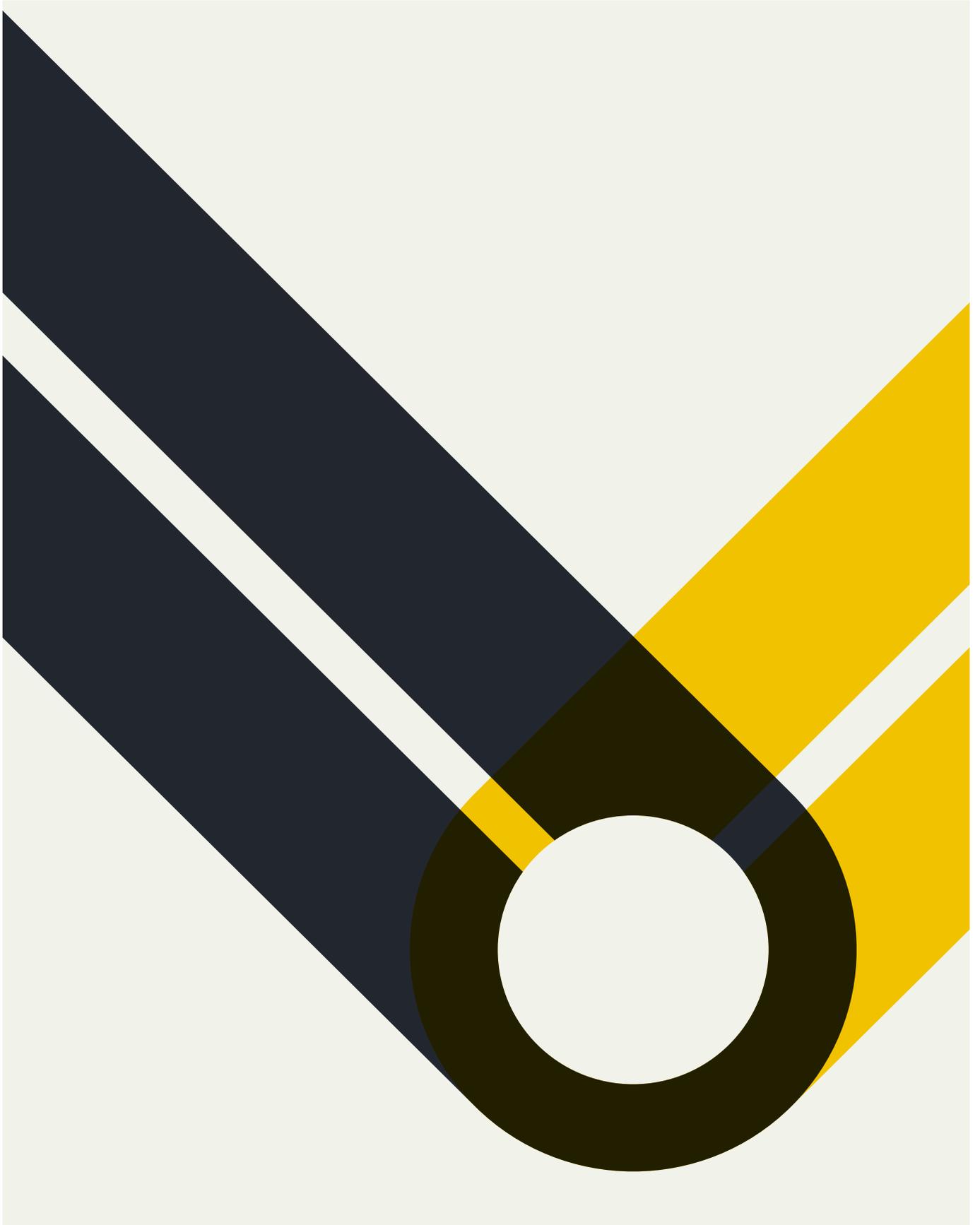




TECHNIEKPACT

NATIONAL
TECHNOLOGY PACT
2020 TARGETS FOR
2016-2020

↘ APRIL 2016



1. TECHNOLOGY PACT TARGETS FOR 2016-2020

On 13 May 2013, over 60 parties signed the National Technology Pact 2020¹ in an effort to structurally improve alignment between education and the technology job market and reduce the shortage of technically trained staff. Since the official signing of the Technology Pact, all the involved partners have made concerted and dedicated efforts to implement the necessary measures on the basis of an integrated approach entitled 'Choosing, learning and working in technology'. The Technology Pact is characterised by a regional approach with a national support infrastructure. As the results clearly show, the approach has proven effective and is now being emulated at international level: in the wake of Estonia and Flanders, Denmark is also set to introduce its own Technology Pact later this year. We will thus be continuing our current strategy in the years ahead. The Technology Pact was updated three years after its original signing in order to evolve in pace with the inevitable social changes as a result of ongoing technological developments. A new structure has been defined on the basis of twelve objectives, offering room to continue ongoing measures from the original Technology Pact and formulate relevant new goals. The overarching ambitions for the Technology Pact 2016–2020 will remain unchanged: *developing a structural approach to ensure a well-trained workforce with enough smart and capable technicians for the jobs of today and tomorrow.*

¹ Letter to Parliament on the Technology Pact, 13 May 2013, session 2012–2013, 32637, no. 57.

1.1 LABOUR MARKET DYNAMICS

Technology is everywhere. It affects us all, both at a personal level and throughout the society we live in. It is the greatest driving force behind our economic prosperity. Crossovers between technology and industry sectors such as health care, food, energy and sports are becoming increasingly prominent and are set to have a major impact on our working environment. Demand for skills and knowledge on the application of technology in professions outside of the technology sector will inevitably increase in the years ahead. These rapid technological developments necessitate an effective response to current labour market dynamics.

As it stands in 2016, we are seeing the emergence of many new technological developments: from artificial intelligence and robots in the care sector to self-driving cars, sensor networks, big data, 3D printers and drones. With changes taking place at such a rapid rate, many are already referring to this period as the fourth industrial revolution. Following previous developments such as the steam engine, mass production and information technology, this latest industrial revolution revolves around technologies set to radically and rapidly change our world in both social and economic terms². We need technological innovations to ensure economic growth. A proactive approach to these new opportunities will require a joint effort to contemplate their effects on the human resources at our organisations. We will see the emergence of entirely new positions, in industries we cannot yet predict. Just a few decades ago, who would have been able to foresee the emergence of professions such as 'Big Data analyst' or 'Care engineer'? This labour market dynamic will inevitably bring considerable challenges. How can we ensure that the young people and employees of today possess the skills they need to function on tomorrow's labour market? How can we help those working in the technology sector adapt to any changes they face, and how will this affect the workplace of the future?

In an effort to address the latest technological developments, the Technology Pact emphasises ICT technology through its Smart Industry action agenda, Human Capital Agenda ICT, the Code Pact and application of the Onderwijs2032 Platform outcomes. Growing digitisation will require a greater focus on digital skills. If the Netherlands aims to reap optimal benefits from the potential of digitisation in future, government bodies, employees, employers and the fields of science and education will all have to work together to apply ICT as effectively as possible.

As such, the Technology Pact must thus shift its focus towards aligning the various action agendas and capitalising on the potential of digitisation. However, the completion of ongoing measures and resolution of bottlenecks such as the lack of technical teaching staff will also remain relevant.

In addition to sparking the emergence of new professions, the technological revolution is also giving rise to new requirements for current technicians. The 'shelf life' of professional knowledge is growing ever shorter. The impact of new technologies is so great that industry professionals will have to supplement their technical knowledge with other competences in order to remain relevant to the labour market – competences such as advanced problem solving skills, a broad perspective on working processes, leadership abilities, the ability to collaborate with other professionals and creativity.

² World Economic Forum, *The Future of Jobs: Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution* (Davos, January 2016).

1.2 CONTINUED URGENCY DESPITE RESULTS

The efforts of the many Technology Pact partners have put us on track to achieving successful results in every area. The Technology Pact 2015³ Progress Report and monitor show solid results in the areas of 'Choosing, Learning and Working'.

- **More young people opting for technology:** in the 2014/2015 school year, 51 percent of all pupils in the 4th grade of senior general secondary education (HAVO)/university preparatory education (VWO) opted for the exact science-focussed Nature & Technology or Nature & Health profiles, as compared to 39 percent in 2004/2005. 31 percent of all vocational education pupils are currently enrolled in a technical degree programme, as compared to 29 percent in 2005/2006. The percentage of incoming students at exact sciences programmes in vocational education institutions rose from 18 percent in 2004/2005 to 22 percent in 2014/2015, whereas the percentage at universities rose from 26 percent in 2004/2005 to 35 percent in 2014/2015.

	Education level	% 2005/06	% 2014/15
	HAVO (N profile)	30	45
	VWO (N profile)	52	62
	Preparatory secondary vocational education (VMBO) (basic and advanced vocational programme)	29	27
	VMBO (hybrid and theoretical vocational programme)	38	38
	Secondary vocational education (MBO)		31
	Higher professional education (HBO)	18	22
	University education (WO)	26	35

source: monitor Techniekpact 2015

- **Growing involvement of the business community** in technical vocational education; over 2,000 companies are supporting the secondary vocational and higher professional education sectors through public-private partnerships, financial contributions or access to facilities and machinery and/or skilled staff members.
- **A more transparent and broad range** of higher professional education Bachelor's programmes; the number has been reduced from 65 to 36 broadly-oriented programmes.
- The Technology Pact has served to build **solid infrastructure** in the various regions, resulting in concrete collaborations between regional and industry sector parties that will help to ensure a well-trained workforce with sufficient technicians.
- The Technology Pact is increasingly establishing **links with agendas** and programmes such as the Smart Industry action agenda, Human Capital Agenda ICT, Human Capital Roadmap Priority Sectors, Code Pact and Onderwijs2032 Platform.

These results are certainly encouraging. In accordance with the Technology Pact's integrated approach, all efforts must be viewed within the context of the overarching collaboration, with a continued focus on the various bottlenecks.

³ Letter to Parliament on the Technology Pact Progress Report, 15 June 2015, session 2015–2016, 32637, no. 195.

In order to ensure sufficient intake at technical degree programmes and respond adequately to issues in the area of shrinkage and declining pupil numbers, secondary vocational and higher professional education institutions will continue their efforts to promote technical profiles. As a result of rising intake levels, higher education institutions are mainly focused on maintaining educational quality and sufficient well-trained lecturers.

Additional attention will be focused on the preventing the outflow of students from exact sciences programmes at secondary vocational and higher education institutions. The percentage of secondary vocational education graduates with a technology or exact sciences profile in the Netherlands is still below the European average. The higher professional education sector has seen a decline in both the absolute number and percentage of exact sciences diplomas. At universities, despite a rise in the number of exact sciences Master's and doctoral degrees, the percentage of exact sciences degrees hardly increased over the same period.

The Research Centre for Education and the Labour Market (ROA)⁴ expects the number of jobs in the Netherlands to grow by a total of approximately 400,000 in the period until 2020, representing average annual employment growth of 0.8 percent. The more highly-educated (HBO and university-level) will enjoy the best labour market perspectives until 2020, and highly-trained technicians and ICT specialists are likely to benefit from improving economic conditions. As a result of the high demand for replacements, teachers will also enjoy good labour market prospects. Furthermore, employment opportunities are also set to improve in specific industry sectors. According to the Economic Institute for the Construction Industry (EIB), new construction projects are expected to create more jobs in the years ahead.⁵

Despite the many efforts and results so far, the focus will remain on ensuring that sufficient well-trained technicians enter the labour market while retaining talented technical staff on the shop floor. To this end, the social partners will be investing in sustainable employability in order to retain employees for specific businesses or technical industry sectors. Efforts to prevent employees from leaving the technology sector will also be addressed at a regional level through the regional Technology Pact agendas and Technology Service Desks.

Ensuring the availability of sufficient well-trained technicians at all levels and in all fields will be crucial in maintaining the Netherlands' leading position in the global economy. Specific technology-related job vacancies are still difficult to fill. According to the latest figures from the Employee Insurance Agency (UWV)⁶, technical and ICT-related professions will continue to experience labour market shortages in the medium term. Examples of such professions include: electricians, CNC operators, technical calculators, maintenance engineers, specialist language programmers and process operators.

⁴ Research Centre for Education and the Labour Market (ROA), *De arbeidsmarkt naar opleiding en beroep tot 2020* (Maastricht, 8 December 2015).

⁵ Economic Institute for the Construction Industry (EIB), *Investeren in Nederland* (Amsterdam, June 2015).

⁶ S. IJzerman & M. van der Aalst (UWV), *Arbeidsmarktbeschrijving Technische en ICT beroepen* (Amsterdam, 10 September 2015).

Continual interaction between the education community and business sector will be crucial in ensuring the future availability of well-trained engineers. This interaction will help ensure qualitative, up-to-date education that reflects current labour market demands.

The National Technology Pact Steering Group has formulated five common themes for the years ahead in an effort to address the aforementioned challenges:

- Transfers to vocational education: further develop and increase the appeal of transfers and learning pathways from primary and secondary education to vocational and higher professional education, with a focus on career orientation and counselling for girls;
- Technology lecturers: ensure there are sufficient well-trained lecturers/teachers;
- ICT: establish stronger links with digitisation, programming and Smart Industry;
- Public-private partnerships: stimulate and facilitate PPPs within the (vocational) education community and work to ensure the sustainability of existing infrastructures;
- Mobility: encourage inter and cross-sectoral mobility and Lifelong Learning.

These themes have been incorporated into the targets for the updated National Technology Pact 2020.

2. REGIONAL TECHNOLOGY PACT AGENDAS FOR 2016-2020

Choose, learn, work' will remain the guiding 'mantra' for the Technology Pact, which will be implemented at local level by means of the five regions. This integrated regional approach on the basis of a national support infrastructure serves to ensure the effectiveness of the Technology Pact. The existing infrastructure in the various regions and concrete collaboration between regional and industry sector parties will offer great added value during the implementation process.

SOUTH-WEST

Techforce Rijnmond is a continuation of the Leading Technology in Business initiative based around 30 participating intermediate and higher vocational education institutions in the Rijnmond region and close ties with the regional business community. A total of 24 Technology Pathways have been launched so far. Participants are cooperating with primary education institutions as a part of the Choosing Technology programme and working with higher vocational education institutions within the framework of the Innovative Skills Centres and Centres of expertise. Efforts are being made to improve the professionalisation of lecturers and school administrators, while reducing the shortage of technology lecturers in collaboration with Teach&Tech.

From 2013 onwards, the various regional partners have made great strides in addressing the challenges of the Technology Pact – with each region having to deal with its own specific dynamics, labour market issues and ambitions. The various nationwide measures are being implemented on the basis of one or more regional Technology Pact agendas within the framework of the five regions and various sub-regions. A finely-meshed collaborative network within the provinces, sub-regions and municipalities contributes to the success of the Technology Pact. This serves to optimise the alignment between education and regional labour markets, while ensuring continued employment opportunities within the technology sector.

EAST

The Province of Gelderland will be investing €14 million in new initiatives aimed at aligning supply and demand more effectively over the 2016–2018 period on the basis of its ‘from crisis to employment’ plan. The technology and ICT sectors are having especially great difficulty filling open job vacancies due to inadequate alignment between education and the current job market. Provincial Executive Scheffer: ‘We’re still training too many people for jobs that no longer exist. Our education will have to shift its focus to the jobs of the future. Smart industries need smart people.’

In a similar vein to the national targets, the regional priorities determined in 2013 have been updated for the 2016–2020 period. The coalition agreements between the provinces for the 2015–2019 period are generally auxiliary to the Technology Pact targets and help the parties to capitalise on labour market opportunities. The regional ambitions for the 2016–2020 period have been described separately for each region and are included as an appendix to this document.

NORTH

What makes an employer appealing to talented young technical staff? How can the technology sector in the northern part of the Netherlands ensure the influx of sufficient young technical staff and retain them for the future? TechKnow Noord, a publication from April of 2016, describes the best practices applied by technology companies in Drenthe, Groningen and Friesland in the recruitment, guidance and development of young technical staff. These real-life examples have been supplemented with practical tips and tricks as well as background information on the technology labour market in the northern provinces.

3. TECHNOLOGY PACT TARGETS

In 2013, educational institutions (public and private), employers, employees, regional authorities, young people and the national government reached a series of agreements on the training of more talented exact sciences students and efforts to increase the appeal of technology sector jobs. These agreements took the form of 22 concrete measures. These agreements have since been assessed, updated and supplemented with new objectives in consultation with all the involved parties.

CHOOSING TECHNOLOGY

Discovering technical and technological talent at an early stage, attracting expert lecturers in order to provide inspirational basic education

1. Ensure that all primary schools offer their pupils Science & Technology education on a structural basis by 2020, with a prominent emphasis on digital skills.
2. Help primary education teachers improve their skills in the area of Science & Technology education.
3. Strengthen public-private partnerships in support of primary and secondary education.
4. Ensure greater intake and retention of secondary education pupils opting for an exact sciences profile, and effectively apply career orientation and counselling programmes.
5. Improve the alignment between secondary education, vocational education and higher education.
6. Stimulate the professionalisation of current lecturers and increase the number of lecturers with educational Master's degrees in the secondary education system.

TECHNOLOGY EDUCATION

Training technical professionals for the future

7. Active collaboration between the education community and business sector in terms of the training and education of lecturers at vocational education institutions.
8. Ensure more sustainable public-private partnerships within the vocational education sector.
9. Ensure effective alignment between the available range of education programmes, the regional business community and secondary and vocational education institutions, as well as sufficient suitable work placement positions/apprenticeships (for both boys and girls).
10. Ensure effective alignment between higher education institutions and the business community and within the higher education community itself, with a greater focus on international and technical talent.

TECHNOLOGY JOBS

Retaining skilled technical staff and applying talent to benefit the technology sector

11. Promote collaboration between regional and industry sector networks, and offer better access to labour market information.
12. Make optimal use of technically-skilled staff and their talents and retain them for individual companies and the overall technology sector by investing in sustainable employability.

All measures have been categorised into a total of twelve objectives. These twelve objectives, which have been partially reformulated and aligned with existing agreements, offer all twelve partners a basis upon which to continue and initiate relevant measures, achieve results and engage in further collaborations over the coming years.

3.1 CHOOSING TECHNOLOGY

1. ENSURE THAT ALL PRIMARY SCHOOLS OFFER THEIR PUPILS SCIENCE & TECHNOLOGY EDUCATION ON A STRUCTURAL BASIS BY 2020, WITH A PROMINENT EMPHASIS ON DIGITAL SKILLS.

All pupils should be able to understand the world around them and to do their part to help shape it. Of course, this will require a solid foundation of knowledge and skills. The Onderwijs2032⁷ Platform establishes Nature and Technology – alongside digital literacy – as a key component of the basic education curriculum. Over the past few years, the Technology Pact has laid the groundwork for introducing science and technology into the primary education curriculum while strengthening exact sciences/technology at secondary education level. In the autumn of 2016, the second edition of ScienceMakers will be held, in an effort to enable boys and girls at primary and secondary schools – such as the *Junior Vakkanjers* at VMBO institutions – to showcase their talents in the area of science, technology and maker education. The coming years will see a focus on ensuring a solid basis for ‘science and technology’ in the classroom.

- › Schools will be offered support in the process of implementing Science & Technology in their curricula through existing regional science & technology networks, and at their own request.⁸
- › As of the 2016/2017 school year, secondary school teachers will be allowed to teach at primary schools in an effort to improve the alignment between primary and secondary education. This will create an opportunity to teach Science & Technology at primary level in collaboration with exact sciences lecturers.
- › Intensive collaboration between the Code Pact (an initiative by StartupDelta) and Jet-Net programmes will offer more primary school pupils the opportunity to familiarise themselves with technology, programming and coding.
- › Existing experience gained through the Technology Pact will be applied by means of ‘learning labs’. The business community’s unique role in providing a broader context for specific subjects has resulted in an agreement with nine Jet-Net company CEOs, who will be contributing their experience and expertise by means of a learning lab during the design phase of Onderwijs2032.
- › In his role as Technology Pact ambassador, astronaut André Kuipers will also be visiting schools over the course of six College Tours. The initiative is aimed at interesting primary school pupils in year 7 and their teachers in technology.
- › The network of science museums and centres (VSC) is working with its members and partners in the field to establish a learning programme on science, technology and nature. The programme aims to encourage children and their parents to learn and discover more about science, both at school and at home.

⁷ See: www.ononderwijs2032.nl, 23 January 2016

⁸ Objectives 1 and 2 are partly derived from the Choosing Technology programme set to expire in August of 2016. The Ministry of Education, Culture and Science will come to a decision on the structuring of support for primary and secondary schools before the summer of 2016 on the basis of an evaluation.

2. HELP PRIMARY EDUCATION TEACHERS IMPROVE THEIR SKILLS IN THE AREA OF SCIENCE & TECHNOLOGY EDUCATION.

The primary school teacher training institutions have been closely involved in the implementation of Science & Technology since this aspect was embedded⁹ into all primary school teacher training curricula in the fields of geography, history and nature and technology (at minimum) in 2015/2016. This school year will see the graduation of the first batch of teachers qualified to offer science & technology education, as part of the fast-track procedure for third and fourth-year students. Current primary school teachers can still apply for a professionalisation budget through the 'Choosing Technology' action plan until 1 July 2016. The aim is to ensure that a greater number of teachers and school administrators are well-versed in the field of science and technology.

- › The primary school teacher training institutions are devoting more attention to individual learning, with a focus on Science & Technology talents. As a part of the ongoing implementation of science & technology, programmes such First Lego League could also be introduced at primary school teacher training institutions through the provision of training and supervision.
- › An 'inventory and pilot project' for teachers will also be launched in an effort to prevent stereotyping and gender-based assumptions from clouding their judgement on potential technology talents at an early stage. This will coincide with the launch of a project aimed at raising gender awareness amongst primary school teacher training students and preparing them for their role in the process of preventing and breaking through gender stereotypes.
- › The 'Choosing Technology' evaluation and Onderwijs2032 vision will serve as guidelines for determining the most suitable method of embedding Science & Technology in primary and secondary education, with a specific focus on digital skills and the channels used to share them with all primary school teaching staff.

3. STRENGTHEN PUBLIC-PRIVATE PARTNERSHIPS IN SUPPORT OF PRIMARY AND SECONDARY EDUCATION.

All primary and secondary schools seeking to offer science and technology education should have access to support from the business community. This will require a high-quality infrastructure with nationwide coverage and effective networks between schools and businesses, in order to strengthen interaction between the education sector and business community, ensure alignment of all mutual activities and improve the quality of basic education.

- › 2016 will see the launch of a platform for primary education institutions and businesses, based around the two parties' common denominator – the Jet-Net and TechNet programme networks. This platform will stimulate the exchange of teachers and knowledge with the business community in order to improve basic education, while establishing links with existing regional secondary and higher education networks (including the Exact Sciences Support Centres). The collaboration is expected to be supplemented with various other parties (such as Bouwend Nederland and Nederland ICT) in order to create a network with national coverage.
- › The digital www.techniekonderwijs.nl helpdesk will be further developed in order to offer a clearer overview of the various activities undertaken in support of technology education. Technology Pact partners can link the site to their own networks and activities.

⁹ Administrative agreements to this end have been reached between the Ministry of Education, Culture and Science and the Netherlands Association of Universities of Applied Sciences.

4. ENSURE GREATER INTAKE AND RETENTION OF SECONDARY EDUCATION PUPILS OPTING FOR AN EXACT SCIENCES PROFILE, AND EFFECTIVELY APPLY CAREER ORIENTATION AND COUNSELLING PROGRAMMES.

The coming years will see continued efforts to ensure that 40 percent of all VMBO pupils in hybrid and theoretical vocational programmes opt for a combination of subjects including physics and chemistry (currently 38 percent), and encourage at least 30 percent of all VMBO pupils in basic and advanced vocational programmes to opt for technology (as compared to the current figure of 27 percent). August 2016 will see the introduction of ten VMBO exam profiles, of which five will be oriented towards technical subjects. A regionally-varied and labour market-oriented range of programmes based around the VMBO institutions' preferences will be crucial in this regard.

The objective of ensuring that 55 percent of all HAVO and VWO pupils opt for a Nature & Health and/or Nature & Technology profile (N profiles) will remain in force. At present, 45 and 62 of all HAVO and VWO pupils opt for an N profile, respectively. Programmes such as 'Pass IT on' inspire secondary school pupils to choose an exact sciences profile while offering them a greater insight into the multifaceted career opportunities offered by the ICT labour market.

- › Ans Hekkenberg will be taking up her duties as Technology Pact ambassador in 2016, in an effort to inspire more girls to choose exact sciences profiles. She will be focusing her efforts on VMBO and MBO pupils.
- › The targeted provision of career orientation and supervision opportunities to groups that are traditionally unlikely to opt for an exact sciences profile, such as children from ethnic minorities and girls, should stimulate more young people to embrace technology.
- › VMBO and MBO institutions will be encouraged to collaborate in the area of technology profiles and the use of effective technology facilities, through platforms such as the Leading Technology in Business networks. This will help to generate more attention for and interest in technology at VMBO institutions, while increasing intake levels at VMBO-TL schools and promoting transfers to MBO level.
- › The MBO Technology Gender Focus action plan will be implemented in an effort to increase the amount of female students enrolling at and transferring to technical MBO programmes.

GIRLSDAY 2016:

The annual Girlsday event sees some 300 companies operating in realm of exact sciences, technology and ICT and dedicated technical and ICT departments open their doors to as many as 10,000 girls in the 10-15 age group. The girls can take part in a range of interesting activities organised especially for them, while acquainting themselves with the exact sciences/technical aspects of the day-to-day professional practice. Naturally, they will also have an opportunity to meet with the participating companies' female employees!

5. IMPROVE THE ALIGNMENT BETWEEN SECONDARY EDUCATION, INTERMEDIATE VOCATIONAL EDUCATION AND HIGHER EDUCATION.

Over the coming period, the Technology Pact will continue to strengthen successful collaborations in an effort to promote transfers to technology programmes. The same applies to joint regional measures aimed at ensuring a varied range of technology profiles and programmes as a part of the effort to promote transfers from secondary and intermediate vocational education institutions to higher vocational education programmes. The newly-developed elective components for intermediate vocational education programmes – aimed at enriching qualifications and helping students gain more in-depth and broader knowledge of their field – will also play an important role in improving the transfer process.

- › Efforts will also be made to strengthen networks that organise activities aimed at improving the alignment between HAVO/VWO and higher education, such as the existing regional secondary and higher education networks (including the Exact Sciences Support Centres).
- › The 'experimental scheme for VMBO and MBO learning pathways', which offers professional skills and technology/career pathways for VMBO and MBO schools, will be continued.
- › The Ministry of Education, Culture and Science supports the development of the experimental 'Technology and Application' school examination programme through the Netherlands Institute for Curriculum Development (SLO). A total of twelve schools are currently experimenting with the programme as part of a pilot project. Amongst other objectives, the programme was designed to improve the alignment between VMBO-H/TL and MBO 4 technology programmes, and centres around improving VMBO H/TL pupils' skills in the area of research, design and entrepreneurship.

6. STIMULATE THE PROFESSIONALISATION OF CURRENT LECTURERS AND INCREASE THE NUMBER OF LECTURERS WITH EDUCATIONAL MASTER'S DEGREES IN THE SECONDARY EDUCATION SYSTEM.

Schools will need sufficient well-trained teaching staff in order to provide high-quality education. However, the quantitative and qualitative shortage of lecturers may well increase further in the years ahead, especially in the exact sciences. A large number of older lecturers are retiring, while too few (academically trained) students are currently opting for a teaching career. The Sector Agreement for Secondary Education and 2014–2020 Secondary Education agenda¹⁰ also emphasise the importance of attracting and training highly-skilled lecturers and offering further opportunities for professionalisation and practical support. The existing infrastructure of eleven regional secondary and higher education networks (including the Exact Sciences Support Centres) will also be applied to further stimulate regional value chain collaboration between secondary and higher education institutions and the business community in 2016. These networks offer secondary education teachers an opportunity to continually develop their professional skills, innovate curricula and improve the alignment between secondary and higher education in collaboration with technical higher education institutions and the business community.

- › School administrators and lecturers will be stimulated to actively and clearly express their wishes in terms of professionalisation. The regional networks for schools and school administrators offer a platform for the exchange of experiences and programmes in the area of professionalisation.

¹⁰ Letter to Parliament on the Sector Agreement for Secondary Education, 16 April 2014, session 2013–2014, 31289, no. 187. According to the terms of the Sector Agreement for Secondary Education, 50 percent of all secondary school teachers should have obtained a Master's degree by the year 2020 (33 percent in 2013). Over 80 percent of all VWO teachers assigned to pupils in the senior years should also ideally have obtained Master's degrees by this date, as compared to 53 percent in 2013. Also see www.vwo2020.nl.

Implementation of the 'More academically-qualified teachers in the classroom' action plan will stimulate the training of more and more highly-qualified academic lecturers in the secondary education sector. Technology lecturers seeking to obtain their Master's degree can apply for a financial contribution towards their study costs.

- › The networks for higher technical and exact sciences education (HTESE) and regional secondary and higher education networks will be aligned more closely, enabling the parties to strengthen one another more effectively.
- › School administrators will be offered support (at their own request) in the process of establishing more flexible teaching teams. Academics with a degree will be more actively involved in teaching activities through the academic teacher training alumni networks and 'Head of the class' trainee programme. This will also create room for hybrid positions: academics that spend part of their time teaching and devote the rest to other duties.
- › More work placements and guest lectures for sitting and novice teaching staff through initiatives such as the 'STEM Teacher Academy', whereby lecturers work to improve their professional skills and develop new teaching materials.

3.2 TECHNOLOGY EDUCATION

7. ACTIVE COLLABORATION BETWEEN THE EDUCATION COMMUNITY AND BUSINESS SECTOR IN TERMS OF THE TRAINING AND EDUCATION OF LECTURERS AT VOCATIONAL EDUCATION INSTITUTIONS.

Education will become more appealing to both pupils and teachers if teachers have up-to-date knowledge of the latest developments in their field. The teaching profession must be made more attractive for students and employees with a technical background. The past few years have already seen efforts to improve the quality of the transfer process as a part of vocational education training measures. Amongst other results, the measures have yielded a 'Quality framework for transfers at MBO institutions' and 'National Framework for Didactic Certification'. Furthermore, combining a position in the business sector with a teaching engagement will also be made easier.

- › Efforts will be made to streamline the transfer process for skilled technical staff from the business sector and job seekers with a technical background seeking to retrain as vocational education lecturers. Lessons learned over the course of the 'Teach & Tech' and 'Hybrid Lecturer' pilot projects will be shared in support of comparable initiatives, in order to encourage the combination of teaching duties and employment in the technology sector. The Innovative Skills Centres and Centres of expertise will play a key role in attracting lecturers from the corporate sector.
- › Regional collaborations will be initiated with local businesses and education institutions in an effort to improve the appeal of the teaching profession. All such efforts must be designed to reflect the perspective of potential new lecturers.
- › More effective regional embedment of master classes for current teaching staff, provided by industry professionals in collaboration with regional secondary and higher education networks, 'STEM Teacher Academy' and the Leading Technology in Business networks.
- › The MBO Council is currently developing an education agenda for MBO teaching staff. The results of the study by Ockham on potential technical teaching staff shortages will be applied during the development of this agenda¹¹

¹¹ S. Broek & B.J. Buiskool (Ockham) *Onderzoek naar mogelijke tekorten onderwijsgeevenden in de technische sectoren in het mbo* (Utrecht, December 2015), study conducted at the behest of the MBO Council.

8. ENSURE MORE SUSTAINABLE PUBLIC-PRIVATE PARTNERSHIPS WITHIN THE VOCATIONAL EDUCATION SECTOR.

The quality of education and its alignment with the labour market is contingent on the involvement of the business sector and an effective practical component in all vocation education. Close collaboration between the business sector and education community helps to make technical programmes challenging and appealing to both young people and the working population. The past five years have seen the launch of some 90 public-private partnerships in the vocational education sector (MBO and HBO). These centres are jointly funded by educational institutions, the business community and government authorities, with private investments accounting for over 40 percent of overall financing. All the involved partners are jointly responsible for safeguarding the sustainability of these collaborations and ensuring that successful centres can independently maintain their quality standards.

- › The Ministry of Education, Culture and Science still has over €60 million available for new grant applications in 2016 and 2017, which will be provided through the Regional MBO Investment Fund¹². Partnerships between schools, businesses and regional authorities may submit joint applications to the Fund. These grants must be supplemented by means of co-financing, whereby the co-financed amount should constitute two thirds of the original grant. As of 2016, public-private partnerships seeking to develop lectureships or Associate Degree programmes may also apply to the Investment Fund, as may entry-level programmes.
- › The VAT exemption for collaborating schools seeking to offer joint education was expanded effective March 2016. The educational exemption offered to collaborating institutions engaged in such partnerships applies to all education, thus facilitating collaboration within all industry sectors. The elimination of other VAT-related factors currently impeding public-private partnerships will remain vital, and is set to be addressed in conjunction with the Tax Authorities.
- › Regional alignment will be crucial in the effort to ensure sustainability public-private partnerships. In accordance with the Strategic Agenda for Higher Education,¹³ a decision on further support for the Centres of expertise – and contingent support for the Innovative Skills Centres – will be taken in the summer of 2016.
- › The business community aims to offer work placement positions or apprenticeships to all students in technical vocational programmes. This expansion effort will help to ensure and maintain a 30 percent intake rate at technical vocational programmes.

¹² The Regional MBO Investment Fund is a grant scheme offered by the Ministry of Education, Culture and Science, and is aimed at improving the alignment between education and labour market through the encouragement of public-private partnerships. See <http://www.investeringsfondsmbo.nl/> and Letter to Parliament on the Regional Investment Fund for MBO institutions, 6 November 2013, session 2013–2014, 32637, no. 87.

¹³ Letter to Parliament on the Strategic Agenda for Higher Education, 7 July 2015

PPPS IN THE VOCATIONAL EDUCATION SECTOR

Alliances in the vocational education sector	2013/14	2014/15
MBO PPP: Regional Investment Fund (RIF)	0	47
MBO PPP: Innovative Skills Centre (CIV)	18	17
HBO PPP: Centres of expertise (COE)	24	24
Number of participating businesses (CIVs + Centres + RIF)*	1601	2120

Financial commitment by PPPs (€ million) *	CIV	RIF	COE	Total
Government funding	44	38	53	135
Co-financing by businesses	53	61	102	216
Co-financing, other	84	16	71	171

* The specified figures represent the sum total of the COEs and CIVs established in 2011–2014 and the first two tranches of the RIF. The figures are based on business plans, the monitors/progress reports prepared by the Centres, information provided by the Centres over the course of a series of telephone interviews and information provided by DUO.

Source: 2015 Technology Pact monitor

9. ENSURE EFFECTIVE ALIGNMENT BETWEEN THE AVAILABLE RANGE OF EDUCATION PROGRAMMES, THE REGIONAL BUSINESS COMMUNITY AND SECONDARY AND VOCATIONAL EDUCATION INSTITUTIONS, AS WELL AS SUFFICIENT SUITABLE WORK PLACEMENT POSITIONS/ APPRENTICESHIPS (FOR BOTH BOYS AND GIRLS).

Since the launch of the Technology Pact, MBO institutions, secondary education institutions and the business community have been working together to ensure that at least 30 percent of young people opt for a technical vocational programme. The combined vocational training (BOL) and apprenticeship training (BBL) track experiment was initiated in 2015 and is set to run until 2021. The combined track will enable students to acquire additional knowledge and skills before entering the workforce. As a result, companies offering practical training experience will have access to students with a higher degree of knowledge and skills who can then be put to work sooner. The joint development of a vision for the future regarding the range and content of programmes offered in the region represents a key challenge. The Innovative Skills Centres will play an important role in this process.

- › MBO institutions will be offered greater freedom to develop their own range of regionally-tailored programmes. The 'Cross-over qualifications' experiment starting in August 2016 will enable MBO schools to adjust their range of programmes more rapidly to emerging new professions. Institutions will formulate qualifications in consultation with the business community and can then develop the relevant education accordingly. As of 2017, schools will be permitted to offer independently-developed programmes that combine multiple qualifications.

- › More intensive efforts will be made to focus on less highly-educated technology sector workers and instruments aimed at improving their labour market potential. This will include financial support for public-private entry-level programmes through the Regional MBO investment fund.
- › As of the 2016–2017 school year, schools will also be permitted to offer a learning pathway leading from the VMBO advanced vocational programme to an MBO programme at level 3 (the 'professional skills route'). The existing 'Technology Route' will be renamed 'professional route' and broadened to include all MBO subjects: integrated learning routes will also be offered in the area of 'Care and well-being' and 'Economics and commerce'. Experiments within the technology and ecology sectors, both ongoing and new, may continue to use the name technology route.

10. ENSURE EFFECTIVE ALIGNMENT BETWEEN HIGHER EDUCATION INSTITUTIONS AND THE BUSINESS COMMUNITY AND WITHIN THE HIGHER EDUCATION COMMUNITY ITSELF, WITH A GREATER FOCUS ON INTERNATIONAL AND TECHNICAL TALENT.

The effects of the Technology Pact are starting to manifest themselves in the form of growing student intake at technical higher education programmes. At present, 22 percent of all higher vocational education students and 35 percent of all university students opt for a technical degree programme. As a result of this increase, educational institutions are currently having difficulty accommodating all students and offering qualitative education. The institutions will have to work with the business community to effectively address this challenge. Despite rising intake levels, the percentage of students to drop out prematurely is still considerable, especially at HBO institutions. It is thus crucial to ensure that the right student ends up at the right programme.

The Netherlands can only benefit from a climate in which both Dutch and international talents are acknowledged and appreciated. The 'Make it in the Netherlands' action plan – set to run until the end of 2016 – is part of a joint effort to invite international students to start a career in the Netherlands, and offers a basis for extending current initiatives aimed at attracting and binding international talent beyond 2016. This will ensure that the Netherlands remains an attractive player in the international education sector, which, in turn, is a crucial factor in maintaining an internationally competitive economic position.

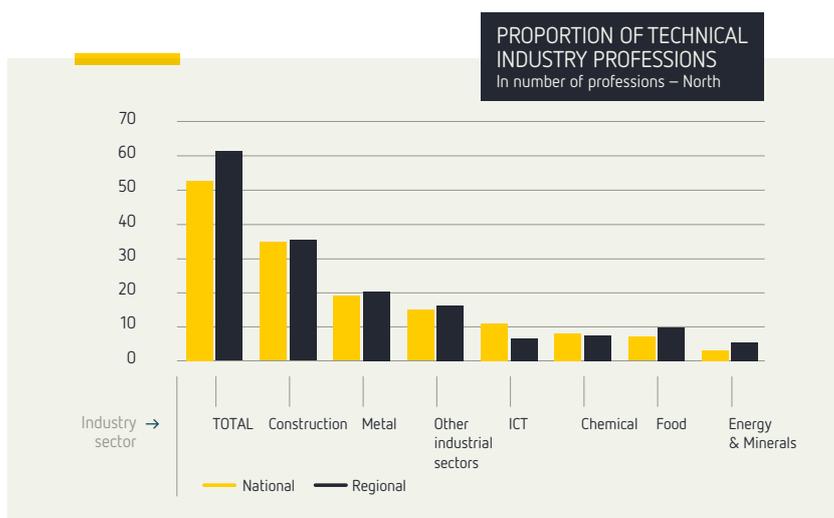
- › The universities of applied sciences currently offering technology programmes will work together to ensure that their range reflects regional demand as well as their own institutional profiles and research priority areas. In addition to the range of available Bachelor's programmes, attention will also be devoted to the development of Associate Degrees, suitable lifelong learning programmes in the field of technology and better transfer opportunities from MBO to HBO level.
- › The first twenty '*Dutch Digital Delta ICT talent awards*' will be presented in 2016. The priority sectors remain committed to the goal of offering one thousand priority sector scholarships to talented students as of the 2016/2017 academic year. An overview will be compiled of all existing talent programmes and efforts to support the organisation of initiatives such as the '*Dutch Digital Delta ICT talent awards*' and priority sector scholarships.
- › The provision of English-language Bachelor's education will enable international students to enrol during the Bachelor's phase. The 'Make it in the Netherlands' programme will ensure the availability of more relevant information for international students and businesses.
- › Government agencies, educational institutions and students will work together to find sustainable solutions to the capacity problems at technical higher education programmes and ensure the quality of education.

3.3 TECHNOLOGY JOBS

11. PROMOTE COLLABORATION BETWEEN REGIONAL AND INDUSTRY SECTOR NETWORKS, AND OFFER BETTER ACCESS TO LABOUR MARKET INFORMATION.

The labour market is highly compartmentalised in both regional and sectoral terms. Ensuring access to accurate labour market information and learning from implementation processes at regional, industry sector or national level will enable the parties to respond more effectively to labour market developments. Collaboration between the various networks will be beneficial in this regard.

- › Collaboration between regional and industry sector networks will be encouraged through meetings in support of the implementation of nationwide and regional industry sector plans. The Technology Service Desks initiative, a collaboration between social and public partners, will also be extended. As a part of the ambition to retain, recruit and apply talent, proactive efforts will be made to assess potential tie-ins between Priority Sector networks and the regional labour market networks initiated as a part of the Technology Pact.
- › As of 2016, education vouchers will be made available as a part of the 'New Work Initiative'¹⁴, and transitional Unemployment Act arrangements will be applied more broadly in order to contribute to more effective work-to-work transitions. Linkage with regional economic, innovation and labour market agendas will be key in this regard. These initiatives will serve to promote both work-to-work transitions and labour market entry for new job seekers.
- › Relevant labour market data will be harmonised and published at national and regional level. The same applies to monitoring data on job vacancies and the supply of and demand of specific competences. The five regions, provinces and the Employee Insurance Agency (UWV) will work together to develop an effectively functioning nationwide structure. The regional labour market dashboard developed by Brainport Network is a good case in point.



Some 10 percent of the overall technical workforce (154,000) is employed in the North region. Of this total, 94,000 (61 percent) work in the technical industry sectors. The majority of technicians work in the construction industry; at 35 percent, this figure is almost equal to the national average of 36 percent. It should be noted that the ICT sector represents a total of only 6 percent, considerably lower than the national average of 11 percent. Source: 2015 Technology Pact monitor

¹⁴ Letter to Parliament on the New Work Initiative, 27 November 2015, session 2015–2016, 33566, no. 86.

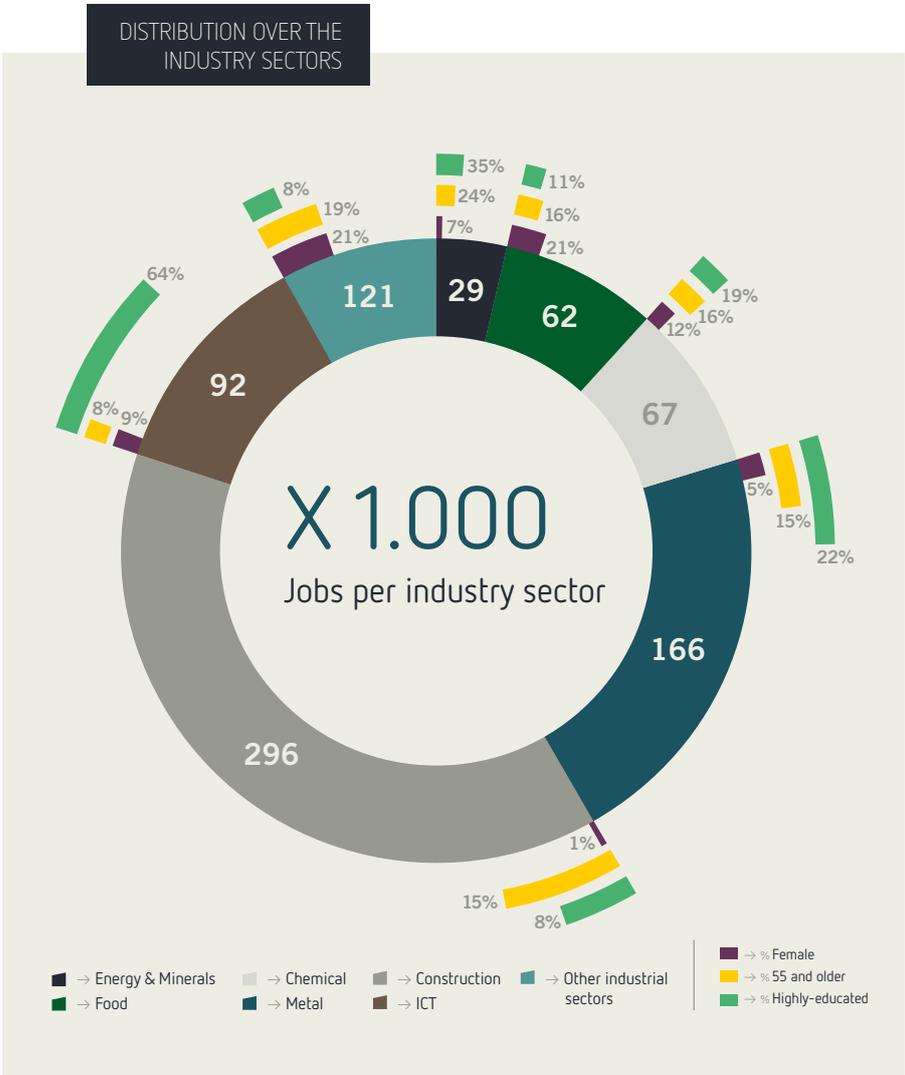
- › A transparent overview of all funding and incentive schemes for employees will be prepared. This overview will include national, provincial and municipal resources such as education vouchers, the European Social Fund, initiatives relating to good employment practices for young professionals and programmes in the area of sustainable employability.
- › A total of 28 new sector plans from the third tranche were launched over the course of 2016. These plans concern work-to-work and unemployment-to-work transitions, and include a total of 17 regional sector plans. All mediation efforts will be based on available job vacancies (supply side). Many regions are experiencing high demand for technical professions. Efforts will also be made to implement the 'New Work Initiative', a package of supplementary measures, in collaboration with the social partners. This package includes measures to offer education vouchers to degree programmes oriented towards high-potential professions and broader application of the transitional Unemployment Act scheme. Resources will also be made available to further reinforce regional collaboration. The deployment of these instruments must reflect regional dynamics.

12. MAKE OPTIMAL USE OF TECHNICALLY-SKILLED STAFF AND THEIR TALENTS AND RETAIN THEM FOR INDIVIDUAL COMPANIES, THE OVERALL INDUSTRY SECTOR AND TECHNOLOGY ITSELF BY INVESTING IN SUSTAINABLE EMPLOYABILITY.

The social partners, national government and regions will jointly continue 2013 measures aimed at retaining skilled staff by investing in sustainable employability. The technical education and research funds are already leading by example with solid results in the area of cross-sectoral and intersectoral mobility in the technology industries. This mobility can be further expanded, based on the example of existing initiatives. National or regional arrangements between government authorities, businesses and education institutions can also contribute to this process by ensuring that relevant programmes are more accessible to the working population and job seekers alike. Crucially, regional collaborations aimed at stimulating intersectoral education and mobility must be expanded. Investments will be made in an effort to retain skilled female staff and those in the over-fifty age group for the technology sector.

- › The flexibilisation pilot project and student-based financing experiments for part-time higher education are set to launch in the Technology & ICT sector over the course of 2016. These initiatives concern degree programmes for which there is currently demand in the professional field. Efforts are also being made to expand the student-based financing experiments to more programmes in the Technology & ICT sector and Care & Wellbeing sector over the course of 2017.
- › Existing inspirational examples in the area of cross-sectoral and intersectoral mobility will be shared with other technical education and research funds.
- › 2016 will see the launch of the Social Innovation Field Lab in collaboration with the industry sectors and physical Smart Industry Field Labs. The Social Innovation Field Lab focuses on the changing role of employees at Smart Industry enterprises and businesses in other sectors, the general and Smart Industry labour market – often in a regional and intersectoral context – and resulting need for different managerial and operational skills. Amongst other key themes, the Social Innovation Field Lab focuses on the promotion of informal learning by creating instructive working environments at SME sector businesses.

- › The priority sectors will jointly encourage the circulation of knowledge by providing training at all levels and introducing a total of seven pilot projects aimed at self-employed persons, HBO lecturers and other target groups.
- › The launch of mentoring circles in collaboration with the National Expert Organisation on Girls/Women and Science/Technology (VHTO), aimed at retaining novice and experienced female professionals and stimulating their mobility.
- › Assessments are also being conducted to determine the potential for transfer schemes for those in the fifty-plus age group that are currently unemployed or in danger of losing their jobs.



833,000 (54 percent) of all technical staff are employed in a total of seven technical industry sectors. Source: 2015 Technology Pact monitor

4. TECHNOLOGY PACT INTERLINKS AND SUPPORTS MULTIPLE AGENDAS

The Technology Pact coordinates its activities with the Smart Industry action agenda, Human Capital Agenda ICT, Human Capital Roadmap for the Priority Sectors, Code Pact, Genderfocus MBO Technology and the Onderwijs2032 Platform. The various programmes and agendas reinforce one another, and participants maintain effective working relationships. The coming period will see intensified efforts to establish mutual connections and build new relationships.

As regards the Human Capital Roadmap, the priority sectors spent 2015 developing a joint agenda for human capital in collaboration with the education community, employers and other stakeholders. This Human Capital Roadmap aims to increase the impact of the individual human capital agendas (HCAs) by creating a common voice for the priority sectors. The Roadmap comprises four lines of action, which intersect and overlap with the Technology Pact at various points or describe concrete measures towards its implementation:

- Education & Innovation: The activities within this line of action centre around more effective alignment between the priority sectors and Innovative Skills Centres and Centres of expertise. The Centres form regional learning and innovation infrastructures, which make up part of the priority sectors.
- Lifelong Learning: The priority sectors will encourage the circulation of knowledge by providing training at MBO, HBO and academic level and introducing a total of seven pilot projects aimed at self-employed persons, HBO lecturers, the Social Innovation Field Lab and other target groups. This joint effort will help the priority sectors amass new knowledge on the organisation of lifelong learning.
- Internationalisation: Attracting, training and retaining international students and knowledge workers for the Netherlands: increasing the percentage of international students that remain in the country from 38 percent to 40 percent. Encouraging international students to participate in the labour market during and after completion of their studies. Strengthening language education: exports remain the key driver of the Dutch economy, meaning languages such as English and German are very important.
- Improving the public image and increasing intake levels: The ambition of four in ten remains in place. Where possible, the priority sectors will harmonise their activities with the Technology Pact. However, the priority sectors want to be able to independently determine which industry sector trains for which purposes. Which abilities are professionals in the industry required to have? The Creative industry, Logistics, Energy and Chemistry priority sectors and team ICT will be contributing to this effort by means of individual studies. Agriculture & Food and T&U will focus on the recruitment of 'green' exact sciences staff.

5. ORGANISATIONAL STRUCTURE

The five regions – South-East, South-West, North-West, North and East – are responsible for developing and implementing their own Technology Pact agendas and translating agreements made at national level into regional guidelines. They will work with representatives of the business community, unions, educational institutions and decentralised government authorities to determine the optimal scale and structure for implementation and working agreements. This approach was adopted to reflect the significant differences between each individual region. In addition to their economic and social structures, the regions also vary in terms of their specific dynamics and approaches. The approach will ensure tailor-made solutions and alignment with local needs and initiatives.

The National Technology Pact Steering Group will coordinate, monitor and ensure implementation of the nationwide strategy and all objectives and agreements established in the Technology Pact. The representatives of the five regions constitute the core of the Steering Group. Other members include representatives of the national government, employers, employees, priority sectors and the education community. The members are all authorised to act on behalf of their supporters.

The Exact Sciences Technology Platform will be responsible for all day-to-day activities, consisting of coordination, communication, implementation of regional incentives and nationwide action lines in the area of education and other matters, and the provision of support to initiators. All activities in support of regional implementation have been recorded in regional collaboration arrangements by the regions and Platform.

In terms of policy, responsibility for the integration of efforts by the national government will remain assigned to the three most closely-involved ministries: Economic Affairs, Education, Culture and Science and Social Affairs and Employment.



FOR MORE INFORMATION:

WWW.TECHNIEKPACT.NL

THE FOLLOWING PARTIES ARE PARTNER TO THE TECHNOLOGY PACT

3TU.Federatie	Anka Mulder
AOC Raad	Jan-Pieter Janssen
Bouwend Nederland	Maxime Verhagen
CNV Vakcentrale	Arend van Wijngaarden
CNV Vakmensen	Piet Fortuin
Code Pact	Neelie Kroes
ECP	Tineke Netelenbos
FME	Ineke Dezentje
FNV	Ton Heerts
ISO	Linde de Nie
Jet-Net	Marloes Michon
JOB	Nicky Nijhuis
Koninklijke Metaalunie	Fried Kaanen
LAKS	Andrej Josic
North Region	Henk Jumelet
Northwest Region	Tjeerd Tjalsma
East Region	Eddy van Hijum
South-east Region	Ton Wilthagen
South-west Region	Hugo de Jonge
MBO Council	Rien van Tilburg
Minister of Social Affairs and Employment	Lodewijk Asscher
Minister van Economic Affairs	Henk Kamp
Minister of Education, Culture and Science	Jet Bussemaker
State Secretary of Education, Culture and Science	Sander Dekker
MKB Nederland	Michael Van Straalen
Nederland ICT	Jeannine Peek
NRTO	Ria van 't Klooster
PBT	Hans Corstjens
Primary Education Council	Rinda den Besten
SBB	André Timmermans
Stichting Techniek Promotie	Rob Fastenau
Team ICT	René Penning de Vries
Technology Pact ambassador	André Kuipers
Technology Pact ambassador	Ans Hekkenberg
TechniekTalent.nu	Ruud Hagendijk
Priority Sectors	Aad Veenman
Uneto-VNI	Titia Siertsema
UWV	Tof Thissen
Vereniging Hogescholen	Thom de Graaf
VHTO	Cocky Booij
VNO-NCW	Hans de Boer
Higher Education Council	Paul Rosenmöller
VNCI	Mark Williams
VSC_network of science museums and science centres	Rinke Zonneveld
VSNU	Karl Dittrich



APPENDIX: TECHNOLOGY PACT AGENDAS FOR THE FIVE REGIONS

The regions and sub-regions still view implementation of the Technology Pact as an urgent priority. The various Technology Pact regions maintain close ties as a part of the knowledge sharing effort. Interaction between the regions and the ministries and other Technology Pact stakeholders is viewed as an essential component of the Technology Pact approach; such interaction is crucial in ensuring an effective interplay between regional dynamics/demand and national policies. This applies to both substantive aspects as well as financing and co-financing. This approach will enable the regions to substantially contribute to the realisation of national objectives. The five regions will be prioritising the following three common themes over the coming period:

- Ensuring the sustainability of infrastructures throughout the entire education chain in order to meet the 'choosing' and 'learning' action line targets;
- Integrating the theme of ICT into the various activities;
- Ensuring more effective regional interaction with national and sectoral policies on the 'Technology jobs'; intersectoral mobility and Lifelong Learning action line.

The section starting on the next page offers further explanations on the Technology Pact agendas developed for each region.



NORTH REGION

In 2013, the business sector, education community and government authorities in the North region (Groningen, Friesland and Drenthe) enthusiastically worked to develop the Technology Pact North and recorded their joint objectives for the period until 2020. Implementation of the Technology Pact has been in full swing since the start of 2014, along with regional efforts to develop a concrete agenda for qualitative education for all age groups and an effectively functioning technology labour market. These efforts are being conducted within the framework of two programme themes, aimed at ensuring greater coherence between activities and a more effective technology infrastructure in the North Netherlands region. The approach centred around taking action and collaboration has proven especially effective in achieving results within the northern region of the Netherlands. The relevant measures have been explicitly linked to policies in the three central Northern municipalities (Emmen, Groningen and Leeuwarden). The North region has its own Technology Pact steering committee and working group, with members from the education community, business sector and government authorities.

PRIORITIES

Despite the solid results achieved so far, the objectives of the Technology Pact North as formulated in 2013 still remain relevant today. The 2016–2020 period will also see an emphasis on ensuring the structural embedment of Science and Technology in regional primary education and the use of public-private partnerships. Accordingly, the number of new key objectives is limited. Changes mainly concern the further elaboration and implementation of existing objectives in order to achieve the northern ambitions. Monitoring, cooperation with the business sector throughout the chain and branding will also be crucial in determining whether targets are being met and communicating successes to the field.

CHOOSING TECHNOLOGY

- A greater focus on career orientation and counselling for girls in the Technology sector;
- The continuation and anchoring of regional 'Leading Technology in Business' collaborations: (primary education) secondary education (VMBO/general secondary education) MBO/HBO;
- Public-private partnerships: co-creation effort to elaborate the regional MBO profile and retain a regionally accessible range of technical VMBO education programmes. These priorities are aimed at facilitating the subject cluster choice process, attracting new funding and accommodating demographic developments.

TECHNOLOGY EDUCATION

- An explicit focus on the labour market perspectives of pupils at Entry and MBO 2 levels (including apprenticeship training, Metalwork);
- A focus on the growing demand for MBO 4 level and higher (learning pathway from MBO-AD-HBO, excellence range).

TECHNOLOGY JOBS

- Promotion of intersectoral mobility and activities and organisational culture in the area of lifelong learning. The municipalities will also be more closely involved in this effort to invest in sustainable employability;
- Attractive employment conditions;
- Efforts to appeal to and retain young employees, including a focus on generations on the shop floor.

NORTH-WEST REGION

The North-West region (comprised of the provinces of North Holland, Utrecht and Flevoland) is implementing a joint regional Technology Pact action agenda. This involves the supra-regional assessment of measures, whereby alignment between the Amsterdam Metropolitan Area, Utrecht, North Holland-North and Flevoland sub-regions offers added value. The participating regional parties have established an administrative Lead Group to this end. Furthermore, a Working Group comprised of representatives of government authorities, businesses and education institutions advises the Lead Group and serves as a sounding board. The sub-regions all have their own agendas and initiatives, reflecting the nature and scope of the challenges and economic priorities in their overarching region. These aspects serve as a starting point for the joint agenda.

Regional consultations and the coordination of measures are organised through: Amsterdam Economic Board; Economic Board Utrecht; TechniekRaad Noord-Holland; Regieraad Techniek in Flevoland.

The aforementioned platforms are composed on a tripartite basis and have close ties with businesses, schools, government authorities and other institutions responsible for actual implementation of the individual measures.

PRIORITIES FOR 2016 – 2020

The parties in the North-west generally support the continuation of current measures, which have all yielded significant results since the launch of the Technology Pact in 2013. The following priorities have also been defined for the 2016–2020 period:

CHOOSING TECHNOLOGY

- Strengthening business community participation in primary and secondary education through platforms such as the regional Technet Circles and ICT business sector participation in the Code Pact;
- The bundling of initiatives aimed at promoting technology at primary and secondary schools through a Technology Pact activity programme in the North Holland sub-region in collaboration with the Amsterdam Expertise Centre for Science and Technology and numerous local and regional initiatives;
- The development and implementation of a 'Playful Learning' pilot project in the Utrecht sub-region;
- Expanding the role and improving quality of science and technology components in teacher training curricula, and providing refresher courses for primary school teachers.

TECHNOLOGY EDUCATION

- The development and elaboration of a future-proof campus structure for the vocational education sector that reflects regional economic priorities; Where possible, existing training centres, campuses, Innovative Skills Centres and Centres of expertise will be expanded on the basis of initiatives launched over the past few years (with the support of the 'Regional MBO Investment Fund' scheme and other resources). Regional government authorities and businesses will contribute from their own funds;

- Scaling up of promising initiatives towards the establishment of VMBO-MBO learning pathways, such as the technology route developed by Amsterdam Technology Master Plan.

TECHNOLOGY JOBS

- Developing and implementing a technology pilot project as a part of the regional Lifelong Learning action programme for the Amsterdam Metropolitan Area. This programme aims to achieve greater structural intersectoral mobility through the regional bundling of sectoral funds.
- Increasing the transparency of labour market information. Existing instruments for the monitoring of labour market data will be improved and made accessible to various target groups.

NORTH-WEST

The Regieraad Techniek Flevoland (Flevoland Supervisory Council for Technology) will be linking up initiatives aimed at ensuring the supply of sufficient technically-trained staff in the province. Employers' and employees' organisations in the technical sectors initiated the Supervisory Council in collaboration with the Flevoland provincial authorities. The technology sector will continue to experience high demand for well-trained staff in the years ahead. Considerable steps will have to be taken in order to ensure that Flevoland has access to sufficient trained staff by the year 2025. This can be achieved by interconnecting existing activities, and ensuring that any 'blank spots' are filled in. The Flevoland Supervisory Council for Technology (RTF) was initiated by the employers' and employees' organisations in the technical industry sector, and the affiliated training and development funds. Education is also represented on the Flevoland Supervisory Council for Technology, in the form of both secondary education and MBO and HBO institutions. Hetty Klavers, dike warden (chair) at the Zuiderzeeland Water Authority will serve as independent chair.

EAST REGION

The East Region comprises the provinces of Gelderland and Overijssel. Liaisons from the various regional technology pacts within the East Region convene on a structural basis. The following regional pacts are currently active: Urban triangle, Achterhoek – Liemers, Food Valley, 2020 Noord Veluwe & Randmeer area, Twente and Zwolle. 4 March 2016 also saw the launch of the Smart and Sustainable Technology Pact. This pact is focused around three priority sectors – Health, Water and Energy – and is not specifically oriented towards any one sub-region.

PRIORITIES

The liaison platform has formulated over 20 different measures as a part of the development effort, which have each been allocated to a specific stakeholder. The coming period will see additional focus on new technology target groups; diversity, international workers and knowledge workers, women/girls, outstanding technology talents. Further expansion of the Twente technology pact monitor to include the entire Overijssel region and – if possible – East, and alignment of the entire chain with learning pathways and routes are also key areas for attention. Efforts will also be made to assess the success factors underlying own projects and European initiatives, while seeking alignment with existing agendas such as Smart Industry 'Boost' (East), and HCA ICT. The provinces are responsible for supporting, strengthening and connecting the various regional initiatives.

CHOOSING TECHNOLOGY

- Development of a Provincial Technology Investment Fund for partnerships between the primary and secondary education sector and business community. Objective: 50 percent of all primary and secondary education in Overijssel should be engaged in active collaborations with the business community by the end of 2019;
- Identification of all regional initiatives aimed at stimulating/strengthening collaboration among primary schools and businesses (Technology Week) and initiatives aimed at introducing technology to students at teacher training programmes. Training and professionalisation of primary school teachers in the area of technical subjects and ICT;
- Active participation in the nationwide effort to improve the technology teacher training programme through the TechYourFuture initiative. All teacher training programmes offer a technology module as part of their curriculum, such as the LEGO studio developed by Saxion;
- Introducing a provincial scholarship programme focused on girls and technology.

TECHNOLOGY EDUCATION

- Co-financing and supporting applications to the Regional MBO Investment Fund;
- Strengthening and expanding existing initiatives aimed at increasing intake levels at VMBO institutions;
- Contributing to the expertise and professionalisation of secondary school/MBO/HBO teachers: alignment with business sector demands;

- Doubling of intake levels at second-level technology teacher training programmes, ensure alignment with existing programme;
- Ensuring that educational concepts are more flexibly structured, or thoroughly developed (Excellent training modules such as Robotics and Domotics, modular education, vocational training tracks, apprenticeship training tracks, tailor-made elective components, etc.);
- Internationalisation. Retaining international talent. Linking international students to regional businesses. Improving the international position of businesses and encouraging the internationalisation of education;
- Targeted monitoring of the ICT sector. Strengthening ICT skills in existing professions (including medical professions); minor in Smart Industry (Windesheim University of Applied Sciences) and AD Smart Industry (HAN);
- Establishing elective ICT modules for MBO institutions with a focus on the integration of existing modules.

TECHNOLOGY JOBS

- Ensuring transfers to and retention of existing staff in technical professions by means of intersectoral mobility and Lifelong Learning programmes;
- Ensuring socially-responsible employment with a focus on the role of technicians and – more specifically – the role of women in technology;
- Mediation for those seeking to enter technical professions, by means of sectoral plans (including weekend S3H and Twente Werkt!) and the Technology Service Desks. Alignment with existing sectoral plans in the area of technology and intersectoral mobility;
- Participation in the nationwide Overijssel SER pilot project on labour market structures;
- Highlighting results in the area of intersectoral mobility in the upcoming TP Province monitor;
- Responding to technical and economic developments within the context of education and competency profiles.

SOUTH-EAST REGION

The South-East Region consists of the provinces of North-Brabant and Limburg and the 6 triple helix regions Midpoint Brabant, Keyport 2020 (central Limburg), AgriFood Capital (north-east Brabant), Greenport Venlo (north Limburg), Eindhoven Brainport region (south-east Brabant) and Limburg Economic Development (LED) (south Limburg). These eight partners are united in the Brainport Network. The South-East Region will have to ensure the availability of sufficient qualified staff in order to compete with other leading technology regions around the world. Brainport Network will be encouraging and broadening supra-regional activities in order to achieve this goal and ensure sufficient technical and entrepreneurial talent. A Brainport Network labour market strategy committee has been established to this end. In addition to the 6 triple helix organisations and provinces, participants also include the West Brabant region (and Delta Region), the Exact Sciences Technology Platform and Ministry of Economic Affairs. Consultations will be based around the Brainport Network 2016–2020 long-term plan, the lines of action defined in the national Technology Pact and collaboration with the Exact Sciences Technology Platform. The various sub-regions also have their own individual action agendas. All activities will be based around application and further development of the labour market dashboard.

OVERARCHING PRIORITIES

- The South-East Netherlands region (including West Brabant) will work with all other triple helix regions, labour market regions and provinces to develop a joint flexicurity exchange programme and approach. This will involve the alignment of all national and regional sectoral plans, and interaction with regional intersectoral mobility initiatives and training programmes. The labour market dashboard (to be developed in further detail) will serve as a key instrument in this process. This will offer all employees, job seekers, regions and employers insight (both within the regions and across regional borders) into current supply and demand (job vacancies, competences, training requirements and opportunities, etc.). The potential for a business panel will be assessed as part of the effort to gain a clearer picture of entrepreneurs' future labour market demands.
- Educational innovation initiatives will be linked to training programmes for the employed and job seekers with the support of Innovative Skills Centres and Centres of expertise.

CHOOSING TECHNOLOGY

- Ongoing efforts and regional infrastructures will be further strengthened as a part of the effort to embed Science & Technology (an inquisitive and experimental learning attitude) in primary education curricula;
- Stimulating a value chain approach to educational collaborations with the business sector (including learning pathways between VMBO-MBO) and ensuring the sustainability of existing regional infrastructures in this area.

TECHNOLOGY EDUCATION

- Training for the labour market of tomorrow with a focus on Lifelong Learning;
- Regional alignment of applications to the Regional MBO Investment Fund;
- Sharing of experiences and interaction with Innovative Skills Centres and Centres of expertise in South East Netherlands (greater sustainability, Lifelong Learning and interaction with the region);
- Encouragement of learning pathways and efforts to improve the sustainability of regional infrastructure (including Leading Technology in Business regions). Sharing of best practices and knowledge;
- Encouraging the implementation of nationwide programmes in the South-East Netherlands region and stimulating interaction with regional infrastructures.

TECHNOLOGY JOBS

- Decentralisation of Education & Research funds and merger of national, provincial and municipal subsidies to create regional training funds where possible. These funds can then be used to facilitate labour market transitions and fund Lifelong Learning for the employed and those transitioning from job to job, as well as programmes and training for the unemployed.
- Further efforts to raise international awareness and recruit and retain international technical talents by means of the Brainport TalentBox, Expat Centre and Euro-region approach.

SOUTH-EAST

An effectively functioning labour market that can be effortlessly navigated by government authorities, businesses, employees and educational institutions, and the continual availability of up-to-date information in order to bridge the gap between supply and demand. The labour market dashboard has brought this ideal of the digital, flexible and transparent labour market of the future a little closer within reach. This labour market 'sat nav' is an initiative developed by the Brainport Network. The dashboard will facilitate all labour market target groups: employers, job seekers, regions, government authorities and educational institutions. The dashboard will be continually updated on the basis of these groups' requirements. This will offer increasingly in-depth insight into future supply and demand for competences, enabling job seekers to find work through tailor-made training courses. The dashboard will be accessible to all registered users. The Brainport Network partners, the 6 triple helix regions in the South East Netherlands region and provinces of North Brabant and Limburg will apply the labour market dashboard to reduce the current fragmentation of labour market information. This will help ensure a more mobile and flexible labour market through greater transparency. The aim is to eventually roll out the dashboard at national and European level.

SOUTH-WEST REGION

The South-West region comprises Rotterdam-Rijnmond, Drechtsteden, West-Brabant, Haaglanden, Holland-Rijnland, Zeeland and Midden-Holland. These regions have incorporated their existing agendas in the field of Technology, Human Capital, Innovation, Economy and Labour Market into the Technology Pact collaboration infrastructure. Alderman for Rotterdam Hugo de Jonge is responsible for overseeing administrative affairs on behalf of the region. Links have been established with the Zuidvleugel Economic Programme Council (EPZ), Strategic Board Delta Region, Rotterdam-The Hague Metropolitan Area (MRDH) and Maritime Delta. The South-West Technology Pact Team includes representatives of all seven sub-regions and meets on a bi-monthly basis to discuss progress, share knowledge and experiences, address bottlenecks and initiate new measures. Its members maintain contacts with the business sector, sector associations, education and research funds, knowledge institutions and organisations working to promote technology within their own sub-regions.

CHOOSING TECHNOLOGY

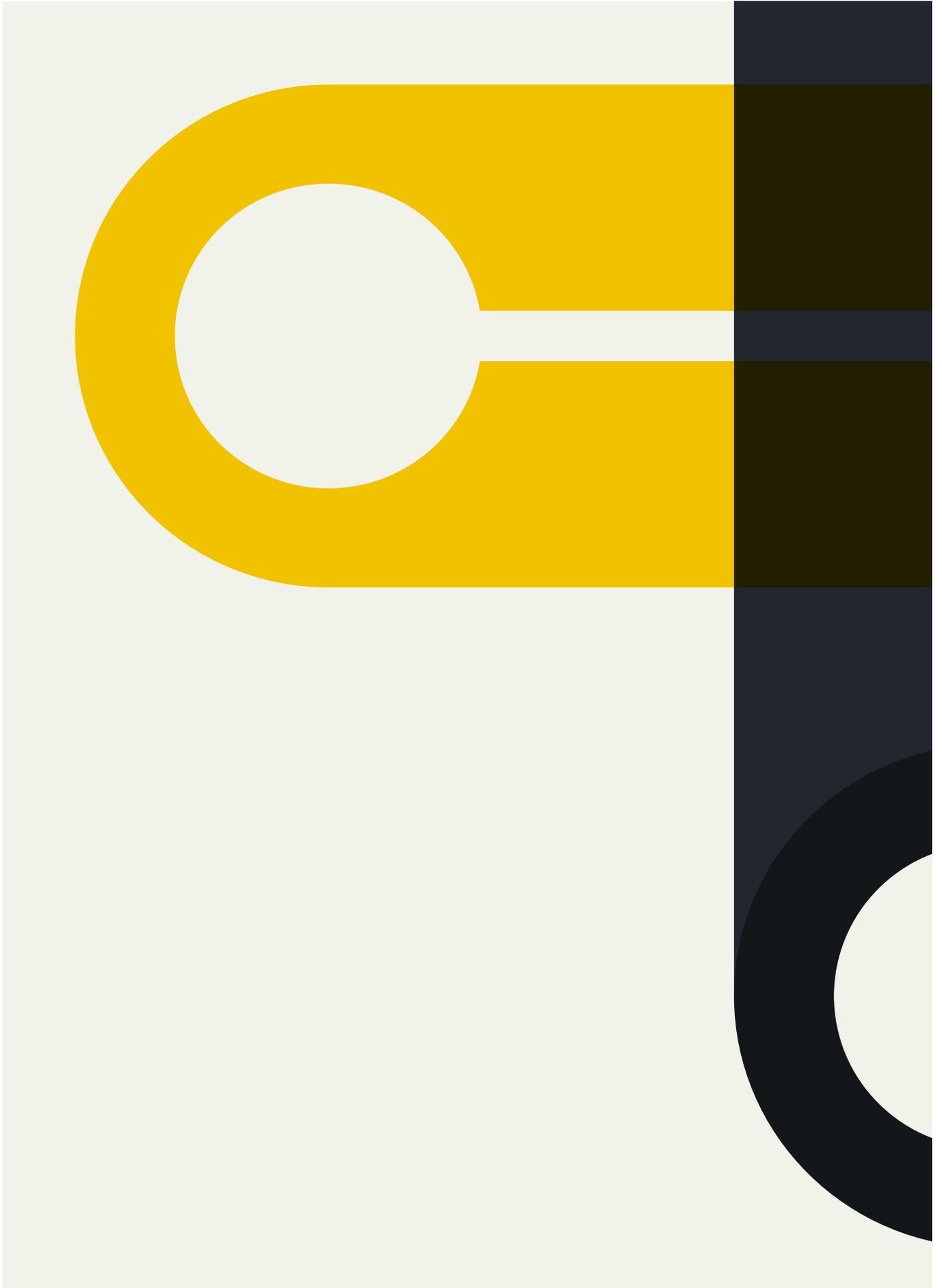
- Ensuring that Science & Technology is structurally embedded in primary and secondary education curricula and teacher training programmes, anchored in the entire education column and linked to existing education/business/government infrastructures in the education sector;
- Continuation of the Choosing Technology programme;
- Encouraging the intake of girls/women and ethnic minorities in technology sectors while retaining existing female staff;
- Strengthening and streamlining career orientation and technology promotion activities;

TECHNOLOGY EDUCATION

- A focus on practical training, Entry-level programmes and level-2 MBO programmes as they relate to labour market opportunities in the technology sector (Top Academies, Boot Camps);
- Elimination of any bottlenecks impeding transfers from level 2 to level 3;
- A focus on the HAVO-MBO pathway as it relates to dropout amongst HAVO pupils at HBO institutions;
- Promoting transfers to MBO 4, AD and HBO;
- Resolving apprenticeship training and work placement issues in various technical industry sectors.;
- Training students for the labour market of the future and stimulating innovation, cross-overs and valorisation;
- Promoting entrepreneurial mindset and entrepreneurship within the technology sector.

TECHNOLOGY JOBS

- Ensuring that successful collaborations between education/business/government authorities are sustainable, anchored at regional level and extended, and combining them with Permanent Learning initiatives for the employed and job seekers;
- Improving the quality and quantity of technical lecturers in the intermediate and secondary vocational education sector, and eliminating impediments to part or full-time transfers (Teach & Tech);
- Promoting transfers to the technology sector: from work-to-work, from unemployment to employment and within guaranteed jobs (Technology Service Points, boot camps, procurement and contracting strategy);
- Connecting Next Economy with less-educated staff (work and work placements), preventing job polarisation;
- Promoting intersectoral mobility;
- Promoting Lifelong Learning through a hybrid education-business collaboration;
- Creating Testing Grounds / Smart Industry Field Labs / Experimental spaces, with a concrete focus on social innovation. Establishing links with MBO institutions.





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