

War for Talent in the Chemicals, Life Sciences and Food industry

Final report of CMG findings and recommendations

29 January 2009



catalysing innovation

Regiegroep Chemie

Arthur D. Little Benelux N.V.
Willemswerf - Boompjes 40
3011 XB Rotterdam
P.O.Box 540
3000 AM Rotterdam
The Netherlands
Telephone 31-(0)10-201.8811
Telefax 31-(0)10-233.1613
adlittle.rotterdam@adlittle.com

Content

1 Executive summary & recommendations

2 Perception of shortage

3 Measures to deal with shortages

4 Job remuneration and prospects

5 KNCV member feedback

A Appendix

This study has been inspired by apparently contradicting signals about the demand for staff in the Chemical, Life Sciences and Food (CLSF) industry

On the one hand ...

- Employers have repeatedly expressed concern about a shortage of staff
- Also, the emphasis on building a “kenniseconomie” in the Netherlands would imply a healthy demand for highly educated staff

On the other ...

- Many KNCV members do not experience such a shortage, which should be evidenced e.g. by aggressive recruitment and increasing salaries
- The CLSF industry has a history of reducing employment
 - Recent reorganizations at Unilever’s and Schering Plough’s laboratories and the current announcements at AkzoNobel come to mind

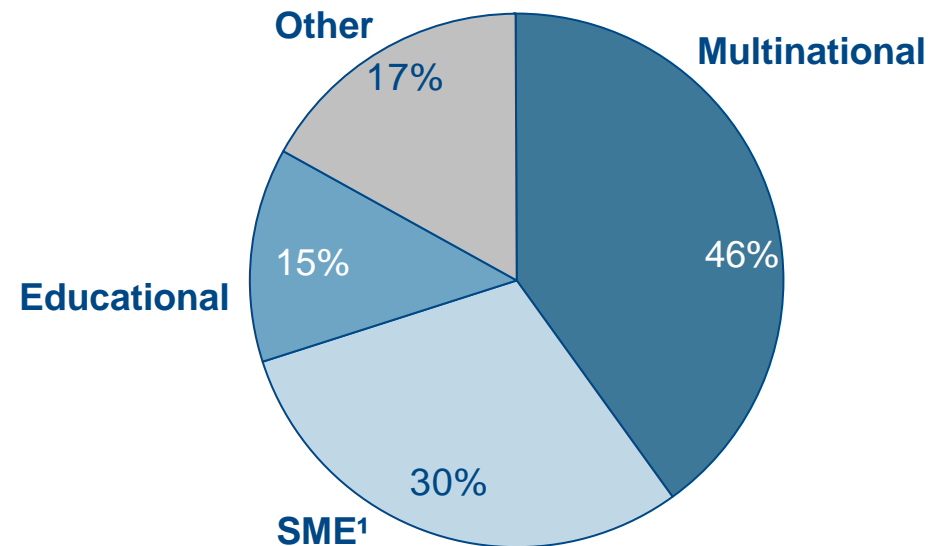
To better understand what’s really happening, and contribute to adequate steps to improve the situation for all stakeholders, the KNCV’s Chemie and Management Group, with support from the VNCI, has carried out a study and survey and has organized a roundtable at the Lustrum symposium of KNCV in November 2008 ¹⁾

1) This study was conducted Mid 2008 and thus before the ‘Credit crunch’

Nearly 30 CLSF organizations were surveyed – Results were supplemented with factual information about employment conditions, salaries, and student enrollment

Activities War for Talent study

- In August and September nearly 30 interviews with organizations active in the Chemicals, Life Science and Food (CLSF) sector have been conducted
- Desk research was undertaken to obtain information on:
 - Employment in the industry
 - Student enrollment in CLSF studies
 - Industry salaries and their development



Split of CLSF organizations surveyed

1) Small- and Medium-sized Enterprise (SME)

While shortages do exist, predominantly for MBO level employees, these have not led to a violent “War for Talent”; Internationally, talent on offer is abundant

Summary

- Overall, **staff availability in the Dutch CLSF industry has tightened**, but the situation varies significantly between MBO, HBO and WO level
 - While shortages exist at each level, due to reduced student enrollment, they are felt mostly at MBO level since (a) MBO students often pursue a subsequent HBO education, while (b) higher levels are more readily sourced internationally
- In general, **companies are not actively preparing for a shortage**, and despite the perceived shortage there is **no improvement of salaries and benefits for employees**
 - Those companies that do prepare for current and future shortages mention automation, outsourcing and internationalization
 - In general, the perceived shortage has not resulted in an improvement of salaries and benefits for employees, although SMEs have been making adjustments
- In terms of job satisfaction and (relative) salary, **the CLSF industry remains very attractive** as a place to work and have a career
- KNCV members support there is a shortage of CLSF talent in the Dutch market, but that it can be met internationally; they believe this situation will persist
 - One way to increase the attractiveness of a CLSF study is to educate and prepare students for non-CLSF-jobs, emphasizing analytical skills rather than specific CLSF knowledge (which can be met internationally)

CMG recommend that government, industry and education work together to deal pragmatically with shortages, and raise employability of (1/2)

CMG recommendations

Government, industry and education should work together to:

- **Confront the MBO shortage**, which is not easily solved through international recruiting
 - E.g. bring back the “bedrijfsschool”, or specific programs to tout the attractiveness of a career in the CLSF industry among future MBO students, and their parents
- **Facilitate hiring at PhD, BA, MA, and HBO level from abroad**, as this is the only way to deal with the current shortage in the short term, and sustain high-quality employment in the Netherlands
- Find ways to **help SME’s get access to available (international) talent** as it is here where the shortage is felt strongest

CMG recommend that government, industry and education work together to deal pragmatically with shortages, and raise employability of (2/2)

CMG recommendations

- **Industry and SME should prepare for continued staff shortages, which they can do in three ways:**
 - In the short-term, analyze the technologies they employ, staff key people on the core technologies, and outsource what is not essential
 - Mid-term, attract international staff where necessary
 - For the long-term, support government and education in encouraging students to study science
- **Deliver graduates that are successful in a global and changing environment**, thus increasing their employability, the image of the profession, and the attractiveness of the Netherlands as a base for the global CLSF industry
 - Quality standards should be raised at each level of education, reducing the need to “trade up” and ensuring that Dutch graduates are top-notch, from whatever
 - In particular, academia should re-engineer their curricula, focusing less on a career as scientist, more on the ability to apply chemistry multidisciplinary in an international setting

About CMG and Arthur D. Little

CMG

The Chemie Management Group, was founded in 1994 as part of KNCV. CMG focuses on management aspects of chemistry in general. The target group concerns managers and future manager in organizations that employ chemists, such as companies, institutes, universities and government agencies.

Arthur D. Little

Arthur D. Little is a global management consultancy specializing in strategy and operations management, serving major corporations and organizations worldwide. We are recognized as leaders in linking strategy, innovation and technology to solve our clients' most complex business issues, delivering sustainable solutions. We are distinguished from others by our deep industry insight and technology expertise. We are proud of our creative people with their commitment to our clients.

As a global service provider we employ 1,000 staff members in over 30 countries.

CMG and Arthur D. Little wish to acknowledge the VNCI and Regiegroep Chemie for their support carrying out this survey and investigation. Particular thanks go to Nelo Emerencia, for making available previous VNCI survey findings, and reviewing report documentation.

About the authors



Frans Kaspersen
Schering-Plough, Oss

- Frans' current position is that of R&D fellow; he is responsible for sustainability activities and production technologies
- He joined Organon in 1980 and was responsible for the chemical development activities
- Before joining Organon, Frans worked 7 years as PostDoc at several institutes including the Institute for Nuclear Physics Research in Amsterdam
- Frans studied at the University of Amsterdam and has a PhD in Synthetic Organic Chemistry



Rob Abbenhuis
Schering-Plough
API Process Development

- Rob is currently Senior Director API Process Development (PD). His sector is responsible for Late Stage Development and gives technical support to the chemical API plants in the Netherlands
- In 1998 started at Diosynth as a project manager in steroid chemistry. He has been responsible for small-scale commercial manufacturing for 3 years
- Rob studied chemistry at Utrecht University and has a PhD in metal-mediated organic chemistry.



Peter Nieuwenhuizen
Arthur D. Little,
Rotterdam

- Peter is a Principal, mainly working in the chemicals and life-sciences sector. His chief contributions are in business strategy, sustainability, and marketing & sales excellence
- Before joining Arthur D. Little, Peter worked for Akzo Nobel in its chemicals division. He lived in the US for 3 years
- Peter studied at the Vrije Universiteit in Amsterdam, and obtained a *cum laude* Ph.D. in chemistry from Leiden University

The authors wish to thank Chris Sonnenberg, Cindy de Keyser, and Adriaan Mos for their significant contributions to this survey and report

Content

1 Executive summary & recommendations

2 Perception of shortage

3 Measures to deal with shortages

4 Job remuneration and prospects

5 KNCV member feedback

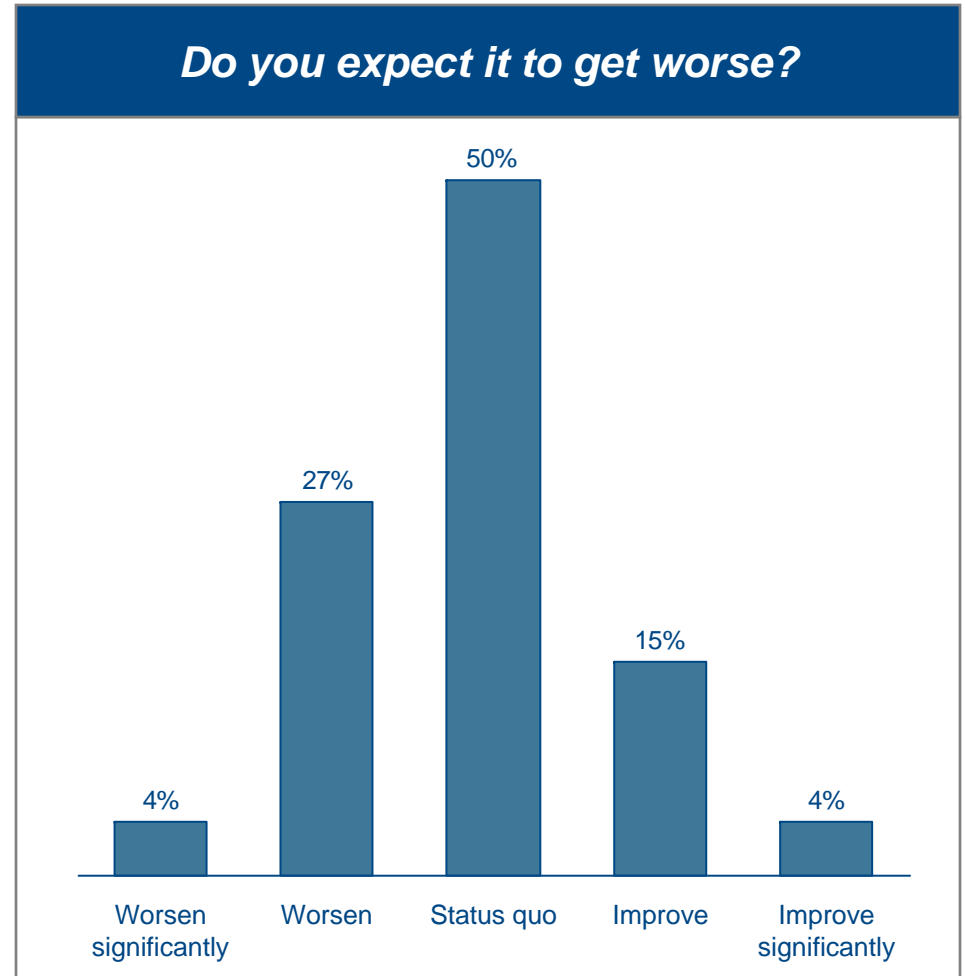
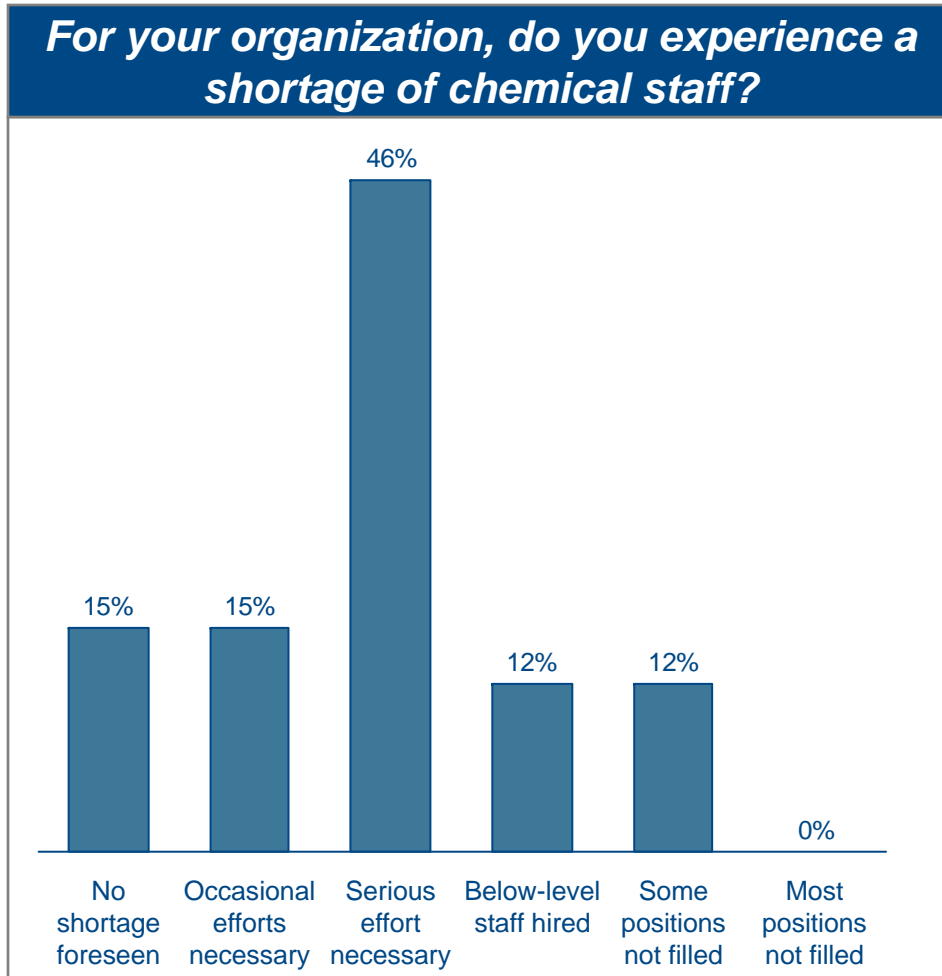
A Appendix

Overall, staff availability in the Dutch CLSF industry has tightened, but the situation varies significantly between MBO, HBO and WO levels

Summary perceived shortage

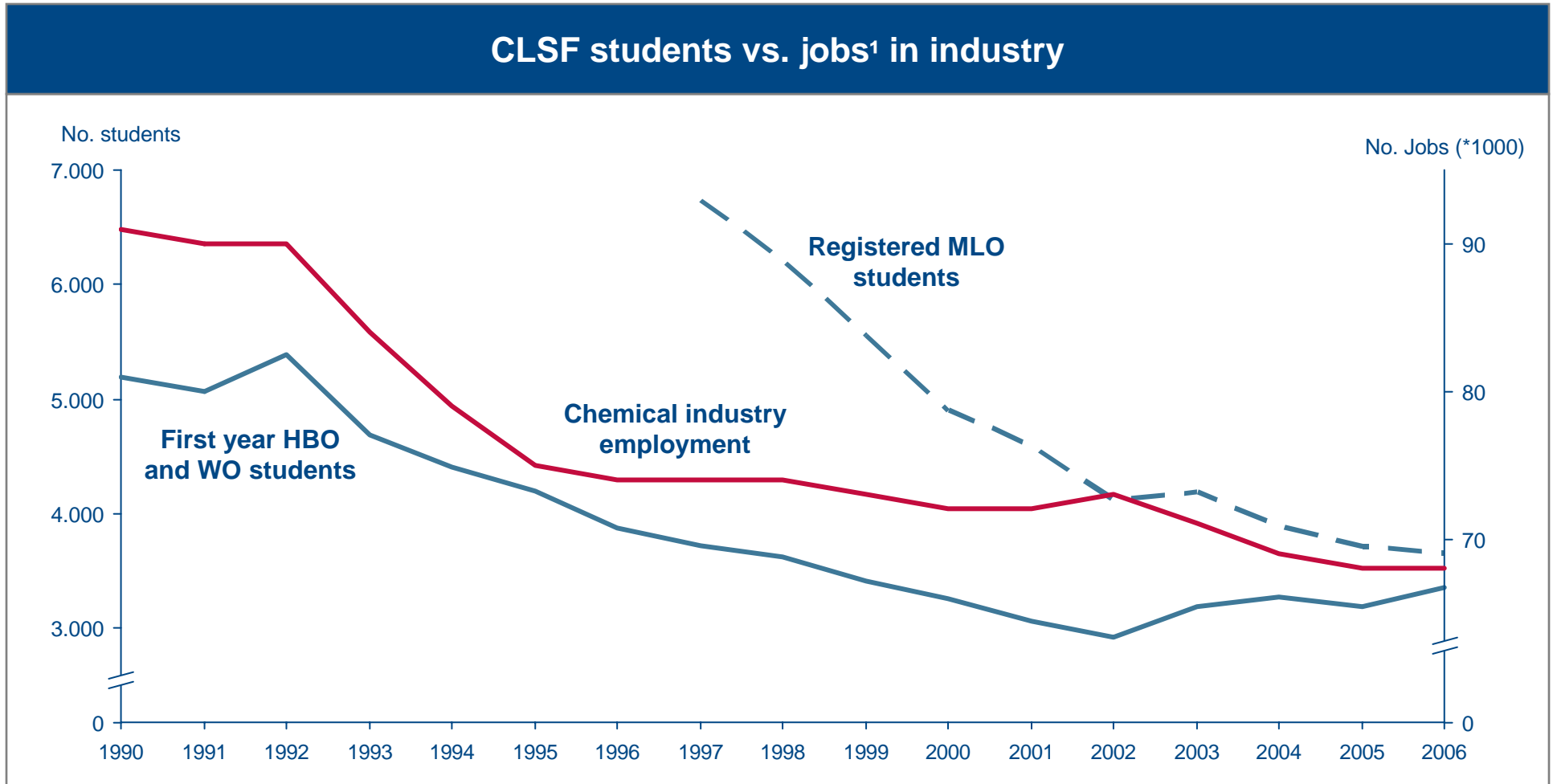
- The availability of staff in the Dutch CLSF industry is perceived as tight, something which will remain the case for the future, or worsen somewhat
- The tightening of staff availability can be understood from CLSF study enrollment dropping faster than chemical industry employment
- However, the situation varies significantly between MBO, HBO and WO levels, with MBO registering the highest drop in study enrollment, and higher shortage in staff
- The perceived shortage is mainly on MBO and HBO level – There are more complaints about shortage in quantity than on shortcoming in quality
 - There are some concerns that HLO does not sufficiently support a career in the laboratory
- About half of respondents expect no or only a slight effect due to retirement of the baby-boom generation; those who do see an issue like to see more attention for knowledge management
- Nevertheless, the chemical workforce is aging rapidly; in just 10 years, the % of employees under 35 years has decreased from 40% to 25%

The availability of staff in the Dutch CLSF industry is perceived as tight, something which will remain the case for the future, or worsen somewhat



Source: Arthur D. Little, Company interviews

The tightening of staff availability can be understood from CLSF study enrollment dropping faster than chemical industry employment

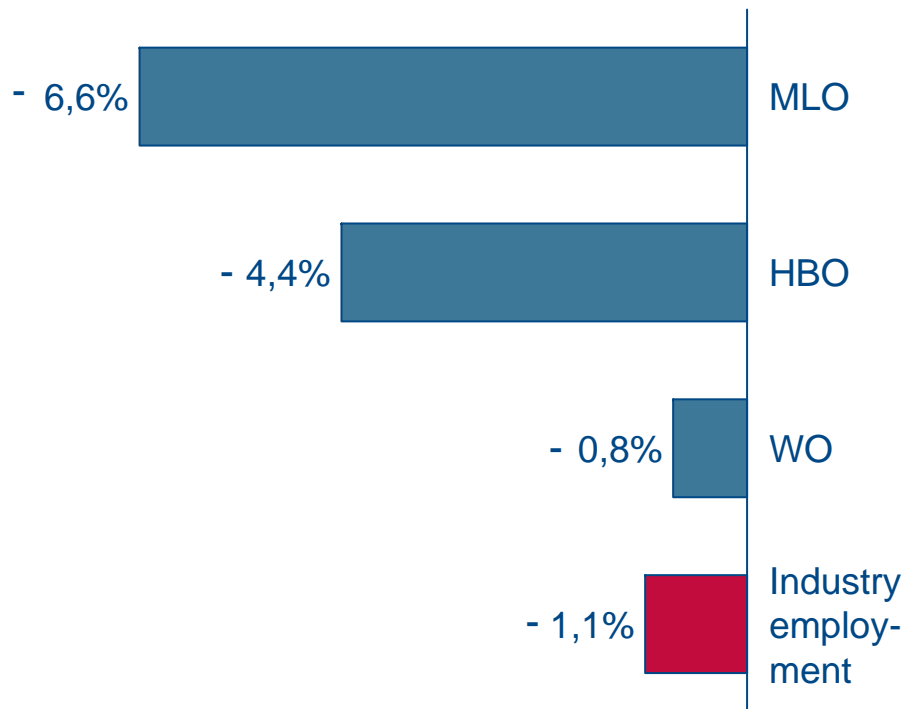


Source: CBS, HBO raad, ROA (SIS), Van der Willik

1) Excluding self-employed

However, the situation varies significantly between MBO, HBO and WO levels, with MBO registering the highest drop in study enrollment, and higher shortage in staff

CAGR¹ of studies enrollment 1990-2006



Interview quotes

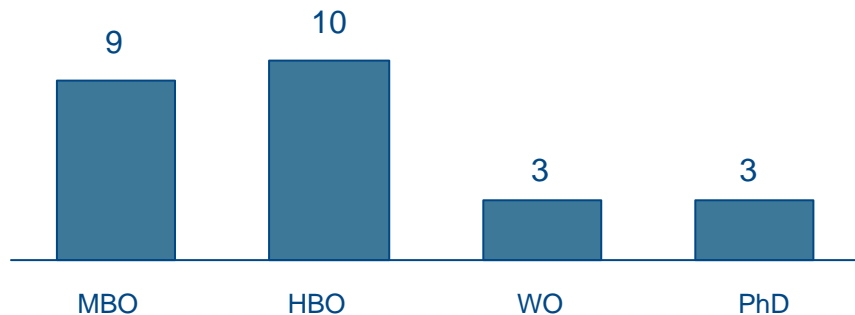
- “Especially in operators there is a severe shortage”
- “Big problem with HLO level because for these positions no foreigners are available”
- “On WO level there is even a reserve”
- “Due to the aging of our employees we expect a worsening of the shortage”

1) Computed Annual Growth Rate (CAGR)
Source: Arthur D. Little, Company interviews

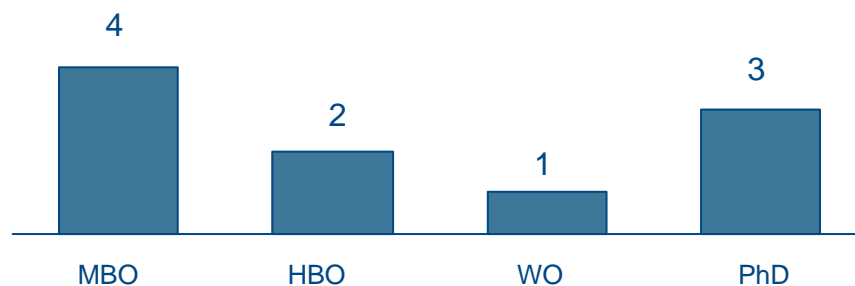
The perceived shortage is mainly on MBO and HBO level – There are more complaints about shortage in quantity than on shortcoming in quality

Quality and quantity shortage between levels

- Number of participants that mention quantity shortage on talent



- Number of participants that mention shortcomings regarding quality of talent



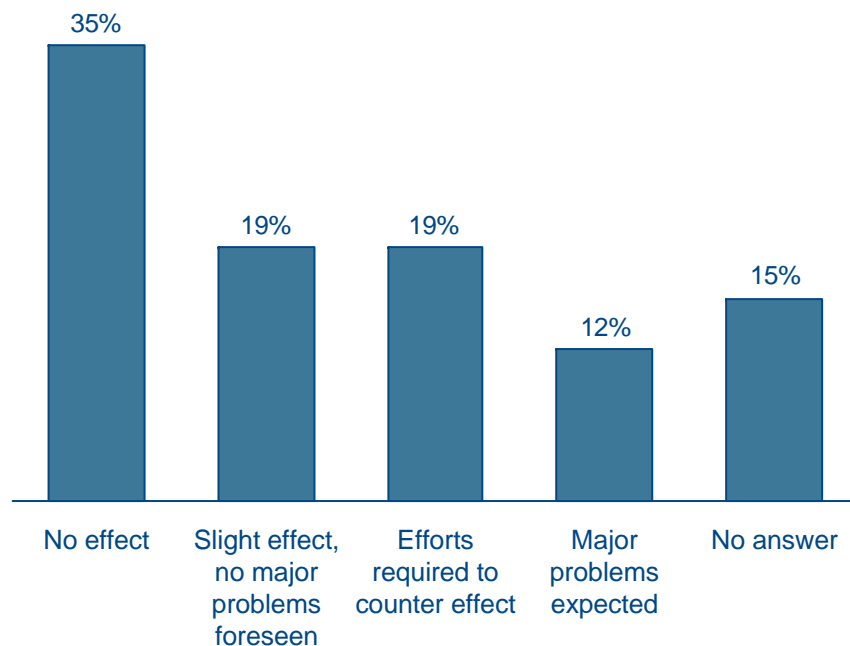
Interview quotes

- “There is a lot of noise, but as long salaries don’t increase there is no issue”
- “Big problem with HLO level because for these positions no foreigners are available”
- “Especially in operators [LBO+, MLO or Vapro level] there is a severe shortage”
- “It is extremely difficult to recruit young people. Recruiting people in the middle of there career is less difficult”
- “On WO level there is even a reserve”
- “Not problem at all, we recruit more and more internationally”
- “The increasing complexity within the chemical sector leads to an increasing demand for specialists”
- “We have little problem hiring MLO/HLO and junior scientists. However positions that require more than 5 years of experience in a specific field are difficult to fulfill”
- “No shortage LBO+ level due to automation”
- “Not many problems until now”
- “Due to the aging of our employees we expect an increase in shortage”

Source: Arthur D. Little, Company interviews

About half of respondents expect no or only a slight effect due to retirement of the baby-boom generation – Those who do see an issue like to see more attention for knowledge management

To what extent will your organization be affected by the retirement of the baby-boom generation?



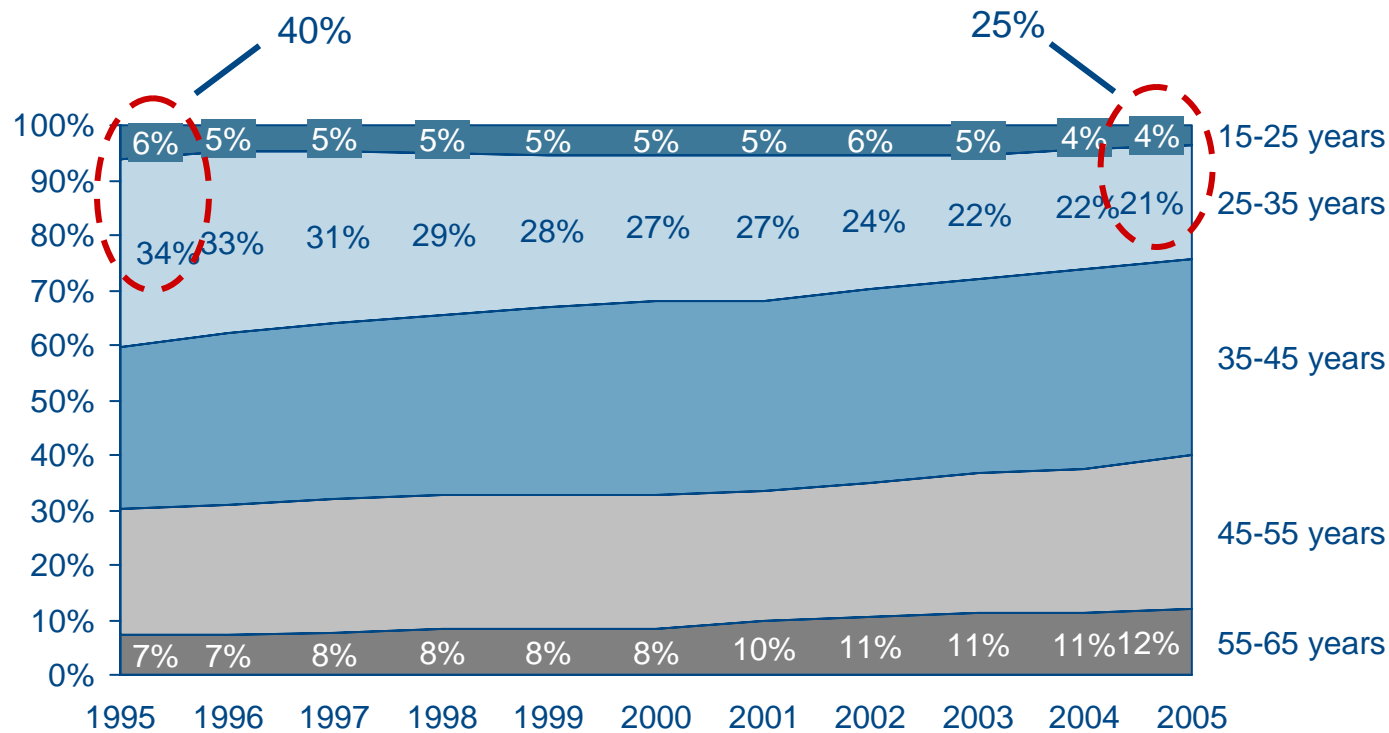
Interview quotes

- “Some people will work longer [...] to firm up their pensions”
- “Due to the optimization policies in the nineties few young people were hired”
- “The related expertise loss is a problem and often underestimated”
- “In the last reorganization the older generation has already left the company, knowledge management was a huge problem”
- “To compensate the loss of knowledge, we recruit a lot of middle management people”
- “Many people will retire in 5 to 10 years”
- “Not a major problem, we only maximize the recruitment of young people”

Source: Arthur D. Little, Company interviews

Nevertheless, the chemical workforce is aging rapidly; in just 10 years, the share of employees under 35 years has decreased from 40% to 25%

Age distribution workforce Chemical industry The Netherlands



CAO average	< 35 years	> 55 years
1995	45%	5%
2005	35%	11%

Source: CBS

Content

- 1 Executive summary & recommendations
 - 2 Perception of shortage
 - 3 Measures to deal with shortages**
 - 4 Job remuneration and prospects
 - 5 KNCV member feedback
- A Appendix

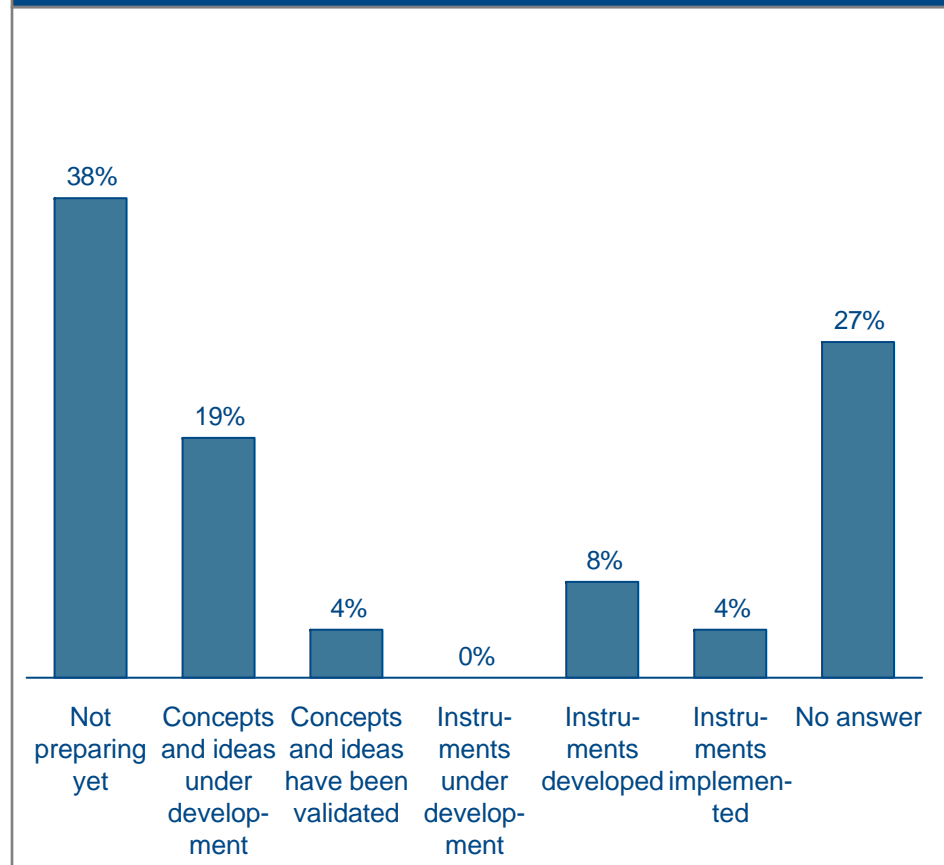
In general, companies are not actively preparing for a shortage, and the perceived shortage has not resulted in an improvement of salaries and benefits for employees

Summary perceived shortage

- Despite the perceived shortage, not many companies are preparing for current and future shortages; Those that do mention automation, outsourcing, and internationalization
- To deal with future shortage, international recruitment is getting more accepted to compensate the shortage in Benelux
- Companies generally have a positive experience in working with (WO) non-Benelux staff – Especially people from Eastern Europe are well educated and highly motivated
 - However, a sufficient number of local staff and managers is desirable to keep companies sufficiently embedded in the Dutch economy
- In general, the perceived shortage has not resulted in an improvement of salaries and benefits for employees
- SMEs appear to experience more of a shortage, and have more often been making adjustments in the benefits packages of their employees

Despite the perceived shortage, not many companies are preparing for current and future shortages; Those that do mention automation, outsourcing, and internationalization

Are you already preparing for shortage in chemical staff?



Actions mentioned

- “Innovation will be required, for instance automation will reduce the needed FTE’s”
- “Outsource as much as possible”
- “Outsourcing operators is not possible, research will go to China and Asia”
- “For an international company the location of R&D is not that relevant, especially with the current development in communication”
- “We recruit internationally in West-Europe and the US, cooperate with educational institutions, facilitate internal education and outsource work”

Source: Arthur D. Little, Company interviews

Content

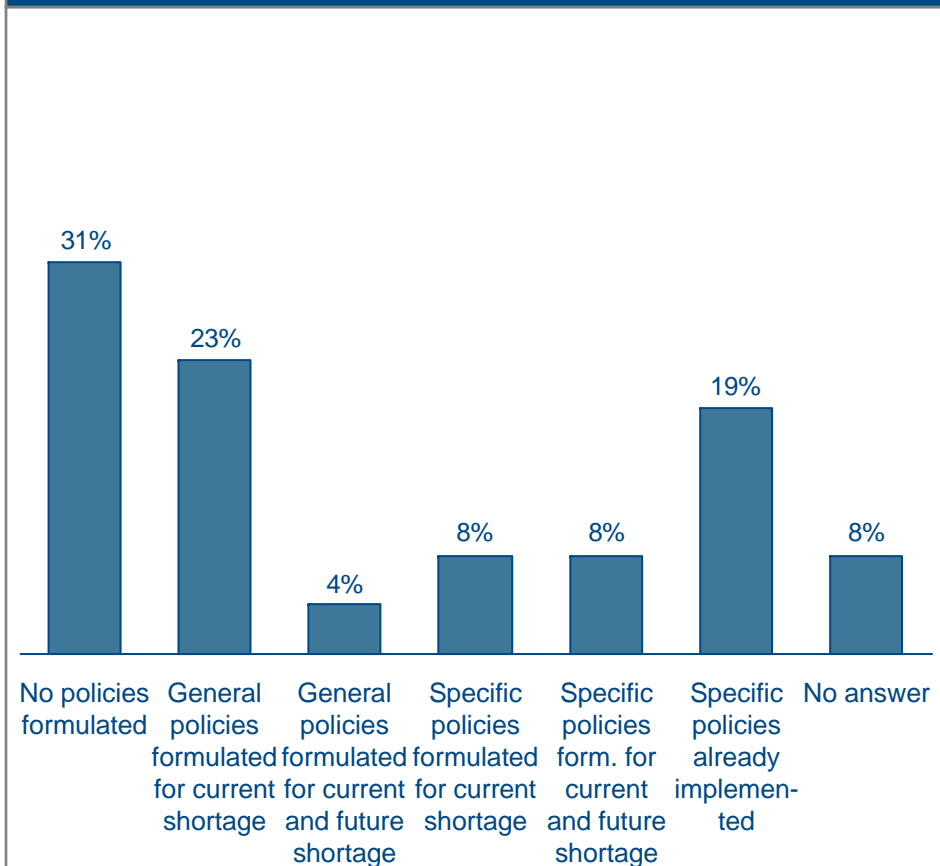
3 Measures to deal with shortages

3.1 Internationalization & outsourcing

3.2 Salaries

To deal with future shortage, international recruitment is getting more accepted to compensate the shortage in Benelux

Has your organization formulated specific policies to deal with current or future shortages?



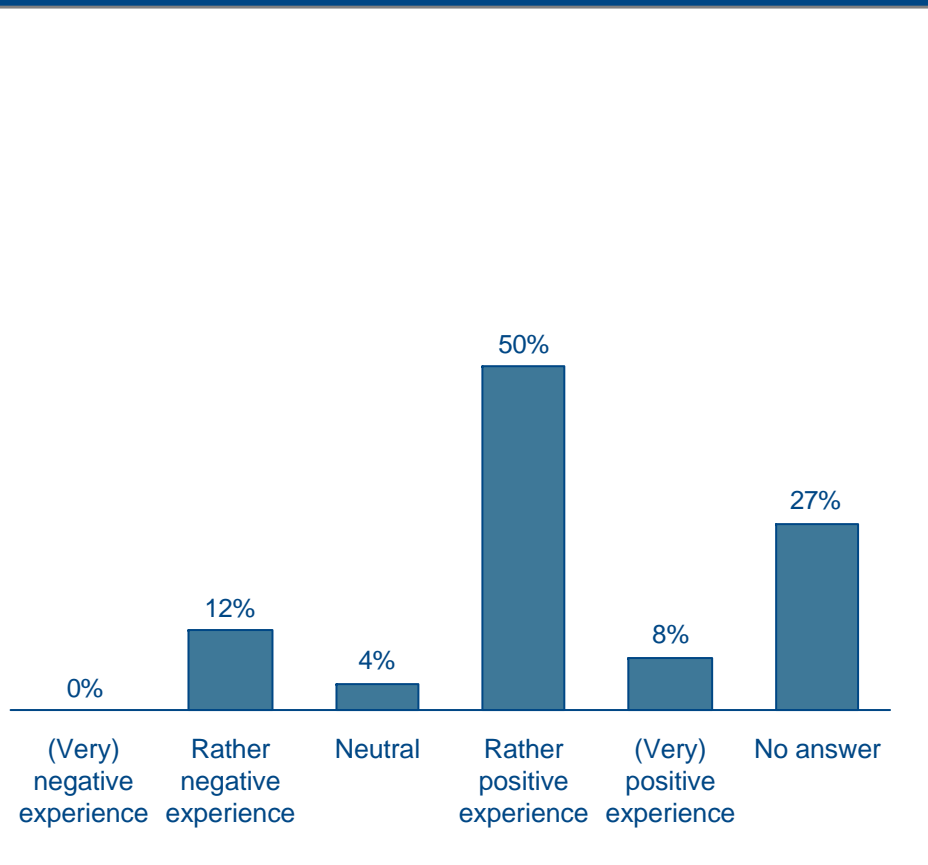
Interview quotes

- “We recruit internationally in West-Europe and the US, cooperate with educational institutions, facilitate internal education and outsource work”
- “We outsource a lot to consultants, because in middle management it is difficult to fill a vacancy”
- “We have increased efforts to recruit internationally and increase the visibility of our employees through participating on especially visible events”
- “Open innovation in partnership with other corporations”
- “We increase loyalty to the employer with extras as childcare, part-time work and career path diversion to non-chemical”
- “Professors join student trips to promote their own area of expertise”
- “Faster conversion of short-term contracts to long term contracts of employees”

Source: Arthur D. Little, Company interviews

Companies generally have a positive experience in working with non-Benelux staff – Especially people from Eastern Europe are well educated and highly motivated

What is your experience working with non-Benelux staff?



Interview quotes

- “Our experience with recruitment in Eastern Europe is that they have a good educational background and are very motivated”
- “Most AIO’s are non-Benelux, and often have a better mentality than their Dutch peers”
- “Initially management was cynical, but were convinced within a month time”
- “European people are used to different cultures and languages, people from the US are less open to new cultures”
- “Rather positive experience however learning Dutch is important for their social contacts”

Source: Arthur D. Little, Company interviews

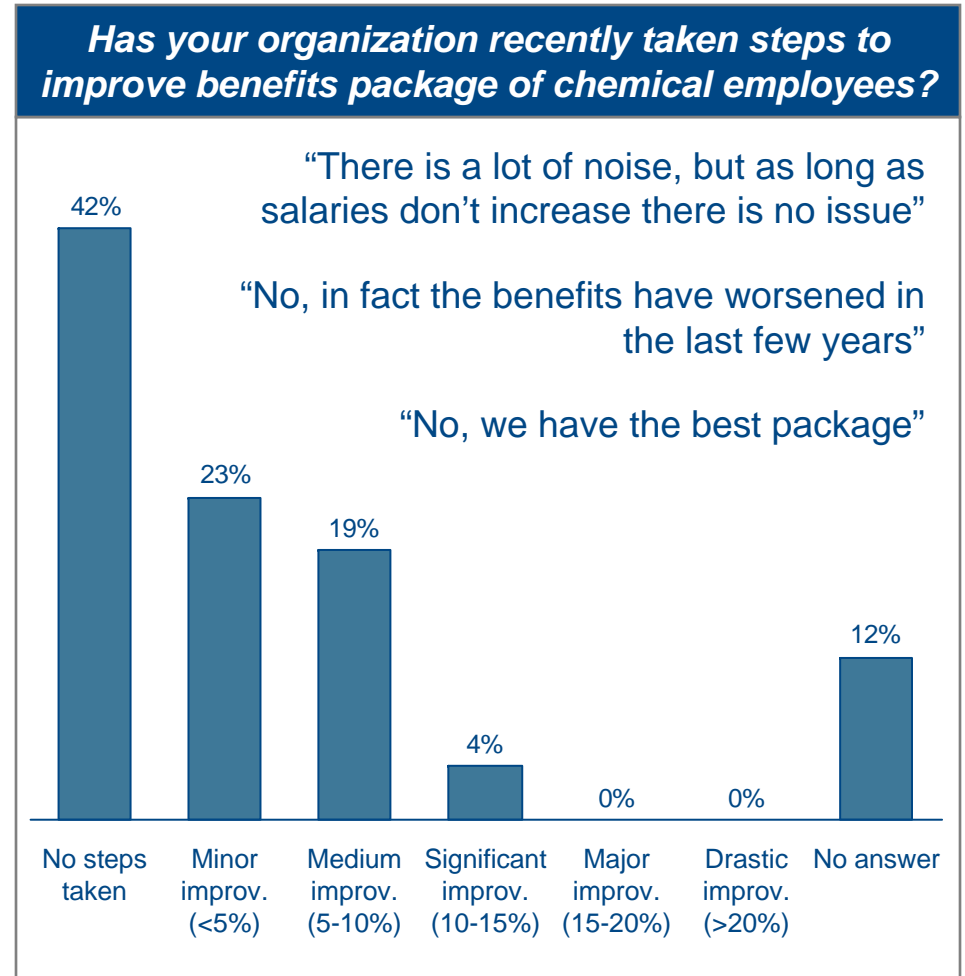
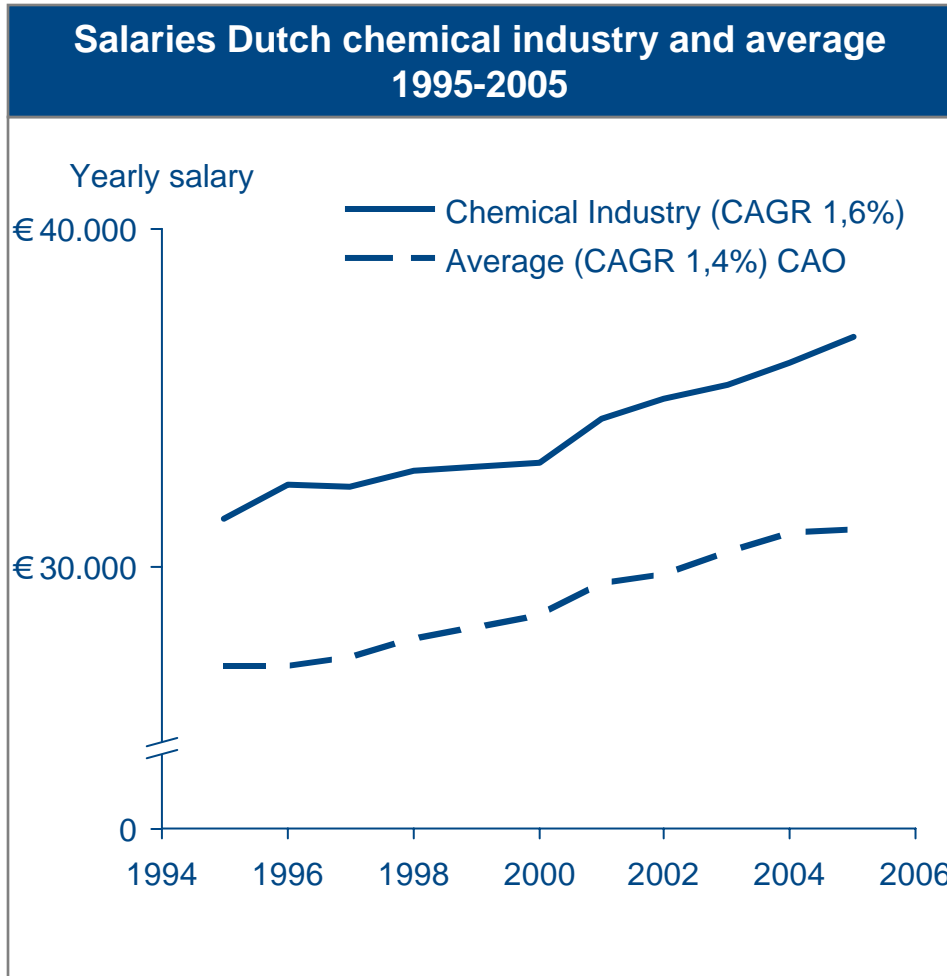
Content

3 Measures to deal with shortages

3.1 Internationalization & outsourcing

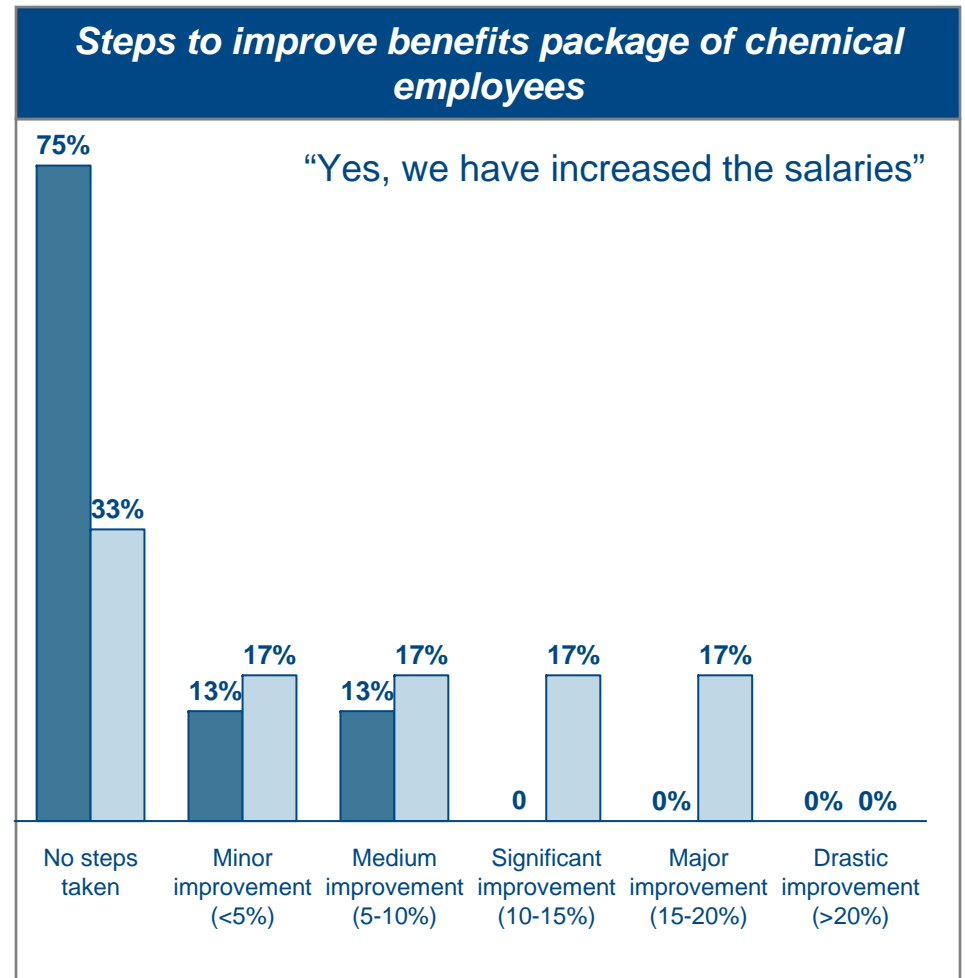
3.2 Salaries

In general, the perceived shortage has not resulted in an improvement of salaries and benefits for employees



Source: CBS, Arthur D. Little, Company interviews

SMEs appear to experience more of a shortage, and have more often been making adjustments in the benefits packages of their employees



Source: Arthur D. Little, Company interviews

Content

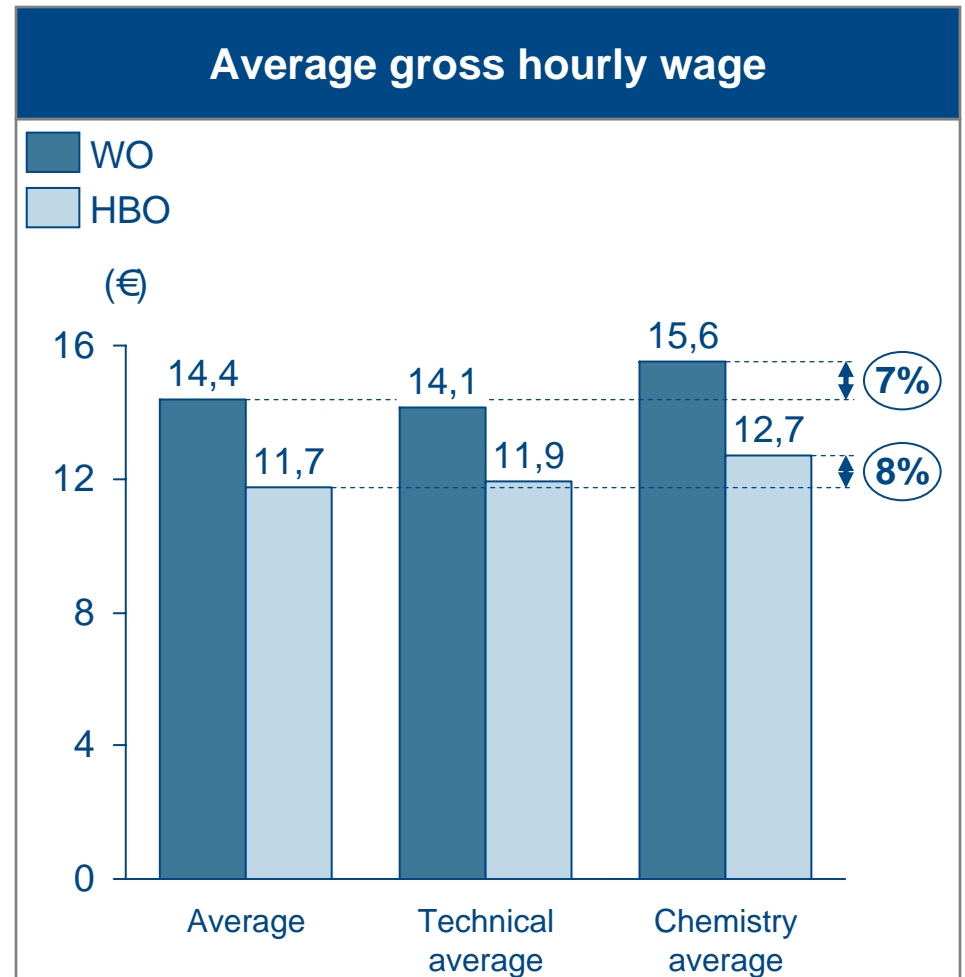
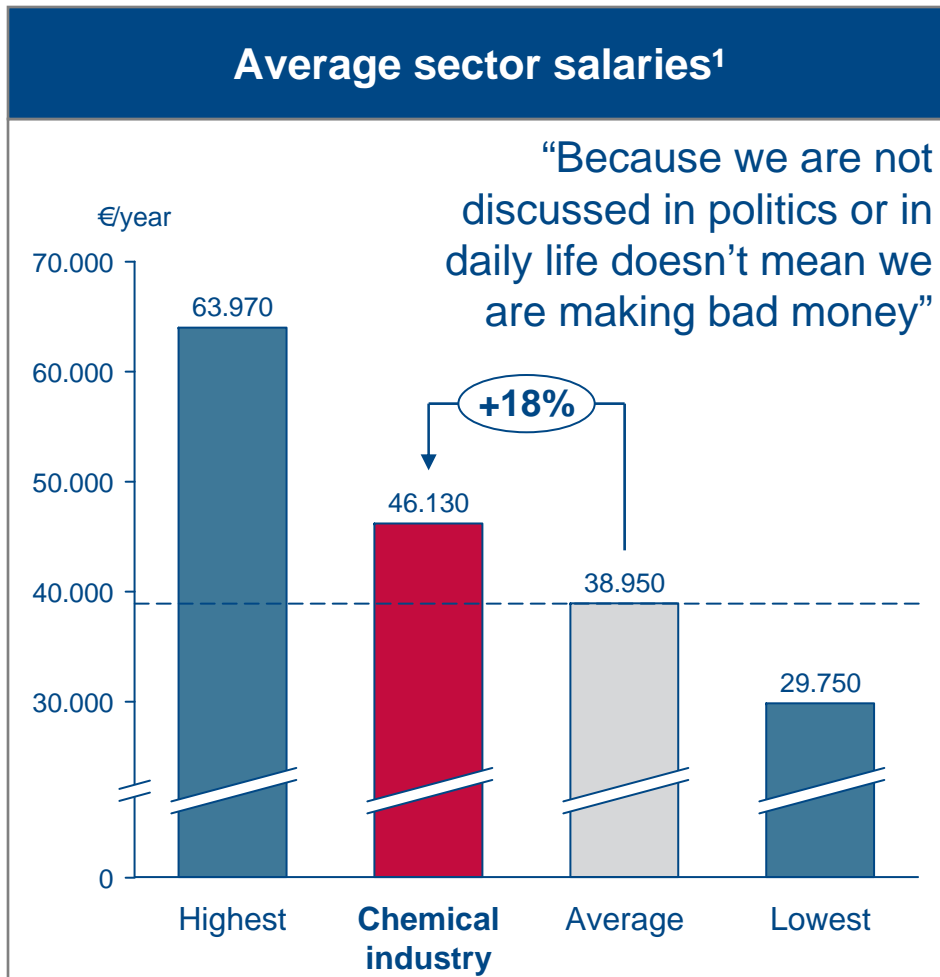
- 1 Executive summary & recommendations
 - 2 Perception of shortage
 - 3 Measures to deal with shortages
 - 4 Job remuneration and prospects**
 - 5 KNCV member feedback
- A Appendix

In terms of relative salary and job satisfaction, the CLSF industry remains very attractive as a place to work and have a career

Summary

- The chemical industry salaries are 18% higher than the average of different sectors, and chemistry starting salaries for HBO and WO are 7-8% higher
 - This may in part be related to a higher HBO/WO level staff working in the Dutch chemical industry, compared with industry average
 - Higher salaries are, amongst others, made possible by >60% increase in productivity of chemical industry workers in the past 10 years
- Job satisfaction in the CLSF industry is generally perceived to be high
- Opportunities to grow from chemical to general management is typically an opportunity that exist in larger companies
- Job opportunities for MBO and HBO are excellent, while WO job opportunities have improved

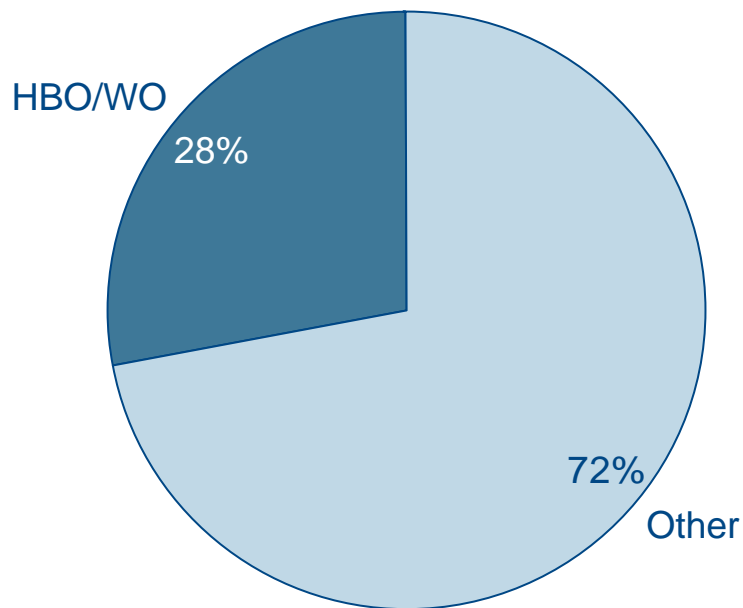
Overall salaries chemical industry are 18% higher than average of different sectors – Starting salaries chemical industry for HBO and WO are 7-8% higher



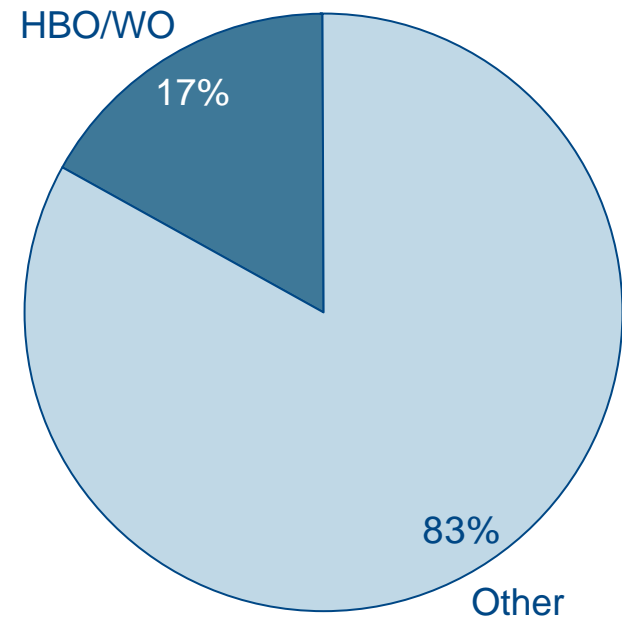
1) See appendix for sector specification
Source: CBS

Higher salaries Dutch chemical industry in comparison with industry average may partly be related to a higher share of HBO/WO level staff

Workforce division chemical industry - 2004

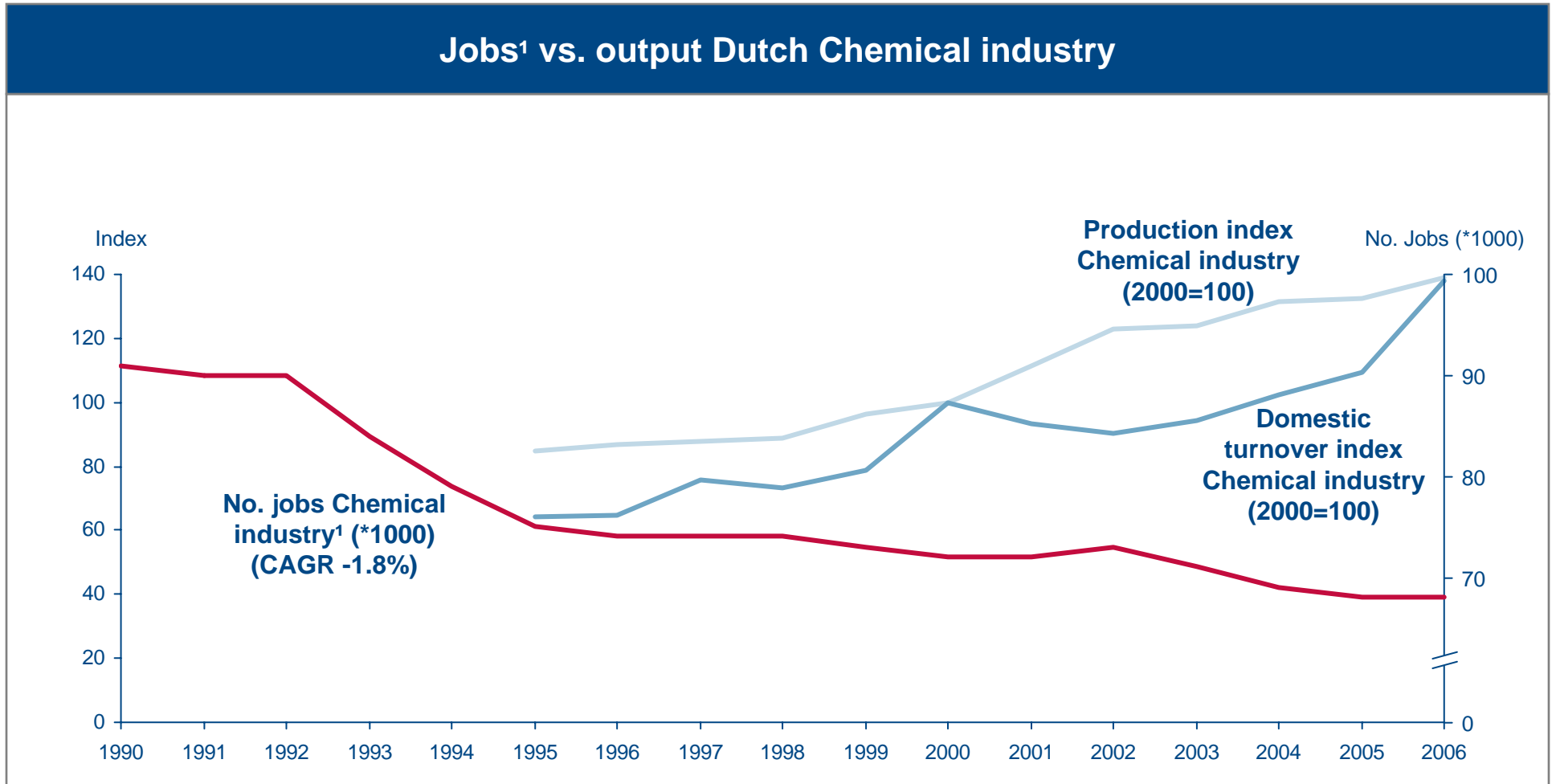


Workforce division industry average - 2004



Source: VNCI

Higher salaries are supported by >60% increase in productivity of chemical industry workers

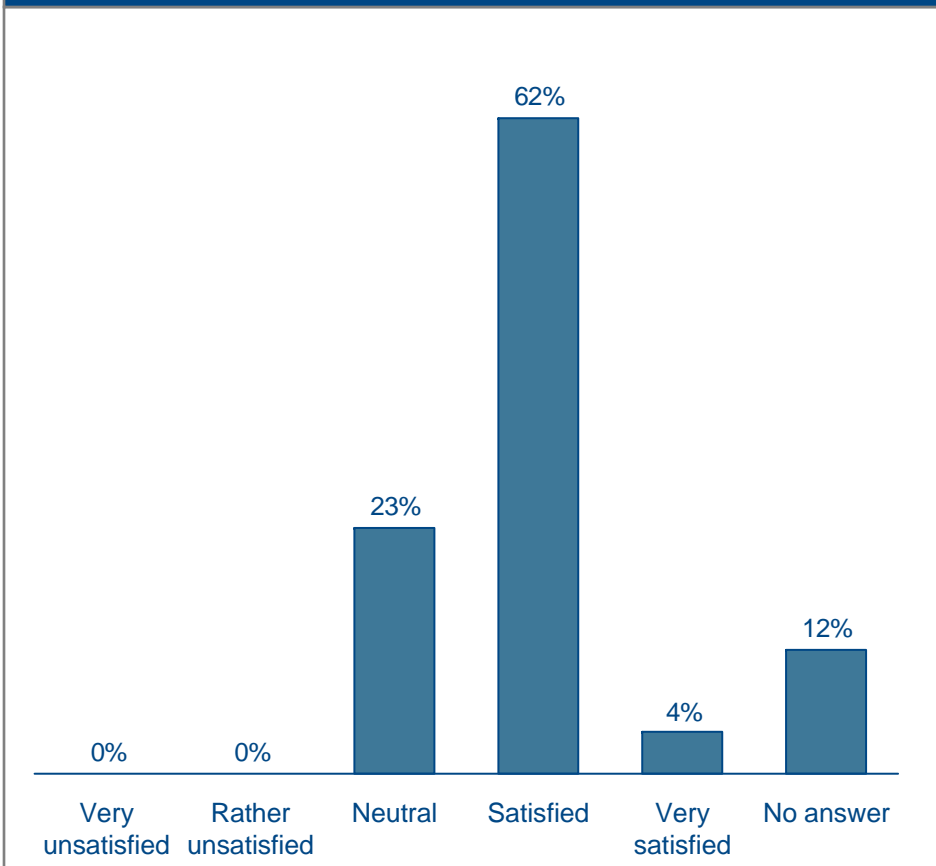


Source: CBS

1) Excluding self-employed

Job satisfaction in the CLSF industry is generally perceived to be high

Is your chemical staff satisfied with their job?



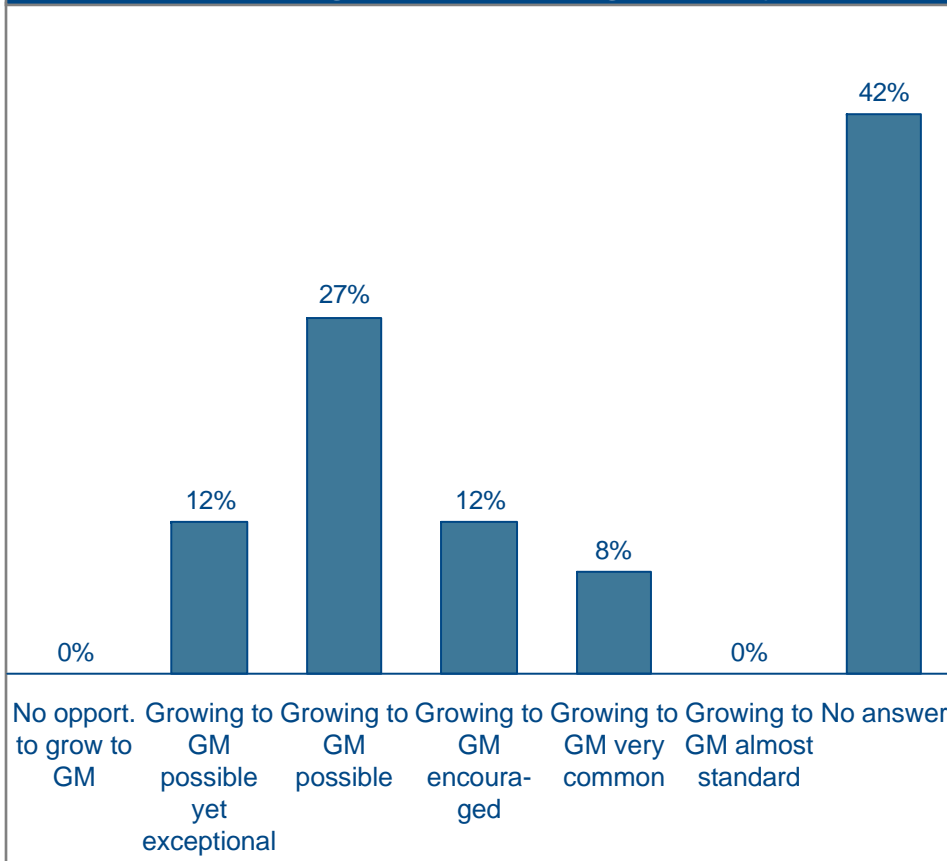
Source: Arthur D. Little, Company interviews

Interview quotes

- "Employee satisfaction is neutral/satisfied, the job itself should be challenging not the potential promotion"

Opportunities to grow from chemical to general management is typically an opportunity that exist in larger companies

What are the opportunities to grow from chemical to general management jobs?



Interview quotes

- “The sky is the limit, high potentials are identified, guided, pushed and provided with extra courses”
- “Employees themselves should be more ambitious”
- “Internal job-hopping has increased in popularity, the aim for high potentials is to switch every three year”
- “The sky is the limit, high potentials are identified, guided, pushed and provided with extra courses”
- “Dual career ladder? We have a triple career ladder!”
- “Employees themselves should be more ambitious”
- “Limited dual career opportunities, in most cases the boss makes more money than the specialist”

Source: Arthur D. Little, Company interviews

Job opportunities for MBO and HBO are excellent, while WO job opportunities have improved

Job opportunities Dutch CLSF students

MBO	<ul style="list-style-type: none">■ ROA Technomonitor 2007 states MLO students have one of the best job opportunities of all MBO-level studies
HBO	<ul style="list-style-type: none">■ During 1996-2003, HBO starters in Chemistry were more often unemployed than HBO starters on average■ However, last few years HBO Chemistry students have better job opportunities than HBO average, and currently, HBO Chemistry students have a job that better fits their level and desires than HBO students in general
WO	<ul style="list-style-type: none">■ Situation for WO Chemistry students is comparable to HBO Chemistry students<ul style="list-style-type: none">– More unemployment than average before 2000– Better job opportunities than average after 2000

Source: ROA Technomonitor 2007

Content

1 Executive summary & recommendations

2 Perception of shortage

3 Measures to deal with shortages

4 Job remuneration and prospects

5 KNCV member feedback

A Appendix

KNCV members support there is a shortage of CLSF students in the Dutch market, but that it can be met internationally; this situation will persist

Summary of KNCV member feedback

- There is a shortage of Dutch chemists, as talented Dutch students do not choose a “technical” education; However internationally there is sufficient supply, increasingly at all levels, alleviating shortages in the Dutch, and broader Northwestern European, market
- The shortage is expected to continue, and possibly intensify, due to (1) retirement of baby boomers, (2) MBO and HBO level students aiming for WO level education, thus causing further shortages at MBO levels, and (3) a chemical education not being very attractive in general
- The relationship between multinational cutbacks and the decrease in student enrollment is not immediately evident; However, students and those who influence their education choice (parents, teachers) may unconsciously be influenced.
- Internationalization at Ph.D. level is seen by the Dutch government as a financial waste, but this is not supported by universities or industry, who see it as part of a broader phenomenon of international give and take: some go, some stay, some Dutch students go abroad and come back to work in the Netherlands
 - Certainly Dutch talent must realize their is, increasingly, international competition for their jobs; a “zes-min” mentality will no longer be successful
- There remains work to improve the societal status of chemistry. Programs like CSI have helped, but unfortunately chemists cannot wield Blackberry’s, lease cars, and laptops to show their job importance
- Finally, the sector should more often emphasize that chemists, due to their analytical skills, can contribute in many different settings, and are found at the highest levels of industry and society; Of course that also means that chemistry education, at high school and university level, should be redressed to support that
 - Universities should aim to educate less for science, and more for society and industry

Key findings were presented on 7 November to ~ 100 KNCV members who provided feedback through a facilitated discussion using 8 “stellingen”

Strategic questions

- A summary of findings was discussed at the KNCV Lustrumbijeenkomst of November 7, 2008, in Utrecht
- Facilitated by Fridus Valkema, around 100 participants discussed the report outcome based on the hypotheses

Roundtable participants

- Gerard van Koten (ex-UU, KNCV)
- Rein Willems (Regiegroep Chemie)
- Marieke Spee (AkzoNobel)
- Edouard Croufer (Arthur D. Little)
- Jan-Paul Favier (CLS recruitment)

KNCV members agree there is a shortage of (good) Dutch chemists ; However, international “supply” is abundant and suppresses salaries

1. There is no shortage in chemists, otherwise the salaries would be increasing

- There is a shortage of good Dutch Chemists
- Companies like to keep a certain percentage of Dutch employees, however in the international market there is no shortage
 - Sufficient Ph.D., HBO and even MBO talent willing to work in the Netherlands, or for Dutch firms abroad
- Especially multinationals are already recruiting in the international market

KNCV members believe today's shortage is likely to persist, supported by three long-term developments

2. There's no shortage now, but there will be one in the future

- There are three issues that can be seen as causes for potential shortage in the future:
 - The baby boom generation will retire in the near future and needs to be replaced
 - The shortage increases to lower skilled levels as students are studying by to higher diplomas and a less international market
 - Chemical Engineering is considered as a tough study and so not very attractive for new students

KNCV members do not see a hard link between cost cutting and declining enrollments, but it may be a factor that influences the choice for a CLSF education

3. The cost cutting by multinationals in (chemical) R&D in hard times is a key reason for the decline in enrollment of CLSF students

- The relation between cost cutting and the fall in students that choose for chemical engineering is hard to prove as there is no report about the awareness of students about market developments
 - However, one may assume that student influencers (parents, teachers) are at least unconsciously aware of the most promising employment areas, now and in the future
- The cost cutting in the nineties is explained by multinationals as a rationalization on the profitability of the industry
- A possible solution is that inspired teachers are given time to teach the content versus context, and help emphasize the general usefulness of a chemical education

KNCV members see internationalization as “give and take”

4. Internationalization is a Trojan Horse; Foreign PhD's are not helping our economy in the long term

- Indeed, the government experiences the education of PhD's as a financial “leak”; On the other hand, for universities it is an important source of income
- Dutch corporations believe that PhD's represent the Dutch interest in foreign countries and that conversely it is of great added value for Dutch people to study abroad.
- Internationalization makes the world more sustainable

KNCV members do not believe they should help industry by accepting lower-level jobs; they do see a problem with the “zes-min” culture given increasing international job competition

5. Highly educated chemist will have to accept a job below their level of expertise to help the Dutch chemical industry

- This statement is not widely supported
- It is implied that for chemists the salary is not that important.
- There is a big difference between the Asian and Dutch mentality, Asians are willing to work harder for their career
 - The “zes-min” culture is not sustainable
 - For interesting jobs in multinationals, Dutch students should realize that they face international competition

KNCV members indicate there is not even a lack of choice as so much talent is available to companies internationally; Dutch talent will have to work harder to get a job

6. Companies do not experience shortage but lack of choice

- In fact, there is no lack of choice on the international market however the Dutch market of chemists is decreasing
 - Shell receives 1 million of applications a year, from all across the world
- Top Talent in Holland is less and less attracted to studies with a high technical content
- Dutch students need to be aware that they are competing in an international market and that the “zesjes mentaliteit” is not helping them

Indeed, KNCV members believe a CLSF job has lower status than other jobs; However, a CLSF study should be coveted by employers based on the analytical skills taught

7. Working in a lab has no social status

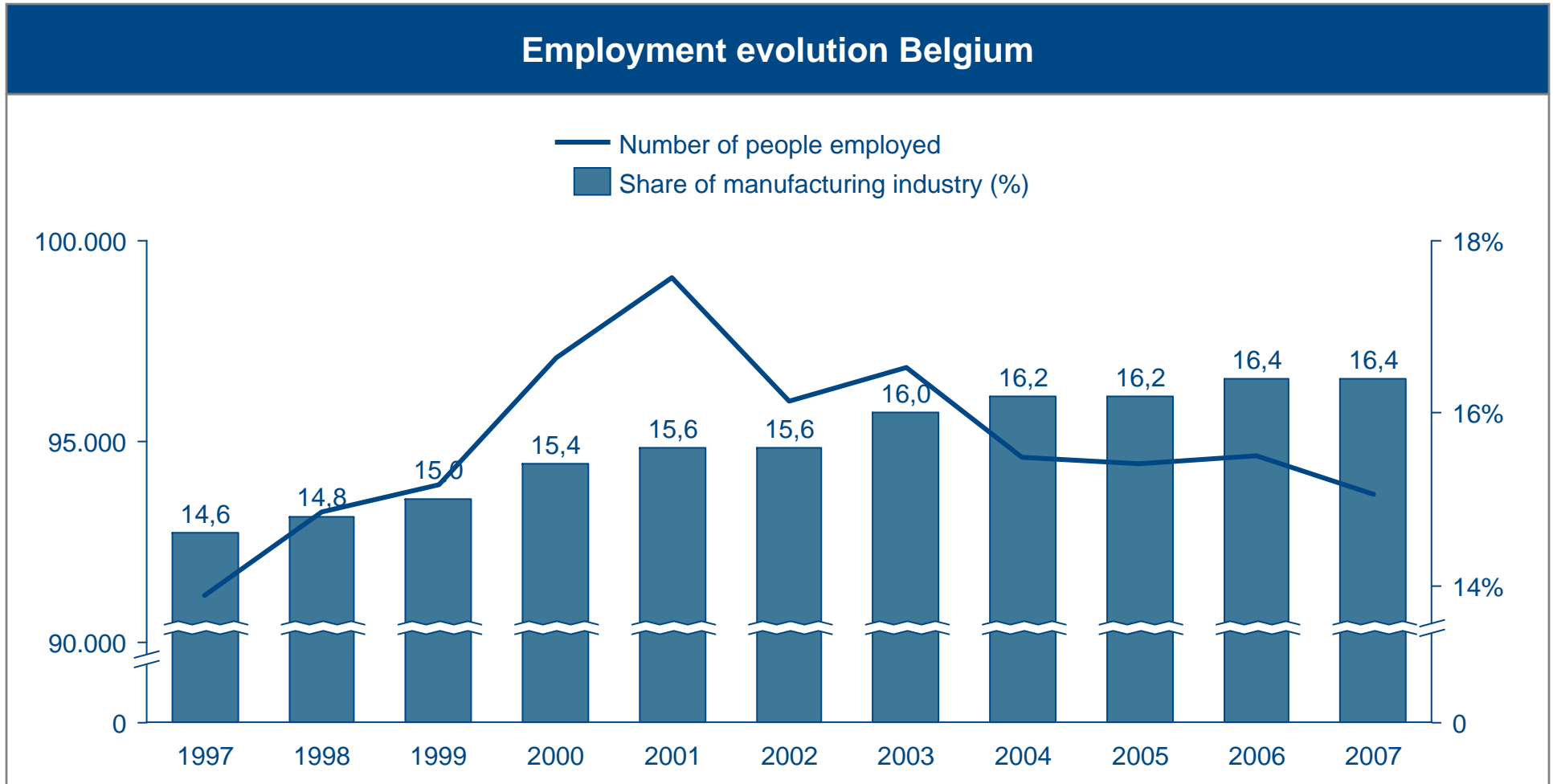
- Chemists that start in a lab often end in management functions and that needs to be stressed more often by the profession
- Chemists have a high degree in analytical skills and can be/are widely used in the society
- Not all students will end in research, that is OK and needs to be stressed by universities
 - The content of high-school and university chemistry should be adapted to make a CLSF study attractive to enter a whole range of jobs based on uniquely good analytical skills, not know-how

Content

- 1 Executive summary & recommendations
- 2 Perception of shortage
- 3 Measures to deal with shortages
- 4 Job remuneration and prospects
- 5 KNCV member feedback

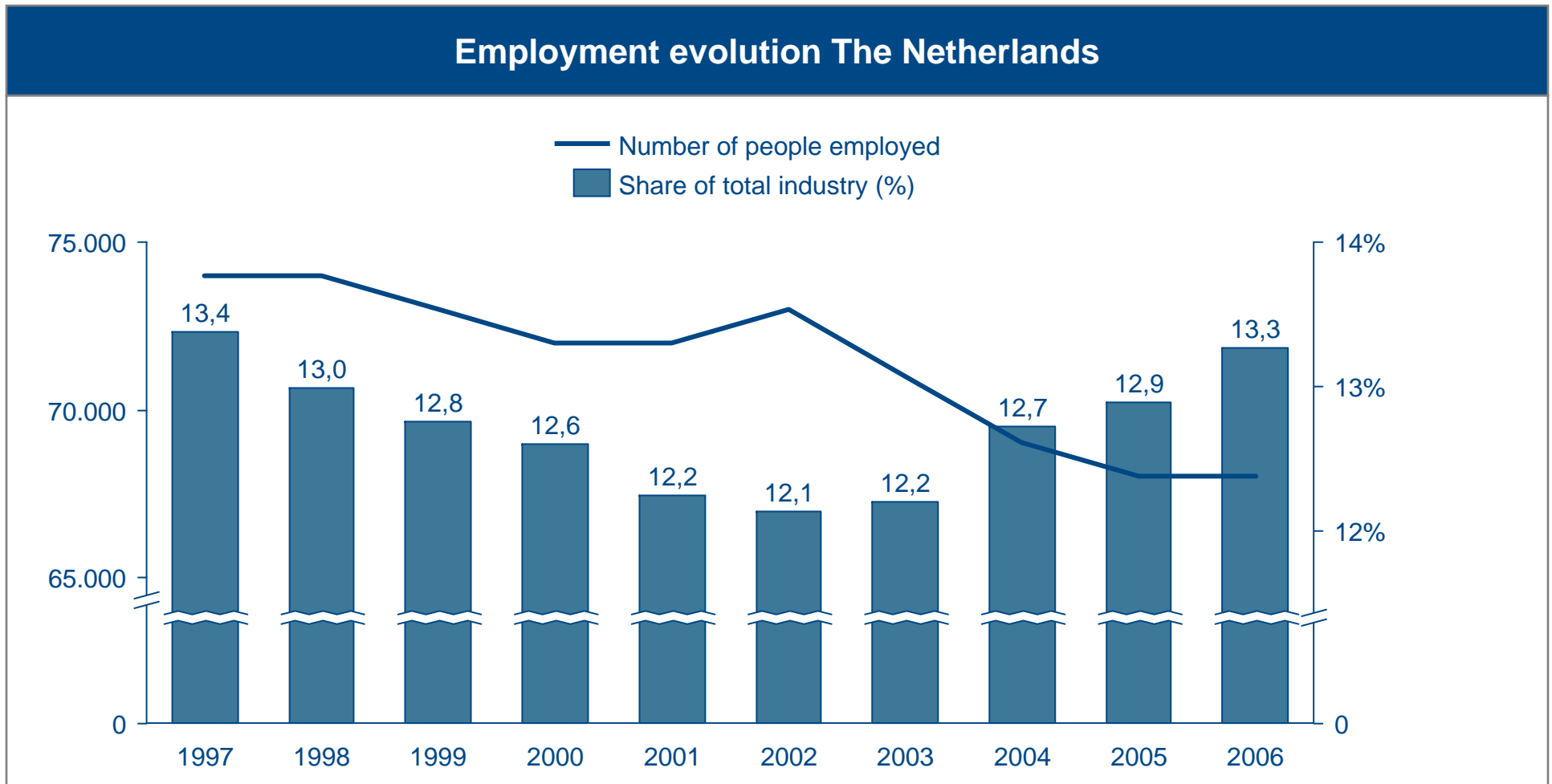
A Appendix

Number of people employed in the Belgian chemical industry grew annually with 0.3% on average (1997-2007). Growth between 1997-2001, decline between 2002-2007



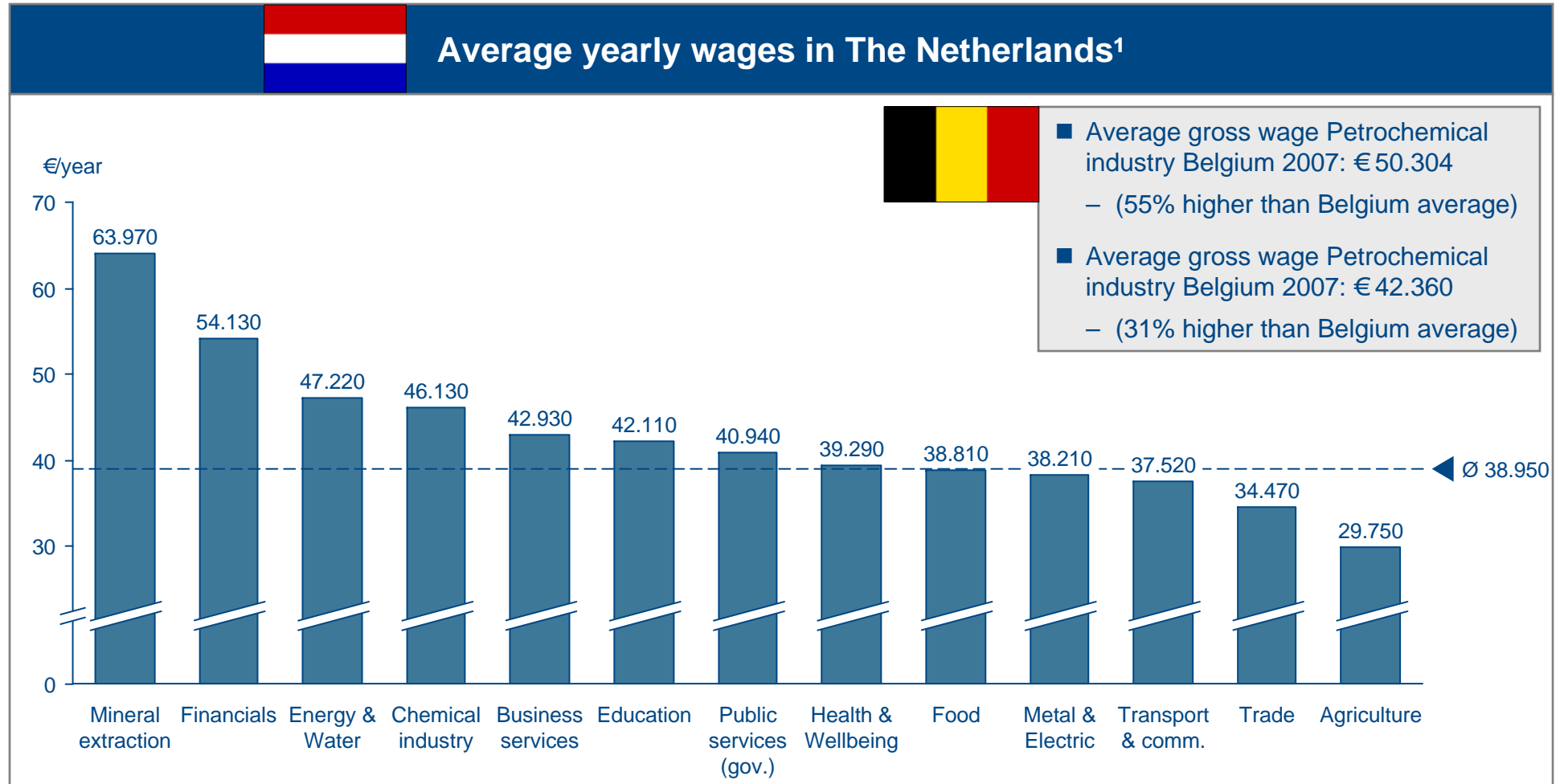
Source: "The chemical and life sciences industry in Belgium" - Essenscia 2008

Number of people employed in Dutch Chemical industry decreased annually with 0.9% on average (1997-2006). Share Chemistry of total industry increasing from 2002



Source: CBS

Average salary in Chemical industry 18% higher compared to other sectors. Energy & Water, Financials and Mineral extraction industries have a higher reward



Source: CBS, FOD Economy

1) Including special rewards. Calculation average salary based on all Collective labor agreement (CAO) sectors