DENKWERK

Labor in transition

How man and technology can work together

Frans Blom

Petra Pubben

JUNE 2019

Using powerful ideas to help make the Netherlands prosperous, inclusive & progressive

Members:

Angelien Kemna
Bernard ter Haar
Boudewijn Wijnands
Feike Sijbesma
Frans Blom
Hans Wijers
Jaap Winter
Marelle van Beerschoten
Petra Pubben (rotating)
Willemijn v/d Meent (rotating)

Information:
www.denkwerk.online

The concerns about the labor market are diverse..

Aantal vacatures bereikt recordhoogte

MACRO-ECONOMIE

CPB: lonen blijven achter door lage groei arbeidsproductiviteit

..and lead to various questions

How should we deal with shortages?

Will technology leave us with enough jobs in the future?

Why is productivity growth lagging behind?

Does our workforce possess the right skills?

Source: 2018 CBS.nl; 2018 FD; 2017 NOS.nl

Main insights of the paper

Technology on the labor market

We need to embrace automation in order to maintain progress and productivity growth in the future with fewer working people

'New occupations' with technology

In the next ten years, half a million people will have to switch to 'new occupations' that with technology

Large-scale upskilling of digital skills

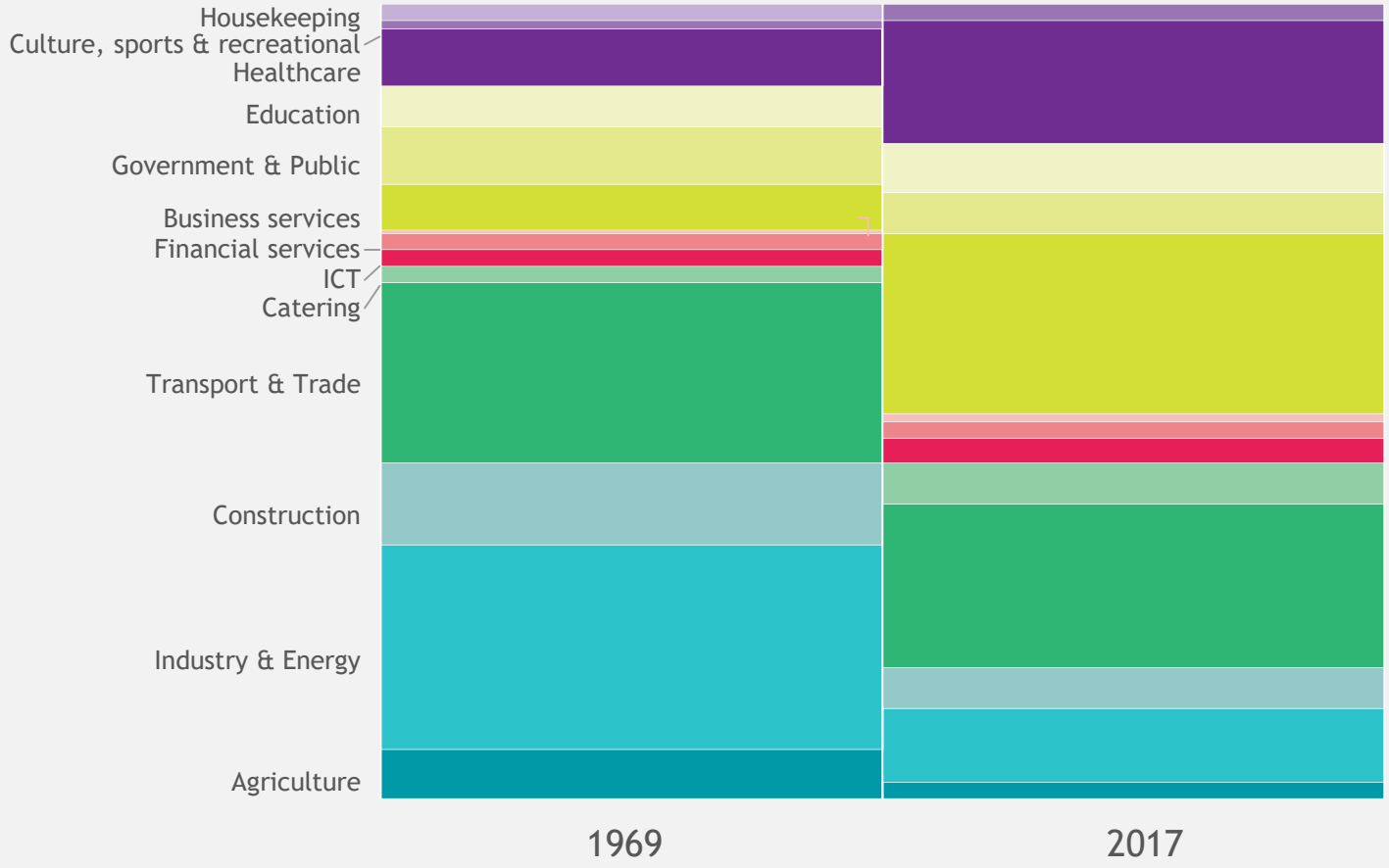
For over four million jobs, a higher level of digital skills will be needed in the next ten years (new entry is the solution for one million jobs)

Doubling of the investment agenda

A doubling of the present investments in corporate training courses is needed to embrace technology

The creation, change and disappearance of jobs through technology is a phenomenon of all times

Shift in the relative distribution of employment in the Netherlands

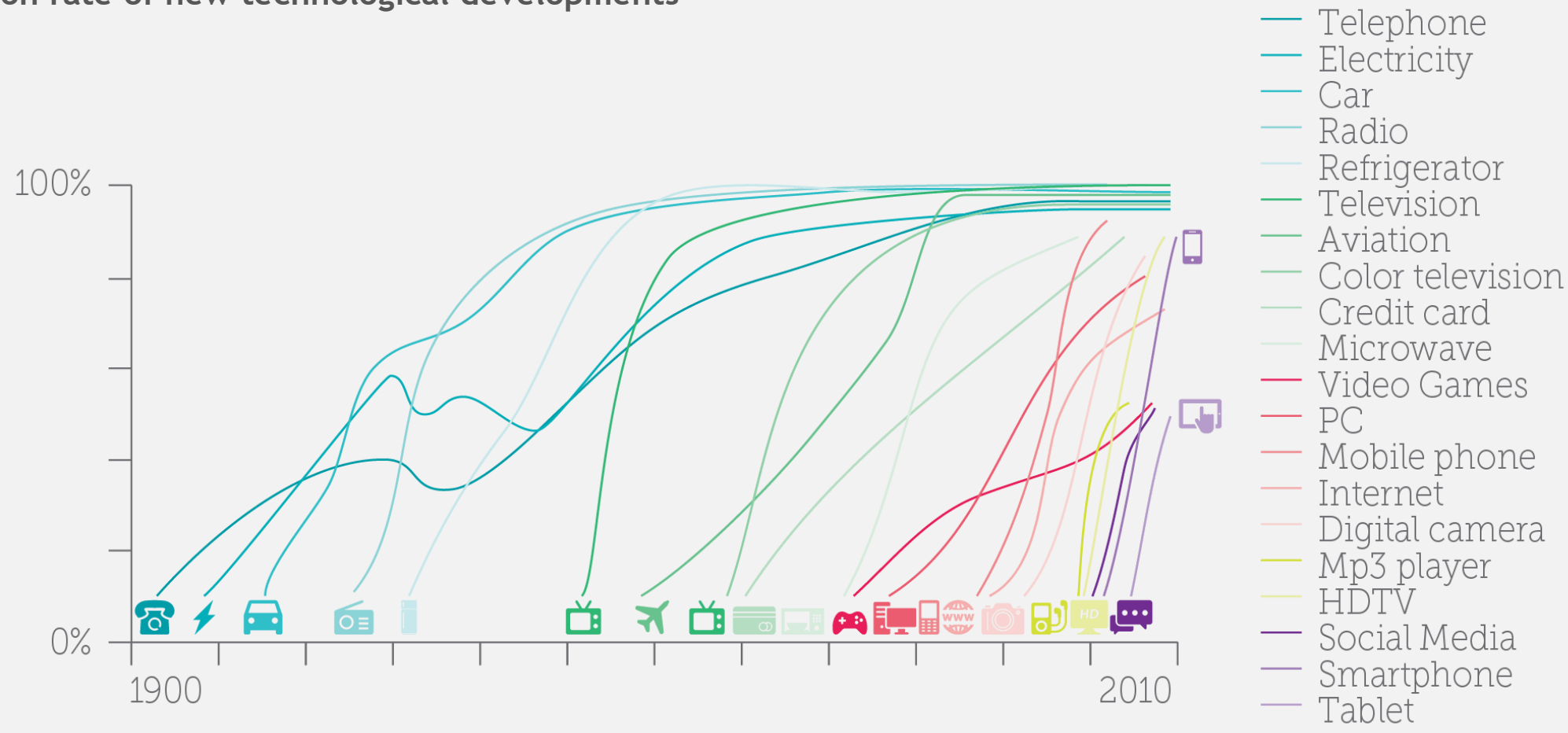


- In historical terms, we see 1% jobs created in new occupations

Source: own analysis based on Statistics Netherlands (CBS) data; Labor volume according to sector 1969 and 2017

Society is adopting new technology at an increasingly faster rate

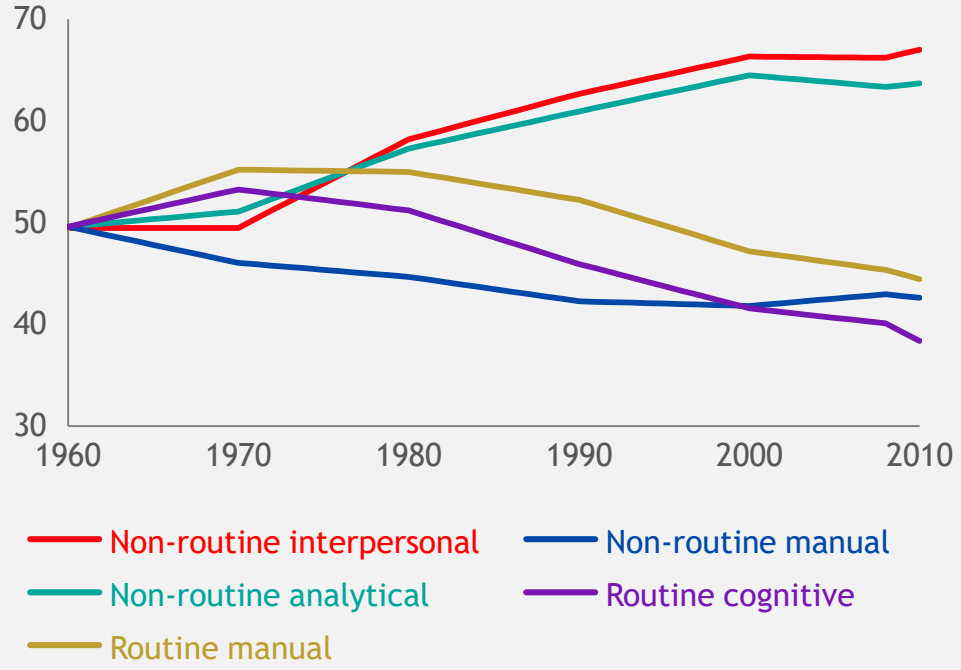
Adoption rate of new technological developments



Source: 2013 Asymco; Seeing what's next. http://www.asymco.com/2013/11/18/seeing-whats-next-2/

The division of tasks between people and technology is shifting

Tasks per percentile for the United States economy (1960-2009)



Source: Source: World Economic Forum; New vision for education; 2015
Note: The starting point of the graph was indexed at 1960

The potential of technology will be used only if people have the skills to apply it

Enough personnel for 'new jobs' in which the newest technology is applied

Sufficient development of skills of personnel in existing jobs to utilize new technology

There is a need for *reskilling* and *upskilling*

Reskilling

The development of skills in order to switch to a different profession

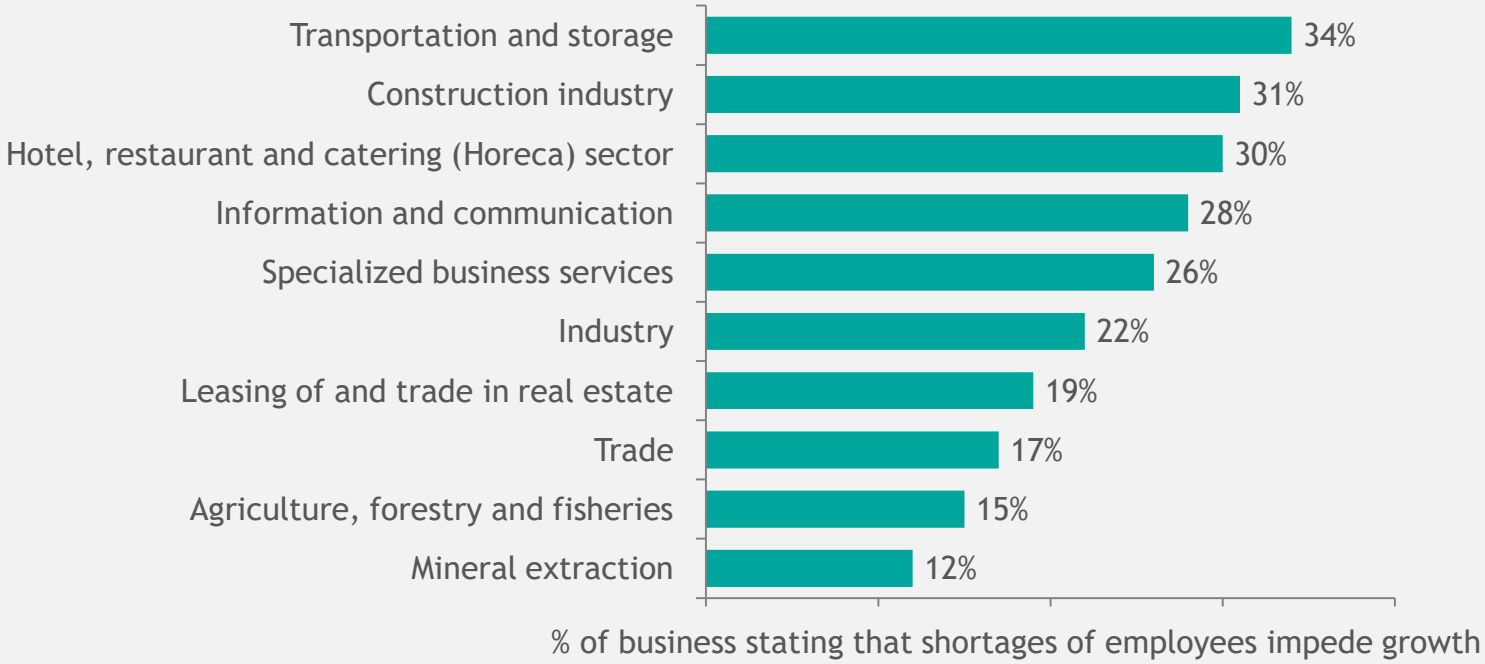
Upskilling

The development of skills aimed at growing along with the changing demand for technical skills in one's own profession

Note: We deliberately use English terms because we are of the opinion that the Dutch equivalents ("om- en bijscholing") arouse too much of an association with formal ('schoolish') learning

The starting point in the Netherlands is one of overall scarcity of employees that limits economic growth

The growth of a great many Dutch businesses is impeded by shortages of employees (Quarter 4, 2018)[1]



This limits the total economic growth in the Netherlands

- 7% of the total economy was impeded by shortages of employees in 2017.[2]
- In the hotel, restaurant and catering sector, investments are lagging behind owing to not enough new employees.[3]

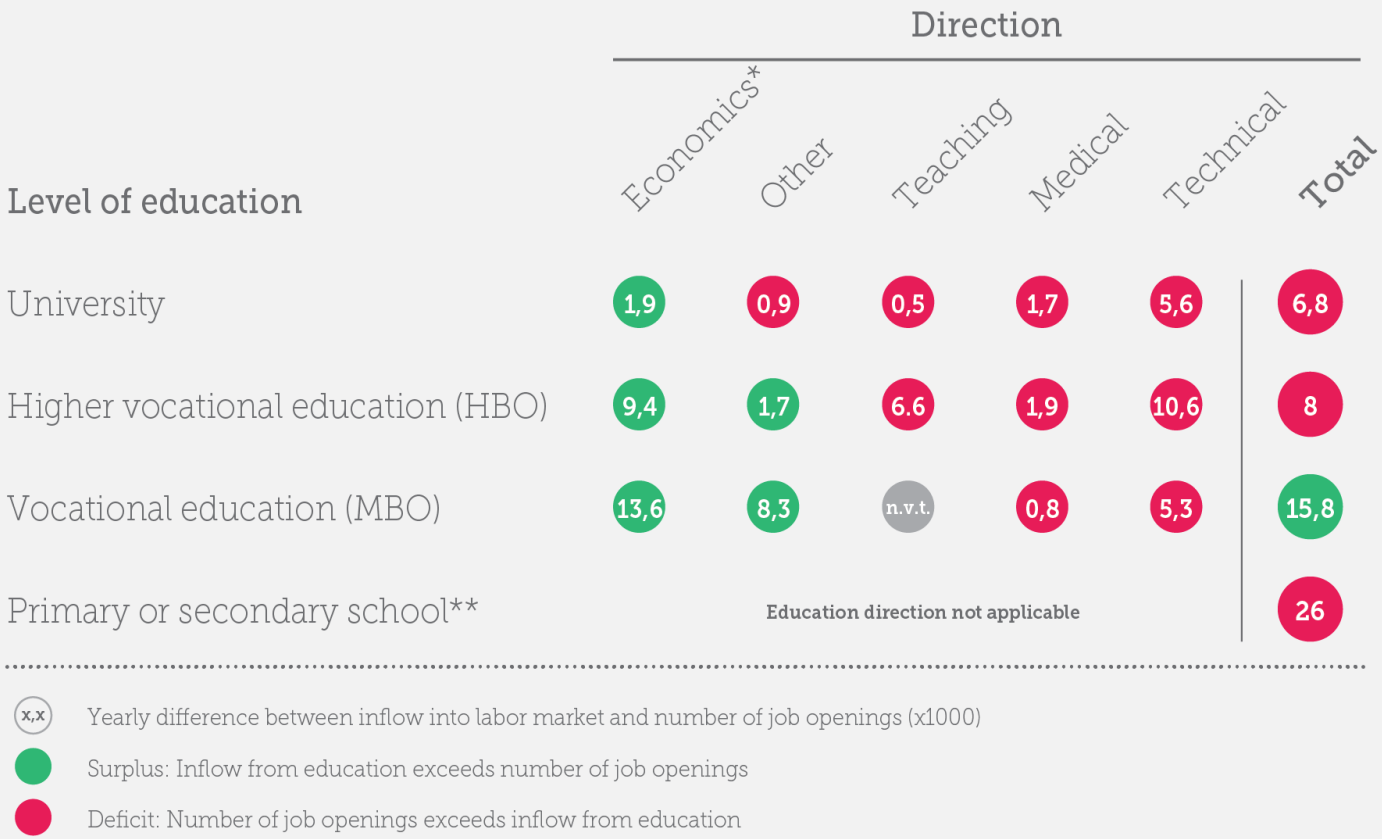
Source: 1. Business cycle survey in the Netherlands, Quarter 4 2018; 2. Rabobank, Thematic message 'The economic impact of the labor shortage' ('De economische impact van het arbeidstekort'), July 2017; 3. Financiëel dagblad, 'Scooter or personal trainer for whoever goes to work in the hotel, restaurant and catering sector' (Scooter of personal trainer voor wie komt werken in de horeca), January 7, 2019

The starting point in the Netherlands is one of total scarcity that limits economic growth

How will this develop up to 2030?

Demand & supply from education do not match: Neither in educational level nor in educational field

Discrepancy between demand and entry according to educational level and - field



* Study 'Media and Design' is part of 'Economics'; ** This are mostly jobs with a low salary and limited career prospects. The number of jobs in this category that is filled by students as a side job are not included in this overview. Note: Numbers are subject to dynamics such as wage elasticity and economic growth. Source: Labor market information system (AIS) of the Amsterdam Regional Body (ROA); expected job openings and entry of school leavers up to 2022, October 2018

Entry on the labor market should be more in line with the demand for labor

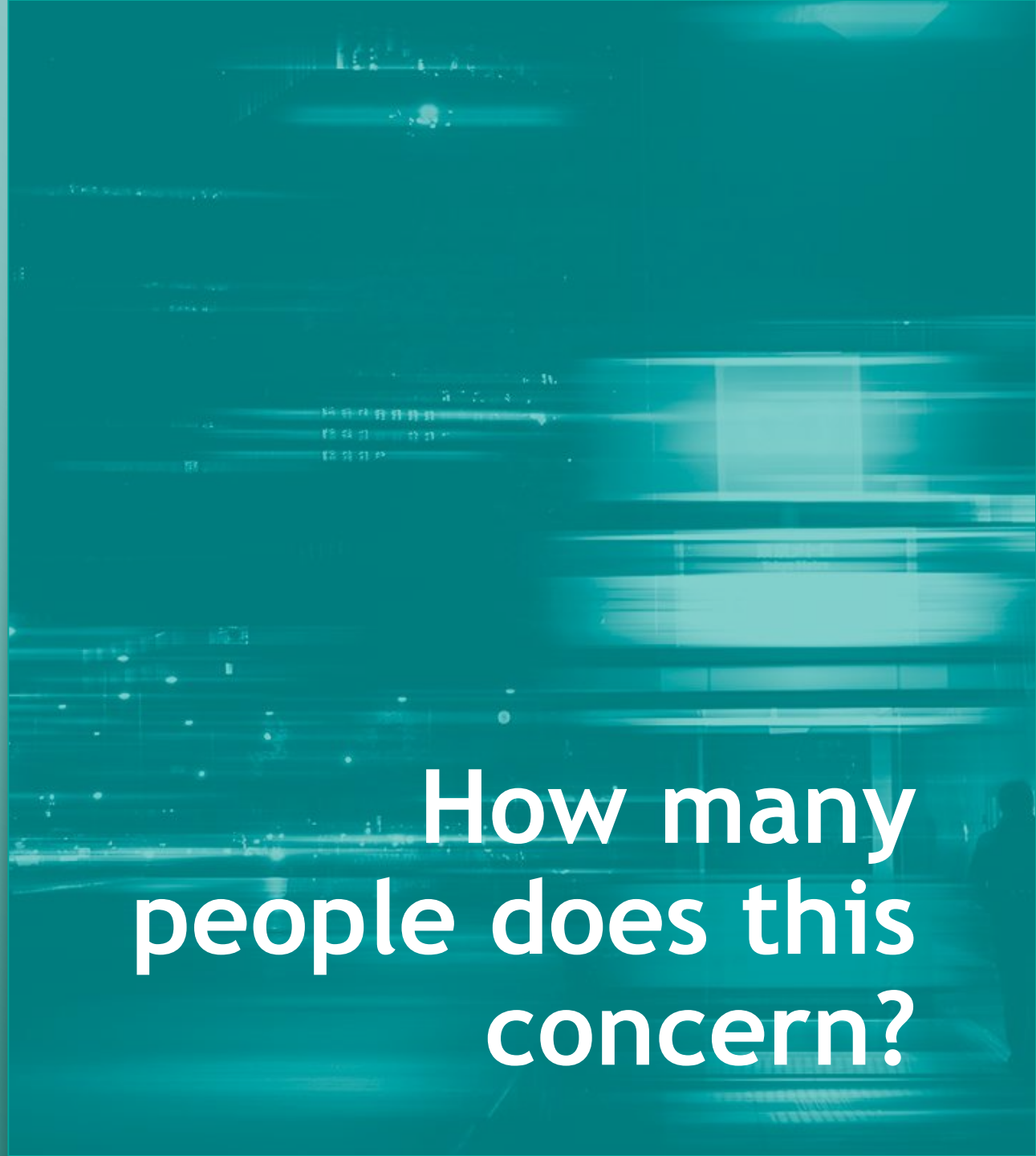
Enrollment restriction (numerus fixus)
Enrollment restriction on study places with poor labor market prospects

Moving away from entry restrictions
Moving away from entry restrictions on educational fields for which there is a great demand for labor

Getting acquainted with the labor market
Traineeships for all students in the freshman year; arrange your own traineeship placement in advance

Broad education
‘University college’ equivalent to senior secondary vocational education (MBO) and higher professional education (HBO)

In order to achieve growth in a shrinking labor market, the Netherlands will have to embrace automation and reskilling



How many people does this concern?

Estimated from two angles of approach: Until 2030, annually 40,000-45,000 people will have to reskill in order to fill the demand

Angle of approach 1:
The disappearance of jobs is driven by technology

Baseline question: how many jobs will disappear on the basis of the current possibilities of technology?

Leads to: reskilling task of 40,000 to 45,000 people per year

Automation and reskilling is concentrated mainly in administrative and logistics professions

Angle of approach 2:
Filling of new jobs in a shrinking labor market

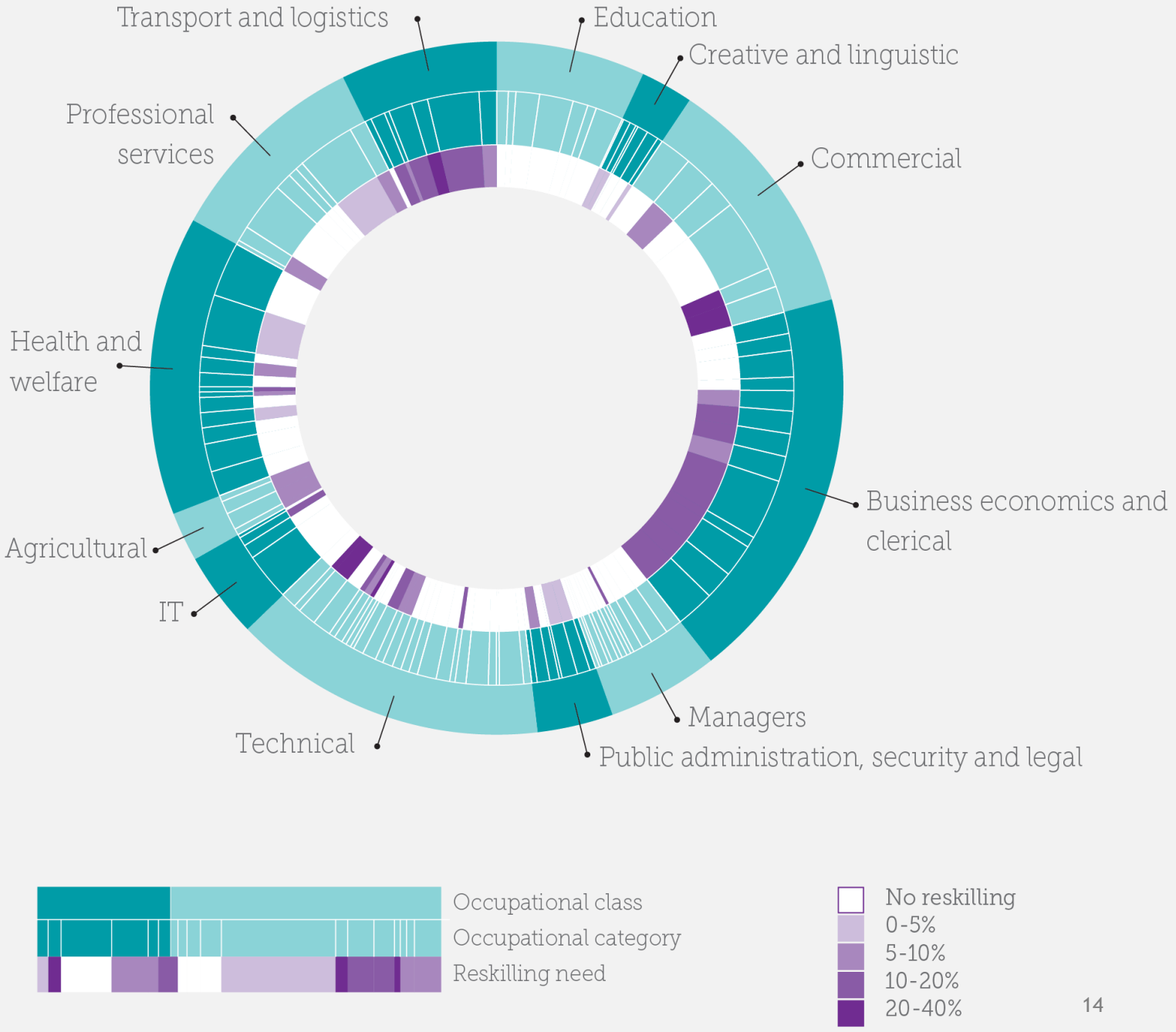
Baseline question: How can we continue filling new jobs that are created, even if the professional population is going to shrink?

Leads to: reskilling task of 40,000 to 45,000 people per year

Automation is *necessary* to enable new jobs to be filled

Angle of approach 1

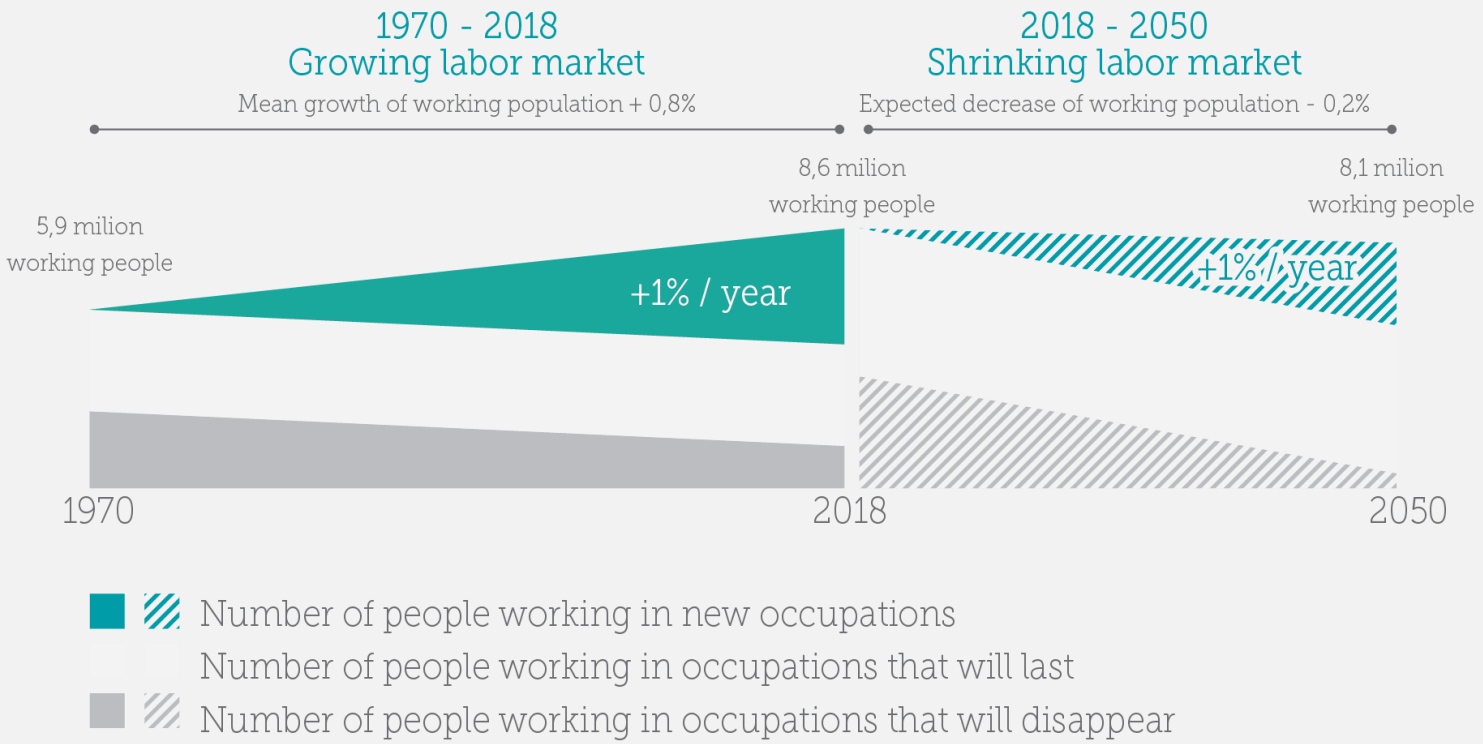
Because of automation, 40,000 to 45,000 people need to reskill annually



Source: DenkWerk analysis, based on a. Occupational categories based on ROA-CBS 2014 (BRC2014); b. CBS, c. 2017 McKinsey, A future that works – The impact of automation in Denmark;

Angle of approach 2

In order to fill new jobs in a shrinking working population, 40,000 to 45,000 people annually need to reskill



Disappearance of jobs: In case of a transition to a job outside the occupational category, considerable reskilling is often needed

In case of disappearance of jobs due to automation:

- People mainly have to look for a job outside their own occupational category
- There are only a limited number of easy job transitions outside the present occupational category
- *Reskilling* is needed for most of the transitions

Source: WEF & BCG (2018) Towards a Reskilling Revolution, using data from Burning Glass Technologies and US Bureau of Labor Statistics

Current barriers to reskilling

The necessary investments in advance, in both time and money

Uncertain job opportunities

Possible drop in salary level

In transitions, strict educational or qualification requirements sometimes play a part

First steps toward facilitating the necessary reskilling

For businesses: 'Learning on the job'

- More internal forms of training
- 'learning on the job' as the main component
- From a focus on existing qualifications to a focus on general skills and learning ability

For education:

- Offering modular study programs, in cooperation with and appropriate to the demand from the labor market

For the government: Facilitation of reskilling in education

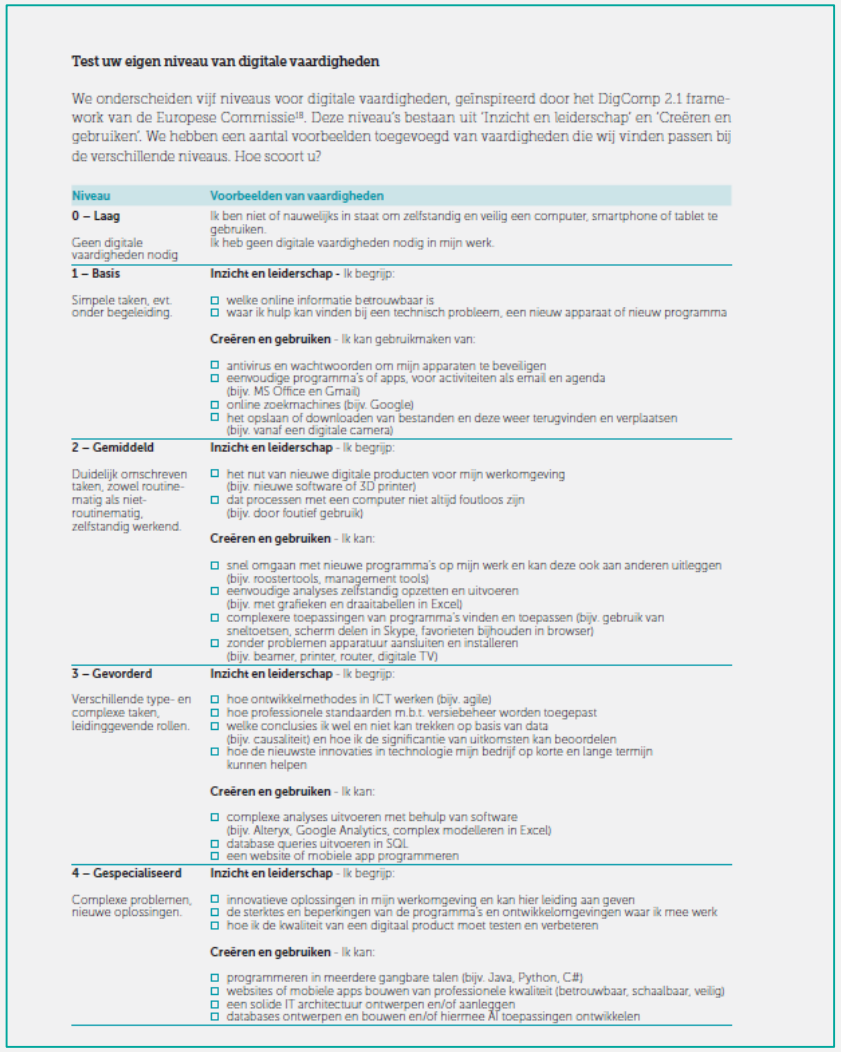
- The educational system should facilitate reskilling on a larger scale
- The government will then have to reconsider funding parts of study programs again on all levels
- National training fund for inter-sectoral training

The potential of technology will be utilized only if people have the digital skills to apply it

Which people does this concern?

What is your current level of digital skills?

We developed a simple self-test to assess ones own level of digital skills



Test uw eigen niveau van digitale vaardigheden

We onderscheiden vijf niveaus voor digitale vaardigheden, geïnspireerd door het DigComp 2.1 framework van de Europese Commissie[18]. Deze niveau's bestaan uit 'Inzicht en leiderschap' en 'Creëren en gebruiken'. We hebben een aantal voorbeelden toegevoegd van vaardigheden die wij vinden passen bij de verschillende niveaus. Hoe scoort u?

Niveau	Voorbeelden van vaardigheden
0 – Laag Geen digitale vaardigheden nodig	Ik ben niet of nauwelijks in staat om zelfstandig en veilig een computer, smartphone of tablet te gebruiken. Ik heb geen digitale vaardigheden nodig in mijn werk.
1 – Basis Simpele taken, evt. onder begeleiding.	**Inzicht en leiderschap -** Ik begrijp: ☐ welke online informatie betrouwbaar is ☐ waar ik hulp kan vinden bij een technisch probleem, een nieuw apparaat of nieuw programma **Creëren en gebruiken** - Ik kan gebruikmaken van: ☐ antivirus en wachtwoorden om mijn apparaten te beveiligen ☐ eenvoudige programma's of apps, voor activiteiten als email en agenda (bijv. MS Office en Gmail) ☐ online zoekmachines (bijv. Google) ☐ het opslaan of downloaden van bestanden en deze weer terugvinden en verplaatsen (bijv. vanaf een digitale camera)
2 – Gemiddeld Duidelijk omschreven taken, zowel routinematig als niet-routinematig, zelfstandig werkend.	**Inzicht en leiderschap** - Ik begrijp: ☐ het nut van nieuwe digitale producten voor mijn werkomgeving (bijv. nieuwe software of 3D printer) ☐ dat processen met een computer niet altijd foutloos zijn (bijv. door foutief gebruik) **Creëren en gebruiken** - Ik kan: ☐ snel omgaan met nieuwe programma's op mijn werk en kan deze ook aan anderen uitleggen (bijv. roostertools, management tools) ☐ eenvoudige analyses zelfstandig opzetten en uitvoeren (bijv. met grafieken en draaitabellen in Excel) ☐ complexere toepassingen van programma's vinden en toepassen (bijv. gebruik van sneltoetsen, scherm delen in Skype, favorieten bijhouden in browser) ☐ zonder problemen apparatuur aansluiten en installeren (bijv. beamer, printer, router, digitale TV)
3 – Gevorderd Verschillende type- en complexe taken, leidinggevende rollen.	**Inzicht en leiderschap** - Ik begrijp: ☐ hoe ontwikkelmethodes in ICT werken (bijv. agile) ☐ hoe professionele standaarden m.b.t. versiebeheer worden toegepast ☐ welke conclusies ik wel en niet kan trekken op basis van data (bijv. causaliteit) en hoe ik de significantie van uitkomsten kan beoordelen ☐ hoe de nieuwste innovaties in technologie mijn bedrijf op korte en lange termijn kunnen helpen **Creëren en gebruiken** - Ik kan: ☐ complexe analyses uitvoeren met behulp van software (bijv. Alteryx, Google Analytics, complex modelleren in Excel) ☐ database queries uitvoeren in SQL ☐ een website of mobiele app programmeren
4 – Gespecialiseerd Complexe problemen, nieuwe oplossingen.	**Inzicht en leiderschap** - Ik begrijp: ☐ innovatieve oplossingen in mijn werkomgeving en kan hier leiding aan geven ☐ de sterktes en beperkingen van de programma's en ontwikkelomgevingen waar ik mee werk ☐ hoe ik de kwaliteit van een digitaal product moet testen en verbeteren **Creëren en gebruiken** - Ik kan: ☐ programmeren in meerdere gangbare talen (bijv. Java, Python, C#) ☐ websites of mobiele apps bouwen van professionele kwaliteit (betrouwbaar, schaalbaar, veilig) ☐ een solide IT architectuur ontwerpen en/of aanleggen ☐ databases ontwerpen en bouwen en/of hiermee AI toepassingen ontwikkelen

Level

Levels based on framework of European Commission: 'DigComp2.1 The Digital Competence Framework for Citizens'

0 - Low

I am barely able to use a computer, smartphone or tablet independently and safely. I also don't need any digital skills in my current job

1 - Basic

Insight & leadership - I have understanding of:

- ☐ which online information is reliable
- ☐ how and where to ask for help with a technical issue or when using a new device or new application

Create and apply – I can make use of:

- ☐ antivirus software and passwords to protect my devices
- ☐ simple apps or software for activities like e-mail and calendars (e.g. Gmail)
- ☐ online search engines (e.g. Google)
- ☐ saving, downloading and moving files (e.g. from a digital camera)

2 - Average

Insight & leadership - I understand:

- ☐ the usefulness of digital apps and products in my work environment
- ☐ that processes with a computer can contain errors (e.g. by misusage)

Create and apply – I can:

- ☐ quickly make use of new software and explain this to others
- ☐ independently set up and execute simple analyses (e.g. pivot table in Excel)
- ☐ apply more complex functions of simple programs (e.g. screen sharing in Skype, assign shortcuts and manage 'Favourites' in my browser)
- ☐ connect and install technology (e.g. beamer, printer, digital television)

4 - Advanced

Insight & leadership - I understand:

- ☐ development methods in IT
- ☐ how to apply professional standards for e.g. version management
- ☐ which conclusions can be drawn based on data analysis (e.g. causality) and how to assess significance
- ☐ how innovations can influence my business

Create and apply – I can:

- ☐ set up and execute complex analyses with software (e.g. Alteryx, Google Analytics, complex Excel models)
- ☐ perform database queries in SQL
- ☐ program a website or mobile app

5 - Specialized

Insight & leadership - I understand:

- ☐ innovative solutions in my working environment and I can lead team using these
- ☐ how to test and optimize the quality of a digital product

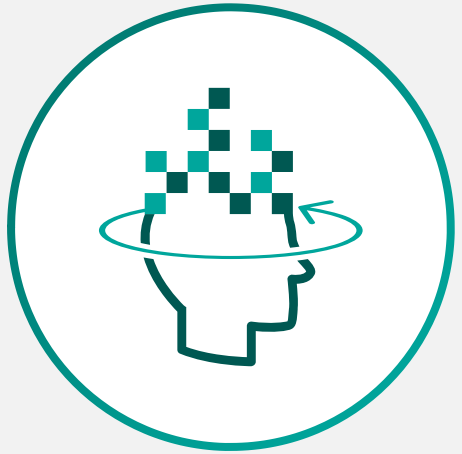
Create and apply – I can:

- ☐ code / program in at least one of the common programming languages (e.g. Java, Python, C#)
- ☐ build apps or websites of professional quality
- ☐ design or install solid IT architecture
- ☐ build databases and develop AI applications

We draw three main conclusions regarding digital *upskilling* in the Netherlands

This concerns a total of 3 million working people[1]

In the next 10 years, the digital skills of this group must rise one level



They can be divided into 3 main groups

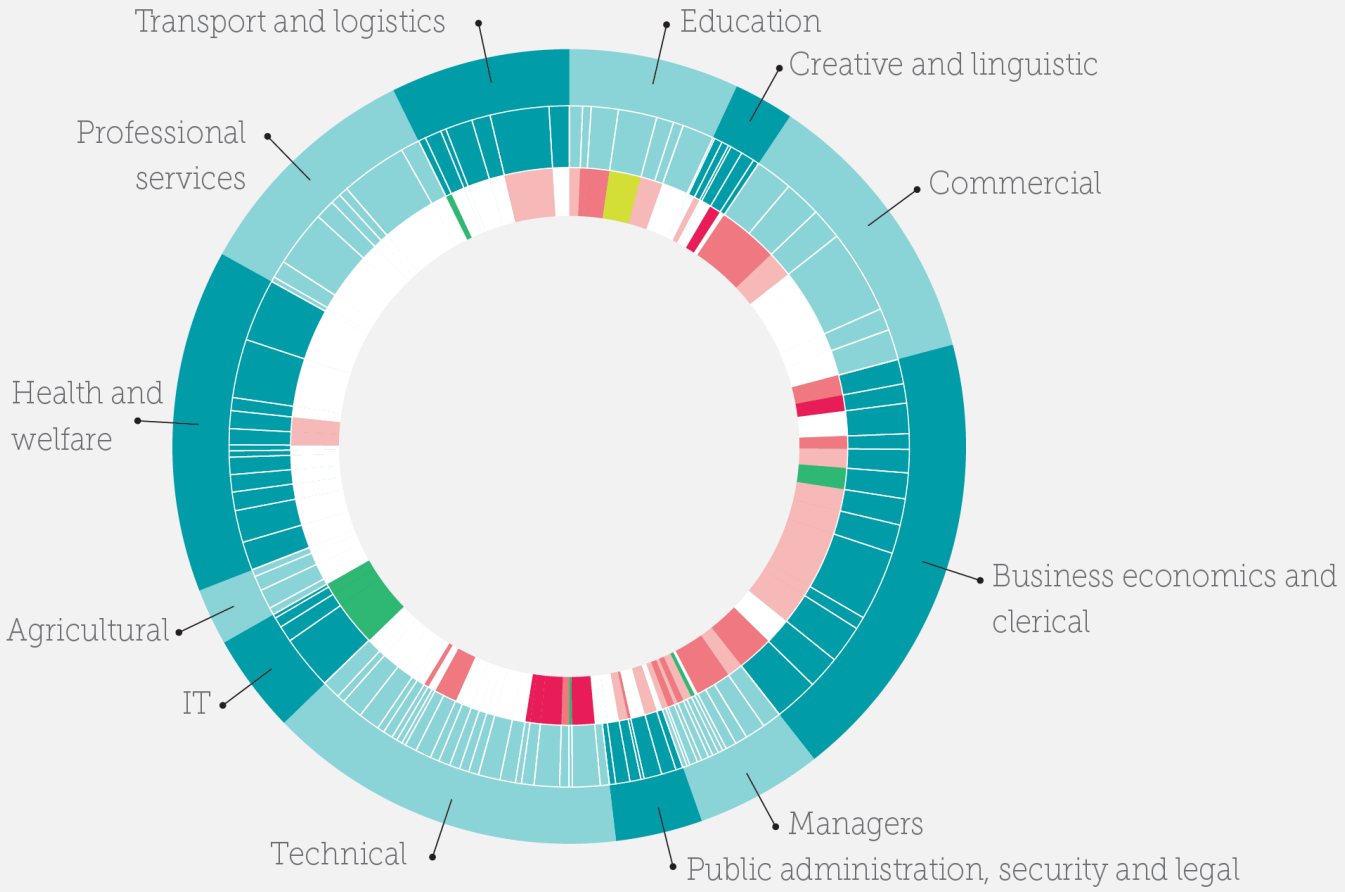
- Specialists: 300K
- Advanced: 400K
- Basic / Average: 2300K

The business community has a leading role in *upskilling*

Especially the business community must invest to allow this task to succeed

1. We estimate that the level of digital skills for 4 million jobs will rise. If we assume that the annually entering starters already possess the desired skills, we will still have to facilitate upskilling for 3 million working people.

In the next ten years three million people of the current number of working people[1] will need digital *upskilling*



Required digital *upskilling*:

- No upskilling needed
- Level 1 → 2
- Level 2 → 3
- Level 3 → 4
- Level 1 → 3
- Level 4: continuous

In addition, there is still a group of about 1.5 million digital illiterates and/or jobless persons

1. Number of working people 2017: 8,5 million (CBS)

Source: DenkWerk analysis based on data about number of working people per occupational category 2017 (CBS)

We see three main groups to whom a different investment and approach apply

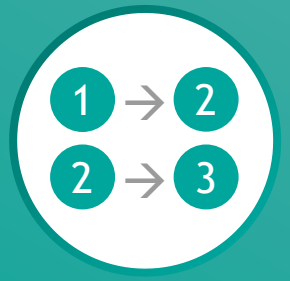
The Specialists
~300,000 employees

Think of:

Database and network specialists;
Software and application developers

The Advanced
~400,000 employees

Engineers;
Architecture and construction technicians;
Financial specialists;



Basic / Average
~2.3 million employees

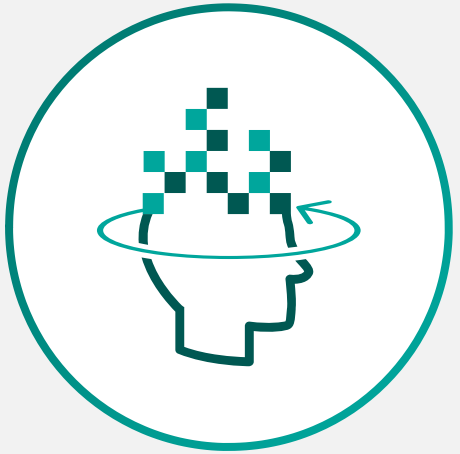
Instructors;
Business service providers;
Administrative assistants; Managers

The scale requires a structured approach to *upskilling*

We see three specific steps that businesses will have to take in order to make *upskilling* in the workplace a success

Strategic perspective

This determines the availability of development opportunities for employees



Learning contract

Employee autonomy, important role for managers

Just-in-time learning

Learning skills during day-to-day tasks

Reskilling & Upskilling require adaptivity:

The ability to adjust and learn will be the key in the longer term as well

Which roles do the different parties have?

It is evident from several examples that a lot of gains can be achieved from investing in adaptivity on the labor market

Large groups of employees remain jobless for a long time after layoffs

Training initiatives do not benefit the most vulnerable groups

Little financial impetus to work compared to maintaining welfare payments

Source: Financieel Dagblad; Weggestuurde bankmedewerker komt steeds lastiger aan de bak (Increasingly difficult for fired bank employees to find a job); 2018. De Nationale DenkTank (The National Think Tank); Final Report 2017: Prospects of work for everyone (Iedereen perspectief op werk); 2017

Gains can be achieved from adaptivity on the labor market

Examples:

Large groups of employees remain jobless for a long time after layoffs

Training initiatives do not benefit the most vulnerable groups

Little financial impetus to work compared to maintaining welfare payments

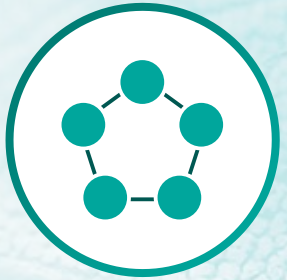
Source: Financieel Dagblad; Weggestuurde bankmedewerker komt steeds lastiger aan de bak (Increasingly difficult for fired bank employees to find a job); 2018. De Nationale DenkTank (The National Think Tank); Final Report 2017: Prospects of work for everyone (Iedereen perspectief op werk); 2017

Institution & individual both play a part in this

Individual level

Responsible for:

- Maintaining one's own employability
- Mindset for development



Institutional level

Facilitating through:

- Education
- Working environment
- Laws and regulations

Stimulation of adaptivity on the labor market

More flexible qualification structure used by the government
This lowers the threshold for entering e.g. the care or education sector

Less strict entry requirements set by employers
Starting by lateral entry should be made easier, with continued growth by learning on the job

Fit for work on termination of contract
Increase of flexibility in employment contracts and a duty for employers to allow the employee to re-enter the labor market fit for work

National training fund
To replace sector-related funds, so that training funds will be accessible to the whole working population

Required annual investments:

Reskilling	€1,5 – 2 billion
Upskilling	€4,0 – 4,5 billion
Adaptivity	€0,5 – 1,0 billion
Total	€6-7 billion

€4-7 billion

Annual potential additional economic value through investment in reskilling, upskilling & adaptivity

This means 50%-100% of initial investments will return within a year

Parties can take steps on the basis of their own roles

Business community

- Facilitating and investing in **'learning on the job'**
- Investment in (digital) skills of employees
- Contribute to a **labor market orientation**

Government

- Adaptivity and digital skills in the **educational curriculum**
- Easing of entry and qualification requirements for occupations
- Implementation of stimuli that **stimulate adaptivity**

Education

- Eliminate entry restrictions for study programs for occupations with a scarcity of employees
- Offering modular education, in cooperation with employers