you explain the importance of the chemical industry within the framework of your experience of more than 40 years?

The chemical industry is an industry that supplies intermediate goods and raw materials to many sectors from the protection of agricultural products to the production of semiconductor circuits, from pharmaceuticals to cosmetics, from packaging to textiles. It has an important role in production and foreign trade. In this direction, the development of a chemical industry capable of competing on a global scale should be one of our priority policies.
We, as Otacı, are a company that produces skin care products that contain natural raw materials and we are happy with the increasing demand for natural raw materials in the world. We know that our country has great potential in terms of natural cosmetic raw materials obtained from medicinal and aromatic plants. We expect and hope that natural raw materials obtained from plants will both meet Türkiye's needs and be exported to higher ranks in the world market. For example, Türkiye is the largest supplier of rose essential oil produced in the Isparta region. It is also one of the largest suppliers of laurel and thyme essential oils. In addition, Türkiye is among the most important suppliers of gum obtained from carob. Providing more investment and incentive opportunities in this regard will be effective in revealing this potential of our country and increasing export revenues.

Due to the Covid-19 pandemic, human life and business processes are being redesigned. At this point, you turned to special studies. How do you evaluate this process?

We have all learned many positive and negative things from the Covid-19 pandemic; In this process, it was very important to be able to adapt quickly to change. As HerbaFarm Academy, we were giving face-to-face trainings before the pandemic and continuing our daily work flow as usual. However, we continued to move on to online applications in all business processes. We started to give most of our trainings online, and thus, participants from many countries of the world had the opportunity to receive training from their own environment. Students are no longer required to travel for education. In addition, the ability to watch from the recording enabled them to receive training at hours suitable for their own lives.
Although we have now returned to our face-to-face trainings, the demand we receive for our online trainings is higher... This is an indication that the way of doing business has changed permanently due to the pandemic.

What advice would you give to young people who want to work in your industry?

My advice to young people; they work hard and never stop learning. It takes a lot of work to be successful. I think that there is no age or time for reading and self-development.

Have you had any hobbies that inspire and energize you in your successful business life? Do these hobbies still add colour to your life?

I am very lucky to be able to make my hobbies such as natural life, healthy eating, growing medicinal and aromatic plants my way of life and my job. With HerbaFarm Academy, I can share this information with anyone who wants to learn.

PROF. DR. KESKİN CHEMISTRY, A FIELD THAT ALWAYS HAS A PRIORITY

Conducting a pioneering and innovative algorithm development project that predicts protein-protein interactions, defined as a chemical reaction, Prof. Dr. Özlem Keskin says that chemistry has always been a priority for humanity.

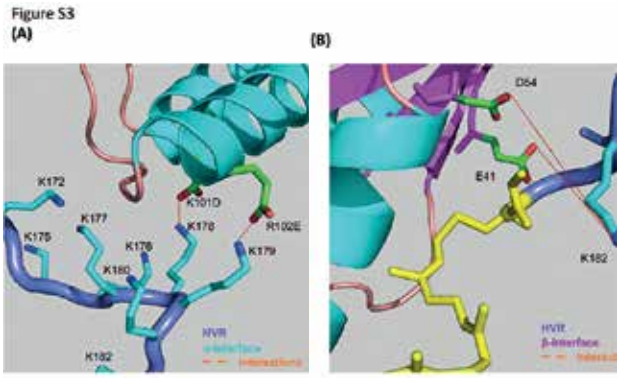
Professor of the Department of Chemical and Biological Engineering at Koç University, who has always been interested in chemistry, Dr. Özlem Keskin says that her interest in this field increased even more during her high school education period. "I was very impressed by seeing the reaction of hydrogen gas and oxygen gas in my high school classes," said Prof. Dr. Keskin. She later stated to notice that the branches of chemistry, biology and physics were intertwined and realized how important these basic sciences were for humanity. Following her excitement that started with chemistry on the way to science, Prof. Dr. Keskin summarizes her successful work, which goes back to the TÜBİTAK Science Award, as "Chemistry is always a priority field".

Prof. Dr. Keskin continues some of her doctoral studies at Boğaziçi University, Department of Chemical Engineering, in a combined doctoral program in the United States. Later, she did postdoctoral research on computational biology at the NIH (National Institutes of Health) in the USA. Keskin said, "I focused on computational biology, bioinformatics, and computational biophysics in my doctoral studies and in the following periods. I learned that by examining the three-dimensional structures of proteins, we can obtain information about their dynamics. I have worked on associating protein dynamics with the functions of proteins in our body. Proteins are actually large molecules called biopolymers. These studies have also showed me that it is necessary to use physics-chemistry-biology and mathematics together."

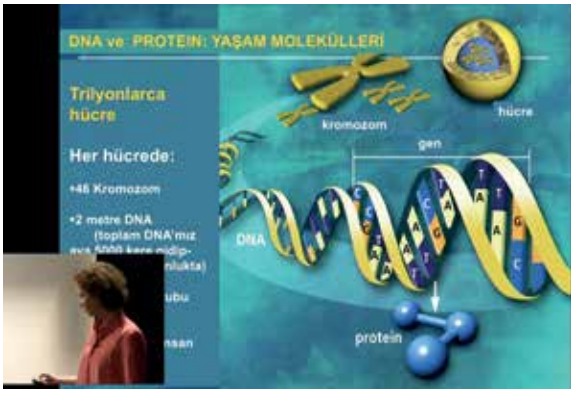
PROF. DR. KESKİN, CO-CHAIRMAN OF THE COMPUTATIONAL SYSTEM BIOLOGY GROUP

By looking at the chemical reactions in a cell with a holistic perspective, she works on how protein molecules communicate with each other and how signals are transported from one place to another. Dr. Keskin continues her words as follows: "Prof. Dr. We continued our studies on systems biology in our 'Computational Systems Biology Group', which we established with Prof. Dr. Attila Gürsoy and co-chaired. Here we are trying to understand how protein molecules communicate with each other."

Mentioning that as the Computational Systems Biology Group, they research protein-protein interactions in their work, Prof. Dr. Keskin said, "The work of our group is in the fields of computational biology and bioinformatics. Protein-protein interactions in the cell can be defined as a chemical reaction. In our

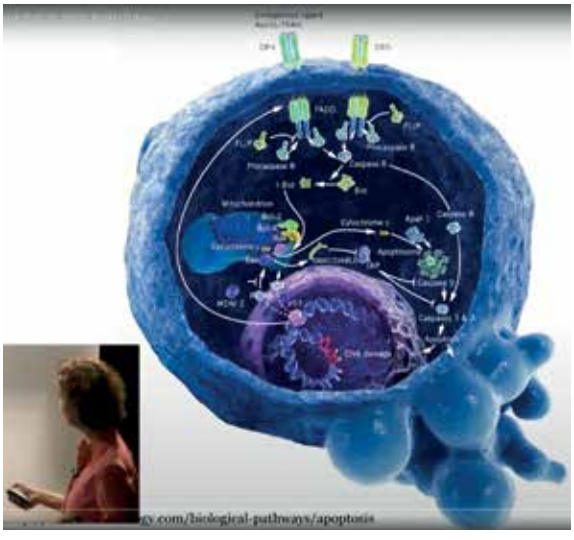


group, we developed a pioneering and innovative algorithm that predicts protein-protein interactions. This algorithm covers both geometric studies and sub-topics such as the calculation of the gravitational forces between atoms. Trying to find where the drug will bind on the surface of a protein is a tedious and long process. Protein binding sites may correspond to sites where drug molecules bind. The hotspot/hotregion (hotspots/hotspots) we developed in our group guides us in finding the areas targeted and bound by drug molecules."



"I HIGHLY RECOMMEND CHEMISTRY TO OUR YOUTH"

Stating that behind her successful work is her discipline and love for the field she works in, Prof. Dr. Keskin emphasizes the importance of young people who are interested in basic sciences, especially chemistry, that they should prefer this field. Noting that all kinds of changes and developments are based on chemistry, Prof. Dr. Keskin speaks to young people as follows: "Chemistry is actually a field that has a very open future and will never be a priority. I highly recommend it to our young people who are interested in chemistry, scientific subjects and basic sciences, or those who want to take part in production."



RESEARCHES ARE CONDUCTED UNDER THE 'TUBITAK PROJECT'

Prof. Dr. Keskin reminds that she was entitled to receive the TÜBİTAK Science Award in 2012 thanks to these works. Stating that as the Computational Systems Biology Group, they also try to simulate the function changes of proteins in biological pathways that play an important role in cancer, Prof. Dr. Keskin states that they are trying to find out the dynamics of the proteins and try to understand their functions.

Emphasizing that her other studies were on understanding which proteins in the human body interact with viruses and bacteria, Prof. Dr. Keskin said, "This research is within the scope of the TÜBİTAK project... In this research, we tried to understand the coexistence of neurodegenerative diseases and heart diseases at the molecular level.

Within the scope of the project we have received from TUSEB, we are working on how to reuse drug molecules for other diseases. Again, within the scope of the TÜBİTAK project, we are trying to extract the human interactome, that is, all protein interactions in the human body. Our aim is to create lasting values for humanity."

Reminding that industry-university cooperation is very important for the further development of the chemical industry; Prof. Dr. Keskin says that these two institutions will focus on innovative products with different perspectives and different priorities. Prof. Dr. Keskin underlines that in addition to the synergy that will be revealed by the industry-university cooperation, by allocating more resources to R&D, it will contribute to the country's economy in every field from employment to value-added products.

Awards that Prof. Dr. Özlem Keskin was entitled to receive:

- UNESCO-L'OREAL Fellowship for Young Women in Life Sciences, European and North American Region fellow, 2005
- Turkish Academy of Sciences (TUBA_GEBIP) Young Scientist Award, 2006
- Science incentive award for developing countries (TWAS), 2009
- TUBITAK Science Award, 2012