Recruitment in the (Petro-)Chemical Industry

An Investigation into Industry Perception and Willingness to Work

Commissioned by:

Deltalinqs

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Executive Summary

In order to solve the problem of an inadequate incoming workforce in the Port of Rotterdam (petro-) chemical industry, the image of working in this industry needs to be improved. Research has shown that there are generally applicable drivers that motivate an individual's willingness to work in an industry, however in light of this research these drivers needed to be updated in order to be applicable to the (petro-)chemical industry in particular. In collaboration with Deltalinqs, we, the consultancy project team researched the perception that jobseekers', current employees, and students have of working in the (petro-)chemical sector in the Port of Rotterdam.

The key objective of this project is to provide Deltalinqs with an understanding of the public perception of working in the Rotterdam Port Chemical Industry, as well as what determines and drives this public perception among potential employees of the sector. Through interviews with key players linked to recruitment in the port's chemical industry the following key drivers were determined to be:

(1) commuting and mobility,
(2) growth opportunities,
(3) shift work,
(4) salary,
(5) positive social status,
(6) sustainability, and
(7) image of the industry.

Subsequently, a survey was developed and distributed to both people that are actively looking for a job in Rotterdam which are also eligible for the (petro-)chemical industry and students in study programs enabling them to work in the port of Rotterdam once graduated. Also, small interviews with current employees of the sector were performed to brighten the understanding of driving forces for working in the (petro-)chemical industry. This survey resulted in some enlightening findings. Only two of the seven tested hypotheses were found to be significant. One's social status and the public perception of the industry were found to significantly influence people's willingness to work in the (petro-)chemical industry in the Port of Rotterdam. One's social status is largely motivated by dated stereotypes that classify the industry as an inherently dirty one. This was also shown to have a negative impact on the attractiveness of working in the industry, since no one wants to be associated with such a negative status. The negative public image of the industry was also shown to heavily affect the attractiveness of working in the industry.

Surprisingly the fact that the harbour is more difficult to reach than a job in the city centre of Rotterdam (thought to be the main negatively influencing factor) was found not to have a significant influence on one's decision to work in the industry, despite many interviews suggesting that this would be an important aspect. However, having a car, or getting a car from the company is important to jobseekers. The great importance of the negative environmental effects for youth was also expected to influence the attractiveness of the industry. However, no significant influence was found.

Based on the results of our research, it is recommended that the (petro-)chemical industry works towards reinvigorating the image of working in the harbour. This would require a more eye-catching public campaign that would move beyond simply promoting what working in the sector

is like, to present the industry as one that is exciting, relevant, and worthy of a youthful workforce. Since the social status associated with working in an industry can greatly influence a potential employees desire and willingness to work, the (petro-)chemical industry itself needs to be positively regarded for someone to feel as though working in the industry is good for their status. By improving the overall image of the industry, the industry itself can ensure its current and potential employees improve their own social status.

This proposal suggests the industry make use of a campaign that highlights real stories of employees from the industry. These stories should be based on profiles of potential employees for the sector. Each profile should have a unique reason and/or positive aspect of working in the (petro-)chemical industry. A site combining these profiles should be launched as a platform for the whole industry. Video's should be used in a social media campaign targeting jobseekers that fit the profile.

By targeting jobseekers with a fit to a certain profile Deltalinqs can increase the chance that these potential employees will be drawn to the industry because they are targeted based on their own personal interests and values.

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1. Introduction and Research Objective

1.1. Deltalinqs

Deltalinqs is a port and industry association that strives to strengthen the competitiveness of industrial enterprises of the Port of Rotterdam. Many of their members operate in the chemical and petrochemical industry and have, in recent years, come under heavy scrutiny in the media and among the public because of their work, especially with regards to chemical accidents and environmental concerns. Deltalinqs is looking after the interests of 95% of the logistic, port and industrial companies in the mainport Rotterdam by the means of lobbying (Deltalinqs, 2019). More than 700 companies are associated to Deltalinqs. All these companies together provide work, directly and indirectly, to 175,000 people (Deltalinqs, 2019). Deltalinqs focused their work on six different themes of which one is the education and employment market. This consultancy project will focus on this theme. In aiming to emphasize the positive contribution of their members within the industry, Deltalinqs is interested in the public perception of working in the Port of Rotterdam chemical industry and in ways of improving this perception, if found negative.

1.2. The chemical industry in the Port of Rotterdam

The project focused on the (petro-)chemical industry within the Rotterdam port, including around 45 chemical companies as well as several biochemical companies, oil refineries and biofuel producers. Rotterdam's chemical industry is highly diverse, stretching from small chemical start-ups to large petrochemical multinationals such as Shell and ExxonMobil. Together with the wide research community, the port's supporting infrastructure and over 120 industrial companies, Rotterdam has become a strong chemical cluster (Port of Rotterdam, n.d.). The Port of Rotterdam is part of the greater Antwerp-Rotterdam-Rhein-Ruhr Area, which together is one of the top five chemical clusters in the world, being responsible for 30-40% of the total chemical turnover in Europe (NFIA, n.d.).

Despite the large contributions of the chemical cluster to the city of Rotterdam, in the economic, investments and employment sense of the word, the Port of Rotterdam is often considered independent of the City of Rotterdam. With chemical companies stretching from Pernis, over the Botlek all the way to Maasvlakte 2, one might have to travel around 50 km from the city centre to certain companies. It is partially due to this distance that the main workforce working in the Port of Rotterdam resides in the surrounding areas such as Brielle or Nissewaard. However, as the population from those areas gets older, companies situated in the Port of Rotterdam struggle to attract and retain enough adequately trained employees.

1.3. Problems faced by the industry

The increasingly difficult task of attracting and retaining the right labour for both technical and administrative vacancies has become a core concern for the (petro-)chemical industry in the Port of Rotterdam. Drastically limiting the well-functioning and growth of their members, Deltalinqs recognises the challenges linked to these labour shortages and hence strives to both understand and counteract the changing labour trends.

The underlying causes of the perceived labour shortage are manifold, ranging from physical distance to the port, unattractive working conditions, public misconceptions surrounding the companies' work, environmental debates with regards to the petroleum industry to the sheer lack of awareness with regards to the chemical industry and the opportunities it offers. Due to the aging population in neighbouring areas such as Brielle, chemical companies must look towards the City of Rotterdam to find potential employees. However, over the past years more and more job opportunities requiring the same profile as those demanded by the chemical industry have emerged within the city centre, providing potential employees with attractive alternatives to working in the port. It is therefore of particular interest for the chemical industry to investigate how job seekers and students who are living in the city of Rotterdam perceive the port and the chemical industry as a workplace in order to strengthen their public image. Studies have shown that a positive employer image can act as a strong advantage in the war for talent, ensuring access to a large talent pool and the retention of critical employees (Berthon et al., 2005; Reis & Braga, 2016).

However, the public perception of the chemical industry is unclear. While many managers within the industry fear a negative public sentiment towards their work, talks with Deltalinqs have shown that most people do not know enough about the port and the respective companies to have a strong opinion. This lack of information renders it difficult for the public to distinguish the different chemical companies, leading to stereotypes and negative spillover effects when it comes to scandals or controversies. Thereafter, it becomes crucial to gain a better understanding in how far public awareness goes, how it is driven and how chemical companies can create stronger brand images.

1.4. Objective and research question

The project's key objective is to provide Deltalinqs with an understanding of the public perception of working in the Rotterdam Port chemical industry as well as the main determinants of this perception, with the goal of attracting more employees to the industry. We first interviewed key players in the recruitment industry such as the unemployment bureau of the government (UWV), as well as job coaches at high schools and vocational schools, to get a general understanding on what the public perception of working in the chemical industry is and how it is driven.

Based on the insights into this perception of the industry's labour opportunities and incentives gained from the interviews, a survey was formulated in order to further research jobseekers' perception of working in the Rotterdam Port chemical industry. This research will provide Deltalinqs with a report that states the in-depth understanding of public perception on working in the Rotterdam Port chemical industry. To this, Deltalinqs is also provided with recommendations on how to use the findings of this research in order to render the chemical industry more attractive to the Rotterdam city workforce.
The project will address the aforementioned issues by answering the following research questions:

What is the perception of working in the Port of Rotterdam's chemical industry and how is this perception driven? How can this industry attract more employees?

1.5. Scope and Domain

Within this research question we focused on the image that people, who are (almost) ready to work, have on the idea of working in the (petro-)chemical industry. We therefore chose not to look into the public image of the industry but focus on the image of working in the industry for people that are *eligible* to work in the industry. In particular, these people are students in technical studies, as well as people searching for a new job with relevant academic/working background. This is worth mentioning since the opinions voiced by Deltalinqs and their members and partners was that the general public image of the chemical industry is bad and thus needs to be improved. However, in order to ensure the most useful and relevant research, this will not be our scope.

We concluded that the problem that Deltalinqs and its members face of employee shortage is more important than the general negative public image. Just improving this public image will not improve the number of people working in the sector and therefore it gives more benefit for Deltalinqs to focus on the image of working in the industry in order to ensure access to an adequate workforce.

1.6. Section Summary

- At the request of Deltalinqs, we, the student consultant team from Erasmus University, looked into the perception of the (petro-)chemical industry in the Port of Rotterdam.
- The goal of this research was to determine the effects that perception of the industry might have on the current issue of labour shortage in the industry, with the goal of determining how the industry may be able to attract more employees.
- The research was conducted through interviews with key industry players, as well as through a survey distributed to students and jobseekers.

2. Literature Review and Theory

The issue of workforce shortages has been increasingly present in Europe throughout various industries and is predicted to grow throughout the coming years, as the current workforce grows older, leaving a much smaller working age population behind. The demographic changes and the constant need for growth introduce numerous problems for companies, especially when it comes to attracting, selecting and retaining the right employees (Cedefop, 2016; European Union, 2015). An EU report (2015) states that "two in five companies claim to have difficulties recruiting people with the required skills to fill their open vacancies and many employees have difficulties to find a job which matches their qualification level" (European Union, 2015, p.14). While the Netherlands has not suffered quantitative labour market shortages, meaning that there is no absolute lack of workers, the country has shown to have high qualitative skill shortages, especially for occupations such as manufacturing and construction technicians or mechanical and electrical engineers, implying a shortage in skills and a mismatch between labour demand and supply. Potential reasons for the labour shortages are the growing demand and insufficient labour supply, negative industry images and unattractive working conditions as well as changes in the relevant working requirements (European Union, 2015, p.50 & p.118).

Considering these challenges and the increasingly competitive economic environment, companies must counteract the labour shortages in order to remain competitive. While the literature proposes numerous measures such as increasing productivity or upgrading employees' skill levels, this research will focus on measures proposed to understand and potentially change the public's perception of working in the chemical industry (European Union, 2015, p.55 & p.73). Considering the reputational ambiguities surrounding the chemical industry in general as well as the uncertainty about the public perception of the chemical industry in Rotterdam, employer attractiveness becomes a central factor in the fight for talent chemical companies in the Port of Rotterdam face every day (TNS, 2015). "Employer attractiveness is defined as the envisioned benefits that a potential employee sees in working for a specific organisation" (Berthon et al., 2005 p.151) as well as their "intention of referring their organization to the external talent pool" (Pattnaik & Misra 2014 p.318). Studies have shown that building up a positive company or industry image in people's minds can significantly lower vacancy rates, reduce employee acquisition costs, improve employee relations and increase employee retention (Berthon et al., 2005; European Union, 2015; Reis & Braga, 2016).

Previous studies, such as Nomura et al. (2018) or Duarte et al. (2014) have measured employer attractiveness through potential employee's willingness to work in a certain company or industry. The use of a measure of intention to indicate future behaviours is based on Fishbein and Ajzen's (1975) theory of reasoned action indicating that human behaviour is based on a rational sequence of cognitions or intentions. In 1979, Fisher, Ilgen and Hoyer applied this theoretical framework to organisational attractiveness and thereby created a widely used and statistically proven multi-item scale assessing general company attractiveness as well as participants' intentions, such as thoughts about the organisation that specifically imply further actions as for example the active pursuit of a job offer (Highhouse et al., 2003). This study hereafter made use of Fisher et al.'s (1979) multi-item scales as described by Highhouse et al. (2003), introducing only slight alterations with regard to framing and language, to define its dependent variable "Potential Employee's willingness to work in the Port of Rotterdam (petro-)Chemical industry".

Exploring the determinants of a company's brand value and consequent employer attractiveness, Ambler and Barrow (1996) came up with a simple three-factor model. They defined 'Employer Brand' as "the package of functional, economic and psychological benefits provided by employment" (Ambler & Barrow, 1996, p. 187). The three dimensions reflect the value that is exchanged between the employer and employee, such as the developmental and usefulness of the activities (functional benefits), the material and monetary rewards (economic benefits) and the feelings of belonging, purpose and direction (psychological benefits).

Ten years later Berthon et al. (2005) came up with a similar five-factor model which they considered an extension to the earlier version. According to Berthon et al.'s model, employer attractiveness is driven by the organisation's interest value and social value (extensions of the psychological benefits), economic value (similar to the economic benefits), as well as the development value and application value (both elaborations on the functional benefits). The interest value refers to the extent to which a potential employee is attracted to the organisation, especially with regard to the nature of tasks and the working environment. Similarly, the social value focuses on the social dimensions of the working environment in terms of interpersonal relationships and atmosphere. The economic value describes the monetary, material and promotional benefits the employer provides its workforce. Building on this, the development value assesses the attractiveness of an employer based on the career-enhancing opportunities and the internal benefits such as self-worth and recognition that the employer offers. Lastly, the application value captures the effect of a learning-enhancing environment and the possibility to apply what one has learned on employer attractiveness. Those base factors have been repeatedly mentioned throughout the literature and have been proven to be of high importance when assessing employer attractiveness. Reis and Braga (2016) find strong support for all five factors, especially when studying younger generations such as the millennials. They write that "individuals have personal motivations that prioritize pleasure, focus on individual interests, and stimulation […]; they want fast promotions […]; they seek flexibility, quality of life, recognition, continued feedback, and positive environments and relationships at the workplace […]" (Reis & Braga, 2016, p.105).

Figure 1: Main Theoretical Models

2.1. Theoretical background and hypotheses

Based on these existing frameworks and the extensive discussions and interviews conducted with industry experts, this study has set up a model similar to Berthon et al.'s (2005) model. While more tailored, this model aims to explain "Potential Employee's willingness to work in the Port of Rotterdam Chemical industry". Thereafter, the causal relationship scheme, as shown below in figure 1, proposes that the dependent variable is influenced by seven variables.

Starting with the economic and even development value variables, the model considers both the perceived "Salary" offered throughout the industry and the perception of "Growth opportunities" available in the industry as having positive effects on the willingness to work in Rotterdam's chemical industry. The third variable is the effect of the "Shifts" on the dependent variable. It reflects on the specific form of work often present in the chemical industry and can be considered part of Berthon et al.'s (2005) interest value, as shift work shapes the working environment. The variable measures the perception of shifts among potential employees and was mentioned multiple times throughout the interviews, however it does not predict a specific effect. The fifth variable is the "Social Status" attached to working in the chemical industry. This variable is drawing on the previously mentioned psychological benefits and development value such as self-esteem and pride which are both highly interlinked with one's social status and tries to explore the general negative stereotype attached to the chemical industry. The remaining three variables are more specific to the chemical industry and its location and were mainly driven by the interviews we conducted rather the prior research. Thereafter, we identified one key variable being the perceived difficulties surrounding "Commuting and mobility". Considering the long distances separating the industry from the desired target employees, this factor was mentioned throughout the interviews as one of the key determinants of the Port of Rotterdam's labour shortage and has therefore expected to have a negative effect on the dependent variable. The sixth variable is the perceived "Sustainability", referring to people's perception of the industry's environmental contributions and the effects this perception has on their willingness to work in the chemical industry. Lastly, the model includes "Image of the industry" as the seventh variable, exploring to what extend the general perception of the industry affects people's willingness to work there, suggesting that relationship to be positive.

The variables that were previously described are depicted in a causal relationship scheme, which can be below in Figure 1. In the next section, a detailed explanation of the expected relationships described in this scheme will be provided.

2.1.2. Commuting and Mobility

Considering the long travel distances between the Port of Rotterdam, where the chemical industry is located, and the city centre, commuting and mobility becomes a core issue for all potential employees in the port. Numerous interviewees raised concerns of the lacking mobility infrastructure and the barrier this posed to attracting the city's talent pool. According to one interviewee, the long commute does not only cause a perceived physical distance but also a mental distance between the city and the port.

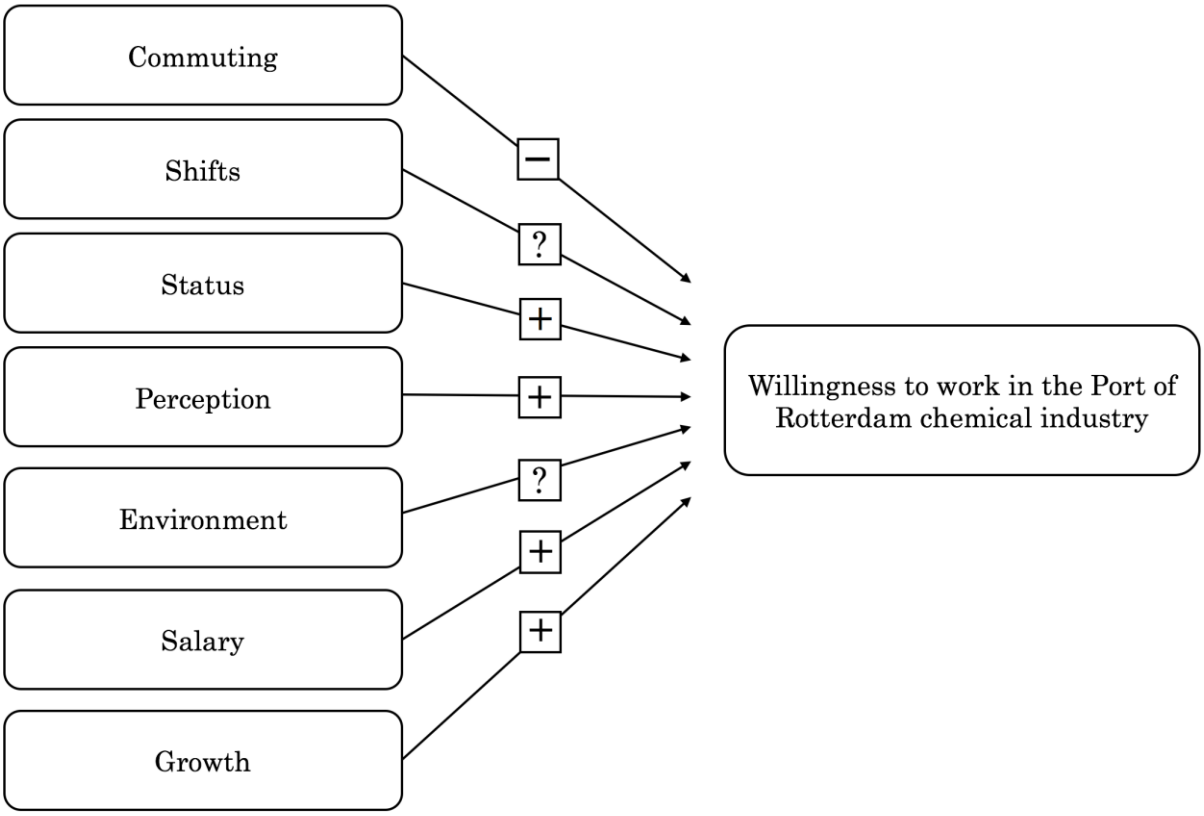

Figure 2: Causal Relationship scheme for "Willingness to work in the chemical industry in the Port of Rotterdam."

Numerous studies have explored the effects of commuting on workers' health, happiness and lifestyle. Olsson et al. (2012) for instance, found that workers' satisfaction with their urban-work commute contributes positively to workers' overall happiness. Others, such as Novaco and Gonzalez (2009) have highlighted the dangers of "Commuting Stress" in terms of physical and mental health. Consequently, Talbot et al. (2016) have found that around 20% of surveyed people in the UK either have, or are considering, retiring or changing their job as a result of issues with their commute. Considering the various strains long commutes pose on workers, from health to monetary costs, it is not surprising that this factor can have a strong impact on the attractiveness of an industry. Therefore, it is expected that an increased willingness to commute will positively affect people's willingness to work in an industry that is far away:

H1: *People that have a higher willingness to commute for longer periods of time will have a higher willingness to work in the chemical industry in the Port of Rotterdam.*

2.1.3. Shifts

In this study, shifts refer to the continuously changing and erratic working hours that are present in the chemical industry in the Port of Rotterdam. These shifts are often intended to assure 24 hour services and hence require employees to work irregular, non-standard hours, including night shifts, weekend shifts and public holiday shifts. While shift work generally forms the basis of working in Rotterdam's chemical industry, it can be difficult to predict its effects on the attractiveness of the industry as an employer.

While numerous studies have been conducted, linking shift work to physical and mental health, family life, overall happiness and others, consistent results are hard to find. On the one hand, working in shifts has been partially proven to have negative impacts on for example family life and health, mainly triggered by fatigue and mental stress. On the other hand, working in shifts can have positive impacts, especially in terms of higher salaries and lower childcare requirements. However, most studies have not separated the nature of the work and the execution of the job and are therefore lacking consistent results in terms of job satisfaction or employer attractiveness (Perrucci et al., 2007). Considering the uncertainty and partial subjectivity with regards to the effect of shift work on people's perception of Rotterdam' chemical industry, the following hypothesis has been formulated:

H2*: People with a different willingness to work in shifts will have a different willingness to work in the chemical industry in the Port of Rotterdam.*

2.1.4. Status

The status attributed to working in the chemical industry has begun to evolve, but not quite at the pace the industry itself has evolved. As a number of interviewees emphasized, the status of the industry continues to be perceived as negative, largely motivated by dated stereotypes that classify the industry as an inherently dirty industry. This perception, while its weight is uncertain, has had a negative impact on the attractiveness of working in the industry.

The importance of this impact is highlighted in scientific literature. Despite being of less importance to current and potential employees than monetary factors, non-monetary factors such as social importance and status were shown to have an impact on one's willingness to work (Danchev & Sevinc, 2012). Moreover, company prestige or status within society, has been shown to be significantly correlated with the attractiveness of a company (Highhouse et al., 2003). It is therefore expected that people with a higher perceived status of a job in the chemical industry in the Port of Rotterdam, will be more willing to work in this industry:

H3: *People with a higher perceived status of a job in the chemical industry in the Port of Rotterdam will have a higher willingness to work in this industry.*

2.1.5. Public perception of the industry

The chemical industry's attractiveness is highly linked to the public image it conveys. Throughout the conducted interview research, concerns surrounding this public opinion, from newspapers to concerned parents, were frequently raised. Through the interviews, it was noted that industry

experts are convinced that public image of their industry is at risk. Interviewees raised concerns surrounding the job security and companies' licence to operate in the chemical industry. Those concerns are mainly grounded in the environmental struggles that chemical companies are faced with, and the "dirty" stereotype associated with the industry.

A research project exploring the public perception of the chemical industry in the UK for example has found that while the image of chemistry in general is positive, there is a wide distrust towards chemists and scientists, especially those working in private companies. The study further indicated that around 50% of the people surveyed felt that privately employed scientists are secretive and viewed them as 'not quite like us', hinting at different moral codes, often being driven "by a desire to discover and create without considering the consequences" (TNS BMRB, 2015, p.16). The study further showed that many younger people find the chemical industry boring and that overall, people did not feel very informed and confident about chemistry and the chemical industry (TNS BMRB, 2015). Considering the overall lack of information and the resulting stereotypes and suspicion, the study assumes that a negative public perception of the chemical industry in the Port of Rotterdam will most likely have a negative effect on an individual's willingness to engage with the chemical industry. This, alternatively, leads to the formulation of the final hypothesis of this study:

H4: *People with a better personal public perception of the chemical industry in the Port of Rotterdam will have a higher willingness to work in this industry.*

2.1.6. Sustainability

The issue of sustainability in the chemical industry, especially among the potential working population, is contentious. From the interviews conducted, there was a general sense that those who would consider working in the chemical industry as an attractive option would have little concern for sustainability. However, academic literature on CSR and sustainability suggests otherwise. Over the past 25 years, this literature has been pointing to the fact that a proactive stance on the environment would result in a company being perceived as more attractive (Bauer & Aiman-Smith, 1996). Not only would this heighten workers' intention to pursue employment at such a company and accept a potential offer, it would also be "good business" for the company itself (Duarte, Gomes, & Neves, 2014). This is because in cases where there are high levels of job choice, such as for those trained in widely applicable technical fields, it provides an additional incentive to take a position (Duarte, Gomes, & Neves, 2014).

Another important consideration is the age of the majority of the new workforce. Recent graduates from technical programs will likely have been born after 1982, placing them within the generation Y or Millennial population. Individuals born within this generation have been shown to be more sensitive to CSR related issues (Klimkiewicz & Oltra, 2017). In a study of jobseekers in Poland, non-compliance with basic CSR, such as environmental measures, was shown to deter the increasingly sensitive Millennial job force (Klimkiewicz & Oltra, 2017).

Due to the conflict between the insights from the interviews and the established literature, sensitivity to matters of sustainability will be examined in order to understand its impact on the perception of working in the Port of Rotterdam's chemical industry. The uncertainty surrounding this concept contributes to the formulation of the following hypothesis:

H5: *People that attribute different levels of personal importance to the environment will have a different willingness to work in the chemical industry in the Port of Rotterdam.*

2.1.7. Salary

Willingness to work in an industry is also affected, and largely determined, by salary (Nomura et al., 2018). Not only have monetary effects been found to be the most important factor in willingness to work considerations (Danchev & Sevinc, 2012), financial rewards are also essential in ensuring worker retention as well as job satisfaction (Nomura et al., 2018).

Salary has also been shown to consistently influence the attractiveness of an employer. The interviewees highlighted that they believed the excellent compensation and benefits associated with employment in the chemical industry had a strong effect on the attractiveness of working in the industry. This belief aligns with the literature, as the economic value of a position was shown to be significantly correlated to the attractiveness of an employer (Berthon et al., 2005).

However, the impact of salary is particularly interesting when one considers the demographics of the future workforce. When examining employer attractiveness from a multi-generational perspective, Reis and Braga (2016) found that as the survey group increased in age, their prioritization of the economic value of a position became less important. This suggests that new entrants to the workforce of the chemical industry will likely place more emphasis on salary than previous generations This leads to the formulation of the following hypothesis:

H6: *People that attribute more personal importance to salaries will have a higher willingness to work in the chemical industry in the Port of Rotterdam.*

2.1.8. Growth Opportunities

For the purpose of this study, growth opportunities are defined as the frequency with which internal promotions and job training opportunities are available within a company. The impact of growth opportunities on employer attractiveness is quite closely tied to that of salary. A number of interviewees expressed that the positive influence that growth opportunities could have on the attractiveness of working in the chemical industry has been overlooked because people are unaware of the opportunities and the salary increases they offer. The assumption that such growth opportunities would have a positive influence on employer attractiveness is backed up by prior research.

In developing and confirming the validity of their scale on employer attractiveness, it was found that there is a significant correlation between the development value of an employer - which itself encompasses growth opportunities - and the attractiveness of an employer. (Berthon et al., 2005). The importance of growth opportunities is reinforced when considering employer attractiveness for a generational perspective. Reis and Braga (2016) found that for generation Y and Millennials certain characteristics of the workforce are more pronounced - one of which is the wish for fast career development. The younger generation, when ranking important attributes, also placed development value after economic value, making it second of importance after matters such as salary (Reis & Braga, 2016). This leads to the formulation of the following hypothesis:

H7: *People that attribute more personal importance to growth opportunities will have a higher willingness to work in the chemical industry in the Port of Rotterdam.*

2.2. Section Summary

- The Netherlands has had qualitative skill shortages, mainly in jobs requiring manufacturing, construction, mechanical, and electrical engineering skills.
- Previous studies have measured employer attractiveness through an employee's willingness to work in a position or industry. These methods will be applied to measure the willingness to work in the (petro-)chemical industry, in order gain a more exhaustive understanding of the perception of the industry.
- The research will examine the impact of seven variables on one's willingness to work in the chemical industry; salary, growth opportunities, shifts, social status, commuting and mobility, sustainability, and image of the industry.

3. Methodology & Data collection

The qualitative and quantitative research methods (the interviews and the survey) that we applied to address the research question are tried and tested scientific methods. Both interviews and surveys were used to gain insights into the perception of working in the (petro-)chemical industry of the Rotterdam port.

Following the six interviews conducted with industry experts, a survey was created and distributed to target groups in order to statistically test the relationship between the variables of the model. The target groups include: (1) *people that are actively looking for a job in Rotterdam*, and (2) *students in various essential studies for working in the Port of Rotterdam*. We used a survey because it is an effective way to quantitatively measure the opinions and intentions of a target group (Theodori & Jackson-Smith, 2010; Berinsky, 2017). The questionnaire will be designed based on the principles that Baxter and Babbie (2004) mention in their book: clarity of questions and an easy to follow flow, having relevant questions, and pretest the survey. The survey further investigated the relevance of the themes that have arisen from the interviews in order to identify which of the hypotheses explain the attractiveness of working for the chemical industry. Most survey questions were based on statically proven questionnaires measuring the attractiveness of an organisation, such as those conducted by Highhouse et al. (2003), who used to measure pre-existing organisational or sectoral attractiveness, and the Royal Chemistry Society (RSC, 2015), who used to measure the public perception of the chemistry sector in the UK. The formulated survey questions were then pre-tested with the "Think Out Loud" protocol formulated by Jääskeläinen (2010) as well as a pre-test with enough participants to research.

Figure 3: Sequence of Research Methodology

3.1. Conducted Interviews

Interviews allow researchers to gain qualitative insights into a person's opinion and feelings towards a certain issue. Researchers conduct interviews with experts on a particular topic in order to gain new insights or to corroborate previous knowledge (Dillman, 2012; Kvale, 2009). Therefore, we conducted interviews with six industry and recruitment experts in the preliminary part of the data gathering process in order to build an understanding of their expectations and observations about the general perception of working in the chemical industry. The different

interviewees were either contacted directly by the research team or were contacted through the Deltalinqs network.

Interviewee	Interest/Description
Cees Alderliesten, Policy Advisor at **Deltalinqs**	• Aims to promote Port of Rotterdam, foster cooperation between companies and vocational education. • Interest in increasing industry employment.
Warner Rosenboom, Advisor at **GoFlex**	• Specializes in MBO education with apprenticeships. • Focus on technical education with work-placement.
Tineke de Wit, HR and Coaching Advisor at **Prodex**	• Technical education and growth opportunities. • Looking for companies to invest in people.
Hans Wentink, Afdelingsdirecteur Algemene Operationele Techniek MBO at **STC**	• Focus on preparing students for technical industry employment.
Two **Rotterdam Labour Policy Advisors**	• Concern with the unattractiveness of working in the Port of Rotterdam • Looking to find ways to make industry more 'sexy'

Figure 4: Interviewees

A script for a semi-structured interview was formulated (appendix A), in order to ensure that all relevant themes were covered, while allowing the interviewees to provide insights into potentially relevant, additional topics (Edwards & Holland, 2013). The interviews all lasted between 45 to 60 minutes. The themes covered in the interviews include: (1) *compensation and benefits*, (2) *growth opportunities*, (3) *mobility*, (4) *health and safety*, (5) *status*, such as social acceptability of the sector (6) and *environmental impact*.

The specific themes were chosen based on extensive group discussions, including the project initiators from Deltalinqs as well as a research article by Highhouse et al. (2003) about measuring attraction to organisations. This research provides an adequate framework for investigating the proposed research question about measuring the attractiveness of the (petro-)chemical industry of Rotterdam as an employer. The results of these interviews will be elaborated on in section 4.1.

The data collected from the interviews was then used to develop a causal relationship scheme displaying the hypothesised relationship between the dependent and explanatory variables. The dependent variable is the willingness to work in the Rotterdam Chemical Industry. As explained in the previous chapter we expect the dependent variable to be influenced by 7 independent variables, namely: (1) *commuting and mobility*, (2) *growth opportunities*, (3) *shifts*, (4) *salary*, (5) *positive social status*, (6) *sustainability*, and (7) *image of the industry*.

3.3. Survey construction and pretest

As mentioned in the beginning of this chapter the survey was built on the interviews conducted with industry experts. The survey therefore focused on the following 7 themes: (1) *commuting*,

(2) *shifts*, (3) *status*, (4) *perception*, (5) *the environment (sustainability)*, (6) *salary*, and (7) *growth opportunities*. For almost all variables the measurement scales were found in prior research. The scales and survey can be found in Appendix A.

For the few scales we produced ourselves, we performed pre-tests to ensure that the results of the survey would be reliable by academic standards. We pre-tested the questioner with the "think-aloud" method (Jääskeläinen, 2010), and thereafter, we distributed it to a limited sample of 25 respondents in order to test the reliability of the multi-scale items.

The "think-aloud" protocol consists of asking participants to think aloud while doing a specific task: in this case answering our questionnaire. This method allows researchers to observe the cognitive process of participants and to gather immediate feedback. In our case, the think-aloud method helped us ensure that the context of the survey was clear and that there was no ambiguity in the questions. Thus, we asked ten Dutch speaking relatives of ages 19 - 66 to complete the questionnaire and to state what came to their mind when answering each question. Thanks to the think-aloud protocol, we were able to refine some questions of the survey and ensure that the context was clear even to a person unfamiliar with the context of this research.

Thereafter, the survey was distributed to a limited sample of 25 respondents in order to test the internal consistency of the multi-scale items. In doing so, we adopted a measure of consistency that is widely used in academic research: the Cronbach Alpha. This statistical test returns a number between 0 and 1, where 1 indicates high reliability and 0 indicates no reliability at all.

By academic standards, a scale is considered reliable enough when the Cronbach Alpha is greater than 0.7. The results of our analysis on the sample responses indicate that for most scales except for two (commuting and shifts), the Cronbach Alphas are reliable.

For the scale "commuting" we observed a moderately high alpha ($\alpha = .54$), while for the scale "shifts" we observed a slightly higher Alpha ($\alpha = .64$). Being these results both less than the accepted threshold of 0.7, they needed some adjustment. To improve the reliability, we could either drop or rephrase those questions that were displayed with a low correlation to the other questions of the scale. Dropping an item would have increased the Alpha of the scale "commuting" to $\alpha = .61$ and that of the scale "shifts" to $\alpha = .73$. We decided to drop an item from the scale measuring "shifts", as this brought the level of reliability over the desired threshold of 0.7. Whereas for the scale "commuting", we decided to rephrase the questions with weak internal consistency, as the strategy of dropping an item would not have brought the Alpha above the desired threshold.

Therefore, we rephrased the third question of the scale "commuting" from the negative form "I do not mind daily commutes of 45 minutes or longer" to the positive form "I mind daily commutes of 45 minutes or longer". The fourth question was rephrased from "I would be more willing to commute longer distances if the company were to establish a direct bus line from my area to the workplace" into "I would be willing to travel longer distances with a direct public transport line to work". In this case, we removed the word "more" in order to reduce the ambiguity of the sentence. We also added two questions ex-novo; namely, "If I get sufficient pay I would be willing to buy my own car to commute longer distances to work", and "If travel time to my job is longer that 45 minutes I would want to receive compensation from my employer". Our motivation to add

these questions was to better isolate the effect of travel compensation on respondents' willingness to travel longer distances.

3.4. Final version of the survey

To test the hypotheses indicated in the causal relationship scheme (see Figure 1), a survey was conducted on Qualtrics and distributed primarily to MBO students at the STC (see Appendix A). The survey consisted of two parts. In the first part, participants were asked to rate ten series of statements on a seven-point Likert scale (1 = Strongly Disagree, 7 = Strongly Agree). In the second part respondents were asked to provide personal information on several control variables. A detailed description of all the variables and items in the survey can be found in Appendix A.

To test the effect of people's willingness to commute for longer periods of time, this study defines a long commute as any commute lasting more than 45 minutes, no matter the transportation mode. This length was chosen because, for a person based in the city of Rotterdam, most workplaces within the city are reachable within 20 to 30 minutes. Therefore, any commute longer that 45 minutes would be considerably longer than the average. Additionally, most chemical companies in the port are reachable within 45 to 75 minutes from the city centre.

Respondents' willingness to commute to reach their job was measured using a seven-item scale that we created based on the work of Berthon et at. (2005). The variable was shown to be moderately reliable (α =.61) after two items were dropped (items 2 and 8). The items were deemed suitable for the current study as they seem to adequately measure how willing a person is to commute to reach the workplace. Respondents that scored higher on this scale were considered to be more willing to commute longer to reach the workplace.

Respondents' willingness to work in shifts was measured using a two-item scale that we created based on a survey conducted by the Society of Workforce Planning Professionals in 2018 and was shown to be reliable (α =.80), after one item was removed from the scale. The items were considered suitable for the current study as they provide a sufficient measure of people's willingness to work in shifts. Respondents that scored higher on this scale were considered to be more willing to work in shifts than respondents who scored lower on this scale.

The status that respondents attach to a job at the chemical industry of the Port of Rotterdam was measured using a five-item scale that we constructed ourselves and was indicated to be highly reliable (α =.86), after one item (item 6) was dropped from the scale. To measure the status attached to working in the chemical industry, we relied on the work of Highhouse et al. (2003). Respondents that scored higher on this scale were considered to attach a high status to a job at the chemical industry, while respondents that scored low were considered to attach a low status to a job at the chemical industry.

Respondents' perception of the chemical industry of the Port of Rotterdam was measured using a four-item scale that we constructed ourselves and was indicated to be highly reliable (α =.76). No item was dropped from the scale. We designed the variable to measure the perception that people have of the chemical industry of the Port of Rotterdam. To do so, we relied on the research

report published in 2015 by the Royal Society of Chemistry about the public perception of the chemical industry in the United Kingdom.

The importance that respondents attribute to the environment was measured using a four-item scale that we constructed ourselves and was indicated to be highly reliable ($\alpha = .88$). No item was dropped from the scale. We designed the scale based on the work of Klimkiewicz et al. (2017). A high score on the scale indicates that environment is highly important for the respondent, while a low score on the scale means that the environment is of little importance to the respondent.

The importance that respondents attribute to a high salary was measured using a three-item scale that we constructed based on the work of Berthon et at. (2005). The reliability of the scale was considered to be good ($\alpha = .79$) and could not be improved by removing an item from the scale. A high score on the scale indicates that a high salary is important for the respondent, while a low score on the scale means that a high salary is of little importance to the respondent.

The scale "growth opportunities" measured how much importance a respondent attaches to growth opportunities such as promotions within the organisation. This was measured with a three-item scale designed based on the work of Berthon et al. (2005). The variable was shown to be moderately reliable ($\alpha = .68$) and could not be improved by dropping an item. A high score on the scale indicates that growth opportunities within the organisation are highly important for the respondent, while a low score on the scale means that the respondent attaches little importance to growth opportunities within the organization.

The willingness to work at the chemical industry of the Port of Rotterdam was measured using a six-item scale that we designed ourselves and was indicated to be highly reliable ($\alpha = .93$). To measure a respondent's willingness to work at the chemical industry, we decided to include statements that directly assessed whether people would consider a job in the industry to be interesting. For example, respondents were asked to rate statements such as "I would accept a job offer at the chemical industry" and "I would be interested in a job at the chemical industry only as a last resort". Respondents that scored higher on this scale were considered to be more willing to take a job at the chemical industry, while respondents that scored low were considered to be less willing to do so.

3.4.1. Control Variables

Lastly, to control for various variables that may influence the assumed hypotheses, the respondents were asked to answer questions regarding their, age, employment status, gender, education level, city of residence, and whether or not they had access to a car.

The gender variable was measured along two options (1 = Male, 2 = Female). Age and income were both measured along selected groups as opposed to explicit numbers. Based on previous research it was assumed that people will be more likely to disclose this information when not having to state the exact number (Moore, Stinson, and Welniak 2000). Age was measured along six options (1 = Under 18, 2 = 18-25, 3 = 25-30, 4 = 30-35, 5 =35-45, 6 = 45-54, 7 = 54-65). Employment status was measured along six options (1 = Unemployed and not seeking a job, 2 = Unemployed and seeking a job, 3 = Employed, 4 = MBO student, 5 = HBO student, 6 = Other). Employment status was measured along five options (1 = Unemployed and not seeking a job, 2 = Unemployed and seeking a job, 3 = Employed, 4 = MBO student, 5 = HBO student, 6 = Other). Education level was measured along eight options (1 = high school, 2 = MBO 1, 3 = MBO 2, 4 = MBO 3, 5 = MBO 4, 6 = HBO, 7 = WO, 8 = Other). City of resident level was measured along eleven options, the first ten options were the major neighbourhood of the city of Rotterdam, whereas the last option was a blank cell that allowed the respondent to insert a location other than Rotterdam.

The respondents for the survey were acquired thanks to contacts at the STC group in Rotterdam. A total of 290 respondents took the survey. After removing incomplete responses, a sample of 219 responses was obtained. Of the total respondents, 72% were male (n= 163) and 28% were female (n= 56). With regards to the age of the respondents, 19% were younger than 18 (n=43), 73% were of age between 18 and 24 (n=161), 6% were of age between 25 and 34 (n=14) and only one respondent was older than 34. Of the total respondents, 37% had access to a car (n=81) and 63% did not have access to a car (n=138). With regards to the level of education of the respondents, 54% of the total (n=119) were studying an MBO 1, 2% (n=3), were studying an MBO 2, 21% (n=47) were studying an MBO 3, and none were studying an MBO 4. Moreover, 5% of the respondents (n=12) were studying at an HBO, and 6% (n=14) were studying at a WO. 12% of they were studying something other than the choices above. Concerning the residence of the respondents, 26% of

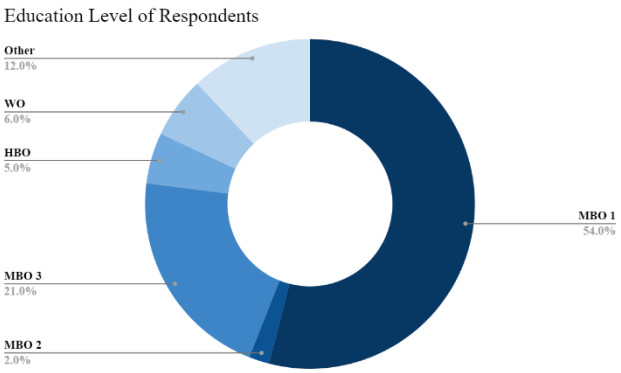

Figure 6: Education Level of Respondents

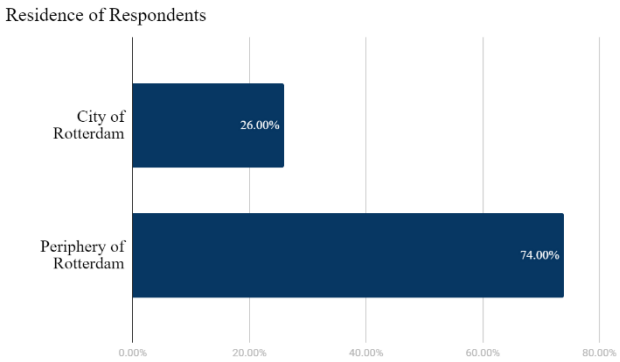

Figure 5: Residence of Respondents

the total respondents live in the City of Rotterdam, while 74% (n=162) live in the peripheries of the city.

3.5. Section Summary

- Semi-structured interviews were conducted with industry experts, covering six themes; compensation and benefits, growth opportunities, mobility, health and safety, status (such as social acceptability of the sector) and environmental impact.
- Following the interviews, a survey was developed and pre-tested. After adjusting the scales to ensure reliability, the survey was distributed primarily to MBO students at STC via Qualtrics. A total of 219 complete surveys were recorded.

4. Analysis

4.1. Interview Results

After introducing themselves and their professional relationship with the Rotterdam chemical industry, the interviewees were asked to provide what they believed was the general perception of working in the Rotterdam chemical industry. Providing a score between 1 and 5, with 1 being very negative and 5 very positive, the average score the interviewees attributed to the industry was 2.4. This suggests that there is a neutral, but slightly negative perception of working in the industry. However, it should be noted that this number was positively skewed by a high score (4) provided by a director working at the STC, as his answer was motivated by the high satisfaction rate of students at the college who were already aware of the industry. There was a general sentiment among the five other interviewees that highlighted two main reasons for the negative evaluation of working in the Rotterdam chemical industry. First, they believed that people were either unaware or misinformed on what it means to work in the industry, causing them to have a more negative or neutral perception. As one interviewee explained, "the industry is unknown and therefore unloved". The second sentiment, also rooted in misinformation, was that working in the industry is still perceived as a 'dirty job'. This stereotype is perpetuating misinformation, as multiple interviewees explained that the jobs are quite technical and increasingly automated. Once this general sentiment was established, we asked the interviewees if they believed we were missing any themes, and to rank the importance of the themes we provided.

Figure 7: Themes Discussed with Interviewees

When asked about missing themes, half of the interviewees did not believe there was anything to add, while the other half all mentioned the company culture or work environment. They suggested that it was a rough environment, dominated by men. However, because the goal of this project is to determine how to improve the attractiveness of the entire industry for everyone, not just for women, we decided not to pursue this line of inquiry. The other themes were ranked, and a clear trend emerged. Compensation and benefits, growth opportunities, and mobility were consistently ranked the highest, while safety, status, and especially the environment were ranked the lowest. When asked about the possible effect of culture, age, and proximity to the city center on this ranking, the two main changes were that younger people and people living in or close to the city center were more concerned about mobility and compensation, while those from non-western cultures found the associated status of working in the industry as a more important feature. Once the interviewees'

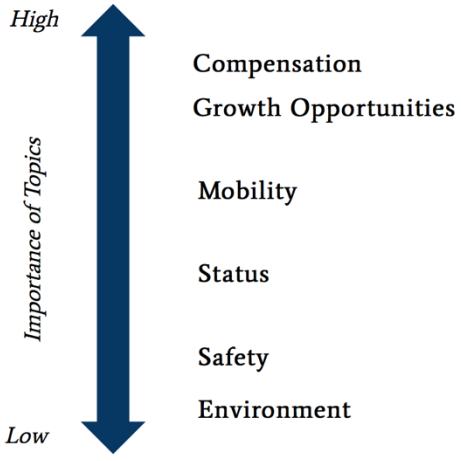

Figure 8: Importance of Topics

general understanding of the themes was established, probing questions were asked on the specific themes to determine why they believed some were more important than others.

> *There's a big group of people that don't know what [the chemical industry] is and then there is a big group of people that think it is a dirty work, it's dangerous, it's not a sexy kind of industry.*
>
> - Tineke de Wit, Prodex -

Lack of mobility was determined to have a negative impact on chemical industry job attractiveness. This impact is particularly important to potential workers from the inner city of Rotterdam, as well as for students who may not yet have the means to buy a car once they have graduated. The distance between the inner city of Rotterdam and the jobs in the port is very salient. The interviewees explained that the main mobility obstacle was simply having access to a car. This obstacle, and the issue of mobility more generally, could be mitigated by providing employees with a company car or other forms of travel reimbursement. As an advisor at GoFlex, a technical education organization, explained, companies that provide cars attract the best talent.

> *When they don't arrange the transport, people won't come*
>
> - Warner Rosenboom, GoFlex -

Within the theme of *compensation and benefits*, the interviews led to three key findings. First, the interviewees unanimously agreed that the excellent compensation and benefits provided by the chemical industry have a very positive influence on its job attractiveness. However, the second finding was that this positive influence is minimized by the fact that the general public is often unaware of how good these compensation and benefits actually are. Finally, it was determined that within compensation and benefits, salary was the greatest factor that influences job attractiveness within the chemical industry.

All interviewees expressed similar opinions concerning *growth opportunities* within the chemical industry. They believed the growth opportunities in the industry had the potential to positively influence job attractiveness. Once again, however, this potential positive influence has not been realized because many people are unaware that such growth opportunities exist unless they are already acquainted with the industry. Furthermore, many prospective employees do not adequately consider the positive impact of additional education on growth opportunities. The interviewees emphasized that a higher salary, rather than personal development, was what made growth opportunities most attractive. But because these prospective employees neglect the impact of additional education, many forgo growth opportunities that would raise their salary.

> *They know that if they want to have growth opportunities at a company they have to study and a lot of people say that when they are 20 that they are done, that they know enough. [So, growth opportunities are only accessible] for the few 20-30% that want to invest, that want to work, that want to go into higher education.*
>
> - Warner Rosenboom, GoFlex -

The impact of *status* on the attractiveness of working in the chemical industry was considered to be negative. This negative perception is largely motivated by the existing stereotype that working

in the chemical industry is inherently dirty, and that the jobs are rough and hands on. The status of working in the industry, unlike the other themes, is very heavily influenced by public perception. Three interviewees noted that the status attributed to working in the industry had more of an impact for individuals from non-western households. Many immigrant parents who worked in the industry or formed their opinions when these jobs were still considered 'dirty' and low status actively try to prevent and discourage their children from working in this industry.

> *I think that [for many people from migrant backgrounds] job status is important. It is that kind of industry that their parents and grandparents have come to Holland to work for and so they still relate it to that kind of job [...] whereas they think they should be moving on.*
>
> - Cees Alderliesten, Deltalinqs -

The responses to *health and safety* questions were split among the interviewees. Four of the interviewees believed that health and safety factors have little influence on the attractiveness of working in the chemical industry. However, this opinion was derived largely from the fact that they were evaluating these factors from the point of view of people who are being trained for those jobs. The two other interviewees answered the question more generally, saying that people still consider jobs in the chemical industry to be dirty, and therefore believe they may have a negative impact on one's health (i.e. lung cancer). One of these interviewees, who works in chemical industry training and recruitment, noted that the chemical industry is not a transparent one. This lack of transparency may explain why people are unaware of the safety measures in place within the industry, thus perpetuating the belief that the industry remains a dirty one.

Environmental impact was unanimously agreed to have little impact on the attractiveness of working in the chemical industry, as people are more interested in making a decent living. Because education for jobs in the chemical industry begins at a young age, if individuals are already considering working in the industry, it not likely that the industry's environmental impact will have influenced the attractiveness of the possible jobs. Although it was mentioned that this may change in the future as younger people are increasingly concerned about the environment.

Finally, we asked the interviewees how informed they believed people were on the actual aspects of working in the chemical industry. Providing a score between 1 and 5, with 1 being very uninformed and 5 very informed, the average result was 1.25. They unanimously agreed that not only is there a general lack of information available due to minimal industry transparency, but the information that is available in the news and on social media is frequently framed negatively, heavily biased, or not factual. Despite the positive aspects associated with working in the Rotterdam chemical industry, such as salary, these persistent stereotypes contribute the idea that jobs within the industry are simply 'unsexy'.

> *Technical jobs are not sexy and not attractive and for many years I understood that because most technical jobs were heavy and physical, but they are not anymore.*
>
> - Tineke De Wit, Prodex –

01	Overall view of the Port of Rotterdam chemical industry	I think that the big problem, and it has nothing to do with your education, is that a lot of people don't know what is happening there [...] I think if the industry wants more people, they have to be more open. Tineke de Wit, Prodex I think in the Netherlands people are a little bit afraid of the harbour, because they think the Harbour is dangerous, it's dirty work etc. Warner Rosenboom, GoFlex
02	Mobility	Mobility is the main issue when it comes to people living inside the city versus living outside, [...] the chance that you find someone for whom it is a problem getting to the harbour is bigger [for people living inside the city]. Especially because you can find a job in the city center that you can reach by public transport. Cees Alderliesten, Deltalinqs
03	Compensation and Benefits	There are people that call me and say, "yes I want to be an operator" and I say why, what's your motivation? "Yeah, I heard you can gain a lot of money" Tineke de Wit, Prodex
04	Growth Opportunities	There are a lot of big companies that see that they have to invest in their employees, not only in education but also in 'what are my workers thinking and what do they need' [...] and I think that people who come to Prodex know this, most of the time people we deliver to our clients are ambitious people [...] and they know that there are opportunities in the industry. Tineke de Wit, Prodex
05	Status	Yes [people are influenced by the general perception of working in the port] because no matter how strong we all want that everybody loves our job. Tineke de Wit, Prodex
06	Health and Safety	[I believe the general perception of health and safety in the industry is] negative. Because if there is a gas explosion, you can put your helmet on, but the helmet will fly 200 feet away, the dangers are too big, the risks are too high. [The most prominent fear is] the fear of death or to get cancer. If you dig deep enough you can find information of health risks in relation to living in Rotterdam. Warner Rosenboom, GoFlex
07	Environmental Impact	[Environmental implications] don't make the industry more or less attractive as people are generally more interested in making a good living and are willing to serve the ones who pay them. (translated from Dutch) Rotterdam Labour Policy Advisor

Table 1: Supporting Interview Quotes

4.1.2. Interview section Summary

- There were a number of key findings from the interviews:
  - General perception of the industry is neutral/slightly negative;
  - People are unaware or misinformed on working industry, believe it to be a dirty job;
  - Compensation and growth were thought to be most important, and safety and environment were thought to be least important;
  - Lack of transparency and negative media coverage negatively affect the view of the industry.
- Thematic relationships established from interviews:
  - Lack of mobility would have negative impact on job attractiveness;
  - Higher salary would positively influence job attractiveness;
  - Growth opportunities had potential to influence job attractiveness;
  - Negative status of working in industry would negatively impact job attractiveness;
  - Health and safety would have little impact on job attractiveness, except for the industry association with being dirty;
  - Environmental impact of the industry would have little impact on job attractiveness.

4.2. Survey Results

To determine whether the different variables described in the data and methods section have their expected effects on people's willingness to work in the chemical industry in the Port of Rotterdam, the Pearson's correlation coefficients between these different variables were determined. The descriptive statistics for the variables included in the analysis are presented below in Table 2.

Table 2: Descriptive Summary Statistics

Statistic	N	Mean	St. Dev.	min	Pct1(25)	Pct1(75)	Max
Age	219	1.877	0.514	1	2	2	4
Employment Status	219	3.918	0.398	1	4	4	5
Gender	219	0.712	0.454	0	0	1	1
Car	219	0.370	0.484	0	0	1	1
Education	219	2.626	2.132	1	1	3	7
Residence	219	0.260	0.440	0	0	1	1
Commuting[a]	219	5.092	0.837	2	4.714	5.714	6.714
Shift[a]	219	3.959	1.461	1	3	5	7
Status[a]	219	4.340	1.159	1	3.6	5.2	7
Perception[a]	219	4.501	1.126	1	3.9	5.2	7
Environment[a]	219	4.715	1.294	1	4	5.8	7
Salary[a]	219	5.578	0.889	3	5	6	7
Growth[a]	219	5.776	0.783	3.333	5.333	6.333	7
Willingness[a]	219	4.062	1.505	1	3	4.9	7

[a] *Likert-scale with 7 answer categories: 1 = strongly disagree,...,7 = strongly agree*

Table 2: Descriptive Summary Statistics

The first relationship that was expected, a positive relationship between people's willingness to commute and willingness to work in the chemical industry of the Port of Rotterdam, was not found. The dependency was not significant at a 5% level (r = -.017, p > .05), and therefore does not support **H1**. These results make is seem that respondents who are more willing to commute are not more willing to work in the chemical industry of the Port of Rotterdam.

The second relationship that was expected, between people's willingness to work in shifts and their willingness to work in the chemical industry, was not found in the analysis. This dependency was not significant at a 5% level (r = -.075, p > .05), indicating that there is no support for **H2**. It seems that respondents who have a weaker or stronger willingness to work in shifts are not less or more willing to work in the Port of Rotterdam's chemical industry.
The third relationship that was expected, a positive relationship between people's perceived status of a job in the chemical industry and their willingness to in this industry, was found in the analysis. This dependency was both strong and significant at a 5% level (r = .76, p < .05), indicating that there is support for **H3**. It appears that people who perceive a job in the chemical industry as one that will provide them with high status, will be more willing to work in this industry.

The fourth relationship that was expected, a positive relationship between people's positive perception of the chemical industry in the Port of Rotterdam and their willingness to in this industry, was also found in the analysis. This dependency was both moderately strong and significant at a 5% level (r = .40, p < .05), indicating that there is support for **H4**. It seems that

people who have a more positive perception of the chemical industry in the Port of Rotterdam are more willing to work in this industry.

The fifth relationship that was expected, between people's personal importance attributed to the environment and their willingness to work in the chemical industry, was not found in the analysis. This dependency was not significant at a 5% level (r = -.21, $p > .05$), indicating that there is no support for **H5**. It appears that respondents who find the environment more or less important do not have a lower or higher willingness to work in the Port of Rotterdam's chemical industry.

The sixth relationship that was expected, a positive relationship between people's personal importance attributed to salaries and their willingness to work in the chemical industry, was not found in the analysis. This dependency was not significant at a 5% level (r = .016, $p > .05$), indicating that there is no support for **H6**. It appears that respondents who find salaries more important do not have a higher willingness to work in the Port of Rotterdam's chemical industry.

The final relationship that was expected, a positive relationship between people's personal importance attributed to growth opportunities and willingness to work in the chemical industry of the Port of Rotterdam, was also not found. The dependency was not significant at a 5% level (r = -.045, $p > .05$), meaning that there is no support for **H7**. It appears that respondents who find growth opportunities more important do not have a higher willingness to work in the Port of Rotterdam's chemical industry.

4.2.1. Formulation of two regression models

Two regression models were formulated, that can both be found below. The first model contains only the control variables measured in the survey (“Age”, “Employment Status”, “Gender”, "Car", "Education" and "Residence"). The second model contains these six control variables as well as the seven independent variables measured in the survey (“Commuting”, “Shift”, “Status”, "Perception", "Environment", "Salary" and "Growth") that were expected to have a direct effect on the dependent variable ("Willingness")

$$\text{Model 1: Willingness} = \alpha + \beta_1 * Age + \beta_2 * EmploymentStatus + \beta_3 * Gender + \beta_4 * Car + \beta_5 * Education + \beta_6 * Residence + \epsilon_1, \epsilon_1 \ (0, \sigma)$$

$$\text{Model 2: Willingness} = \alpha + \beta_1 * Age + \beta_2 * EmploymentStatus + \beta_3 * Gender + \beta_4 * Car + \beta_5 * Education + \beta_6 * Residence + \beta_7 * Commuting + \beta_8 * Shift + \beta_9 * Status + \beta_10 * Perception + \beta_11 * Environment + \beta_12 * Salary + \beta_13 * Growth + \epsilon_2, \epsilon_2 \ (0, \sigma)$$

4.2.2. Estimation of two regression models

Based on the table below, the significant effects on the dependent variable ("Willingness") will be discussed. In the first model, three of the control variables have a significant effect on the dependent variable. Specifically, (1) Men are more willing to work in the chemical industry; (2) People with access to a car are more willing to work in the chemical industry; and (3) People with lower levels of education are more willing to work in the chemical industry. The effects of "Gender" and "Car" were both strong, while the effect of "Education" was relatively small. The

other control variables ("Age", "Employment Status" and "Residence") had no explanatory power for the variance of the dependent variable.

Table 3: Regression Results

	Dependent variable:	
	Willingness	
	(1)	(2)
Constant	2.612*	-0.017
	(1.011)	(0.930)
Age	-0.162	0.021
	(0.205)	(0.140)
Employment Status	0.276	0.246
	(0.230)	(0.154)
Gender	0.848**	0.322*
	(0.217)	(0.153)
Car	0.901**	0.495*
	(0.201)	(0.138)
Education	-0.116*	-0.007
	(0.051)	(0.035)
Residence	0.142	-0.015
	(0.210)	(0.143)
Commuting		0.150
		(0.084)
Shift		-0.87
		(0.045)
Status		0.877**
		(0.063)
Perception		0.126*
		(0.061)
Environment		-0.127*
		(0.049)
Salary		-0.076
		(0.084)
Growth		-0.186*
		(0.091)
Observations	219	219
R^2	0.236	0.673
Adjusted R^2	0.214	0.653
Residual Std. Error	1.334 (df = 212)	0.887 (df = 205)
F Statistic	10.892** (df = 6; 212)	32.509** (df = 13; 205)
Note:	*p<0.05; **p<0.01	

Table 3: Regression Results

In the second model, only the controls variables “Gender” and "Car" still have a significant effect on people's willingness to work in the chemical industry, implying that (1) Men are more willing to work in the chemical industry; and (2) People with access to a car are more willing to work in the chemical industry. Of the remaining independent variables, four were found to significantly affect the dependent variable. These effects include, (1) People who perceive to gain more status from working in the chemical industry are more willing to work in this industry; (2) People who have a more positive perception of the chemical industry in the Port of Rotterdam are more willing to work in this industry; (3) People attribute less importance to the environment are more willing to work in the chemical industry; and (4) People who attribute less importance to growth

opportunities are more willing to work in the chemical industry. The other independent variable ("Salary") had no explanatory power for the variance of the dependent variable.

4.2.3. Partial contribution of the two regression models

The overall predictive performance of the two regression models can be assessed using their respective values for R^2, which indicates what percentage of variation in the dependent variable can be attributed to the independent variables. Because the value of R^2 is expressed as a percentage, its value always lies between 0 and 1. The closer this value is to 1, the stronger the explanatory power of the independent variables is. For model 1, the R^2 is 0.236, indicating that the control variables alone can predict 23.6% of the variance in "Willingness", indicating that the model has a moderate explanatory power. The second model has significantly higher value of R^2, which is 0.673. This model can thus explain 67.3% of the variance in the dependent variable, indicating that the model has high explanatory power.

Table 4: Logistic Regression Results

	Dependent variable:	
	Willingness	
	(1)	(2)
Constant	-1.557	-9.518**
	(1.646)	(3.151)
Age	-0.296	-0.041
	(0.329)	(0.468)
Employment Status	0.289	0.507
	(0.376)	(0.475)
Gender	1.005**	0.591
	(0.355)	(0.482)
Car	0.973**	0.652
	(0.323)	(0.453)
Education	-0.106	0.063
	(0.084)	(0.126)
Residence	0.346	0.298
	(0.340)	(0.450)
Commuting		0.284
		(0.276)
Shift		-0.180
		(0.163)
Status		2.163**
		(0.333)
Perception		0.282
		(0.218)
Environment		-0.199
		(0.183)
Salary		0.071
		(0.271)
Growth		-0.757*
		(0.299)
Observations	219	219
Cox & Snell R^2	0.127	0.466
Nagelkerke R^2	0.169	0.622
Akaike Inf. Crit.	287.648	193.943
Note:	*p<0.05; **p<0.01	

Table 4: Logistic Regression Results

Both models' F-Statistics indicate whether the models as a whole significantly predict the dependent variable. According to their F-Statistics, 10.892 and 32.509 respectively, both of the models' predictions of the dependent variable are significant at $p < .01$.

A logistic regression analysis of the two models was also executed, of which the results can be found in table 4. In logistic regression the dependent variable ("Willingness") is expressed as a binary variable based on the variable's median. This means that "Willingness" will assume a value of 1 when the willingness to work in the chemical industry in the Port of Rotterdam is higher than the median, and a value of 0 otherwise.

The explanatory power of the models in logistic regression can be assessed by their R^2 equivalents, namely Cox & Snell R^2 and Nagelkerke R^2. These equivalents allow the explanatory power of the logistic regression models to be compared with the regression models in table 3. For model 1 in the logistic regression, both R^2 equivalents are lower than 0.236 (0.127 and 0.169 respectively), indicating that the control variables alone can predict less than the 23.6% of the variance in "Willingness" that model 1 was able to predict in table 3. Similarly, the logistic regression of model 2 shows that both R^2 equivalents are lower than 0.673 (0.466 and 0.622 respectively), also showing that the logistic regression of model 2 has a lower explanatory power than model 2 could predict in table 3. These results indicate that the predictive performance of the logistic regression in table 4 is lower than the predictive performance of the regression in table 3. The results from the logistic regression are therefore not used for further analyses and interpretations in this study.

4.2.4. Multicollinearity

Finally, it is important to test whether there is multicollinearity present in the model. High multicollinearity is an indicator that certain independent variables predict the outcomes of other independent variables, which means that isolating their effect on the dependent variable ("Willingness") becomes problematic. To conclude whether multicollinearity was an issue for the

Table 5: Tolerance test for Model 2 - 1

Age	Employment Status	Gender	Car	Education	Residence
0.697	0.956	0.745	0.807	0.643	0.908

Table 6: Tolerance test for Model 2 - 2

Commuting	Shift	Status	Perception	Environment	Salary	Growth
0.737	0.834	0.674	0.763	0.884	0.644	0.707

Table 5 & 6: Tolerance Tests

independent variables, a tolerance test was executed. In tolerance tests, a tolerance close to 1 indicates that the variable has little similarities with the other variables, and that no multicollinearity is present. A tolerance below 0.2 means that the independent variable has significant similarities with other independent variables, and multicollinearity is an issue. The tolerance test for model 2, the best performing model, can be found in tables X and X. Examining the results from this test, it can be concluded that model 2 does not have issues of multicollinearity.

4.2.5. Survey Section Summary

- Hypothesis Results
  - **H1** is not supported, meaning respondents who are more willing to commute are not more willing to work in the chemical industry of the Port of Rotterdam.
  - **H2** is not supported, meaning respondents who have a weaker or stronger willingness to work in shifts are not less or more willing to work in the Port of Rotterdam's chemical industry.
  - **H3** is supported, meaning that people who perceive a job in the chemical industry as one that will provide them with high status, will be more willing to work in this industry.
  - **H4** is supported, meaning that those with a positive perception of the chemical industry will be more willing to work in the industry.
  - **H5** was not supported, meaning that respondents who find the environment more or less important do not have a lower or higher willingness to work in the chemical industry.
  - **H6** was not supported, meaning that respondents who find a job's salary more important do not have a higher willingness to work in the chemical industry.
  - **H7** was not supported, meaning that respondents who find growth opportunities more important do not have a higher willingness to work in the chemical industry.

- Regression Results
  - Model 1 (control variables):
    - Men are more willing to work in the industry;
    - People with access to a car are more willing to work in the industry;
    - People with lower education levels are more willing to work in the industry.
  - Model 2 (control and independent variables):
    - Men are more willing to work in the chemical industry;
    - People with access to a car are more willing to work in the chemical industry;
    - People who perceive to gain more status from working in the chemical industry are more willing to work in this industry;
    - People who have a more positive perception of the chemical industry in the Port of Rotterdam are more willing to work in this industry;
    - People who attribute less importance to the environment are more willing to work in the chemical industry;
    - People who attribute less importance to growth opportunities are more willing to work in the chemical industry.

5. Discussion

5.1. Discussion

The goal of the conducted research in this study was to determine how people perceive working in the chemical industry in the Port of Rotterdam, and to utilize this information to attract more workers to the chemical industry. Out of seven hypotheses regarding people's willingness to work in the chemical industry, the analyzed data has supported two predictions. Firstly, people who perceive jobs in the chemical industry to be higher in status are more willing to work in this industry. Secondly, people who have a more positive perception of the chemical industry are also more willing to work in this industry. These two results are the main findings of the conducted research. Both results suggest that the attractiveness of the chemical industry is largely shaped by psychological processes with a strong social component (Danchev & Sevinc, 2012; Highhouse et al., 2003). Moreover, these two variables were found to significantly correlate with each other ($r = .40$, $p < .05$). This implies that people's perceived status of a job in the chemical industry will increase as people's positive perception of this industry increases, and/or vice versa. Consequently, if public perception of the chemical industry would improve, and people would perceive jobs in this industry to grant them higher social status, the chemical industry could attract more potential employees.

In conjunction with the support for the hypotheses, regression analysis showed that the dependent variables in the survey were able to predict 67% of the variance in people's willingness to work in the chemical industry. Several variables, including status and public perception can significantly explain and predict this variance. The effects that these other variables have, and their implications for the attractiveness of the chemical industry, will be described below.

Results indicated that men are more willing to work in the chemical industry than women. This finding was corroborated by the interview results, in which interviewees admitted the chemical industry is dominated by men. This includes the fact that significantly more men are enrolled in education programs that prepare them for a job in the chemical industry than women. The results would therefore suggest to primarily focus on attracting men when attracting more workers to the chemical industry in the Port of Rotterdam.

Regression analysis also showed that people who have access to their own car are more willing to work in the chemical industry. This result is striking, as people's willingness to commute for longer periods of time did not significantly contribute to the explanatory power of the model. It appears that people who are willing to work in the chemical industry are less concerned with the length of their commute, than they are with their ability to travel in their own car. According to this result, an effort to attract more potential employees to the chemical industry in the Port of Rotterdam should include offering potential employees better access to their own car. Furthermore, academic research has long shown that having access to your own car is perceived as a status symbol (Steg, 2005). By offering potential employees better access to owning a car, the chemical industry could attract more potential employees to the industry by improving the perceived status of a job in the industry.

Of the dependent variables, results indicated that people who attribute less importance to the environment are more willing to work in the chemical industry. This finding is in line with results from the conducted interviews. Several interviewees suggested that people who are considering working in the chemical industry are much more concerned with making a decent living. Additionally, the decision for an education that prepares you for a job in the chemical industry is made at a relatively young age. This decision is affected more by other factors (e.g. status of the industry) than the environmental impact of the industry. Hence, the results suggest that the industry should not include any environmental aspects of the industry in their attempt to attract more workers to the industry.

Finally, results showed that people who attribute less importance to growth opportunities are also more willing to work in the chemical industry. While the results contradict the expectations that some interviewees had, several of them indicated that people who work in the chemical industry largely view growth opportunities as merely a path to a higher salary. Despite their positive views towards the prospects of a higher salary, these people generally do not pursue the extra education that is required to qualify for a better job. People are therefore thought to be more concerned with obtaining a higher base salary when looking for a job. This is a possible explanation for the effect that was found in the analysis. Consequently, the results indicate that the chemical industry's effort to attract more potential employees should not include any aspects that highlight the growth opportunities that the industry has to offer.

5.2. Section Summary

- The two significant variables that were found to impact one's willingness to work in the industry – status associated with the industry and perception of the industry – are also correlated with each other. This suggests that one's perceived status of a job in the chemical industry will increase as people's positive perception of this industry increases, and/or vice versa. Consequently, if public perception of the chemical industry would improve, and people would perceive jobs in this industry to grant them higher social status, the chemical industry could attract more potential employees.
- As men are more likely to be enrolled in applicable academic programs, efforts to attract new employees to the chemical industry should focus on men.
- Results and research indicate that offering potential employees their own car may attract more employees, as well as increase the status of working in the industry.
- Environmental impact, and growth opportunities need not be a focal point when attracting potential employees.

6. Conclusion

6.1. Answer to research question

This research worked to answer the following research question:

What is the perception of working in the Port of Rotterdam's chemical industry and how is this perception driven? How can this industry attract more employees?

As has been shown in the discussion of this research, some enlightening insights have been found. The interviews showed that the perception of working in the Rotterdam Port would most likely be influenced by seven factors. However, the survey distributed to potential employees in the sector concluded that only 2 of these factors were significant.

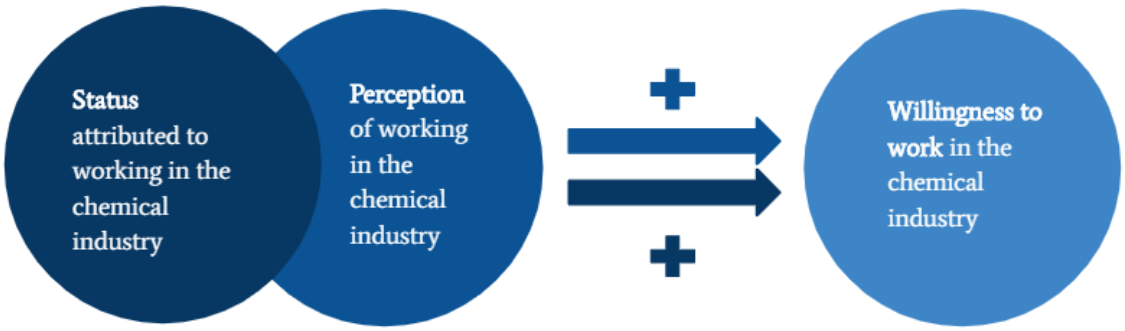

Figure 9: Significant Factors on Willingness to Work

The perception of the (petro-)chemical industry was shown to have a positive influence on one's willingness to work in the industry. This means that if people have a positive perception of the industry, they are more likely to be willing to work in the industry. One's willingness to work in the chemical industry was also shown to be driven by the social status that individual attributes to working in the industry. The perceived status of the industry is largely motivated by dated stereotypes that classify the industry as an inherently dirty one and therefore negatively influence the willingness to work in the sector. The negative public image of the industry was also shown to heavily effect the attractiveness of working in the industry.

Surprisingly the fact that the harbour is more difficult to reach than a job in the city centre of Rotterdam (thought to be the main negatively influencing factor) was found not to have a significant influence on one's decision to work in the industry, despite many interviews suggesting that this would be an important aspect. However, having a car, or getting a car from the company is important to jobseekers.

The industry can improve the attractiveness of work by improving the status one receives when working in the (petro-)chemical industry in the Port of Rotterdam, as well as the image the general public has on the industry. The best way to attract more employees is by highlighting the real stories of employees from the industry. These stories should be based on profiles of potential employees for the sector. Each profile should have a unique reason and/or positive aspect of

working in the (petro-)chemical industry. By targeting jobseekers with a fit to a certain profile Deltalinqs can increase the chance that these potential employees will be drawn to the industry because they are targeted based on their own personal interests and values.

6.2. Limitations

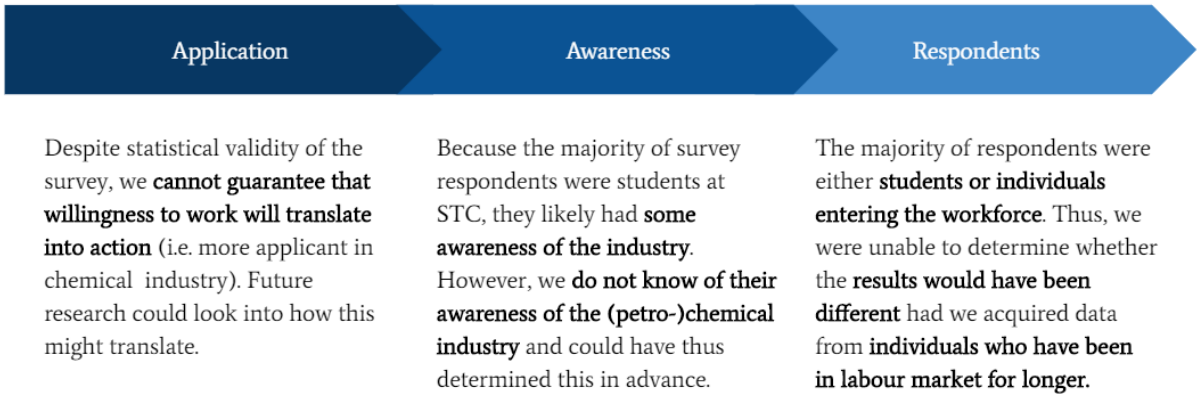

Figure 10: Main Limitations

While the study presented in this research was able to find several significant predictors of people's willingness to work in the chemical industry, the study is not without limitations. Firstly, it is difficult to determine whether an increase in people's willingness to work in the chemical industry will actually lead to more applicants in the industry. However, according to the theory of reasoned action, indicating that human behaviour is based on a rational sequence of cognitions or intentions, this relationship is plausible (Fishbein & Ajzen, 1975).

Perhaps more importantly, it is also unclear how aware the participants of the conducted survey were of the different aspects of working in the chemical industry. Many survey participants were students at STC Waalhaven, who have at least a slight indication of what happens in the Port of Rotterdam. However, many of these students are not aware of what the (petro-)chemical sector looks like and how working in this sector in particular is. It would therefore be good to find out what their knowledge on working in the chemical industry is and how this influences their willingness to work in this sector.

This study decided to focus on acquiring data from students and people soon entering the labour market. This decision was made due to our difficulty accessing people that have been in the labour market for a longer period of time, who have either already been working for a few years, or are currently searching for a new job. It is possible that this group of people would have provided different answers to the conducted survey, causing the study to yield different results. It could therefore be worthwhile to redistribute the survey among these people who have been a part of the labour market for a longer period of time.

7. General Recommendations

In order to provide Deltalinqs with actionable recommendations on how to attract more potential employees to the chemical industry, the results found in this study need to be aggregated into a single plan of action. This plan of action will largely be built around the main findings of the study, namely, that both the perceived status of a job in the chemical industry and public perception of the chemical industry significantly affect people's willingness to work in this industry. According to the research in this study, 68% of people perceive the status of a job in the chemical industry, as well as the chemical industry in general, to be between slightly negative and slightly positive. This indicates that people do not have strong opinions of the chemical industry, and that there is significant room to improve their perception. It is possible that these relatively neutral scores are a result of their lacking (access to) knowledge of the chemical industry. This study argues that both these issues can be addressed by designing an advertising campaign that aims to actively recruit more potential employees for the chemical industry in the Port of Rotterdam.

Previously conducted academic research has shown that advertising campaigns can successfully convey messages of status and shape public perception (Belk & Pollay, 1985). Moreover, large corporations in the petrochemical industry have long been using advertising campaigns to significantly shape public perception of their brands and products (Smith, Smith & Dunbar, 2014). It is therefore posited that the chemical industry could use advertising campaigns as a tool to both increase the perceived status of jobs in chemical industry as well as positively influence the perception of this industry in general.

According to the other findings in this study, the messages conveyed in such an advertising campaign should meet certain specific requirements to not have any adverse effects or unnecessary inefficiencies. These requirements include: (1) *The advertising campaign should be primarily targeted at a male audience*. This requirement is based on the fact that men are both more willing to work in the chemical industry and are more likely to qualify for jobs in this industry. (2) *The advertising campaign would benefit from highlighting how a job in the chemical industry increases people's access to owning a car*. This expected benefit is based on the finding that people who have access to a car are significantly more willing to work in the chemical industry in the Port of Rotterdam. As an additional benefit, providing potential employees with good access to owning a car will inadvertently increase the perceived status of a job in the chemical industry, as owning a car is generally considered to be a symbol of status (Steg, 2005). It must be noted that companies in the chemical industry have to actually provide potential employees with sufficient access to owning a car - either through the leasing of a company car or a high salary that allows them to purchase their own car - as a prerequisite to implementing this component in the campaign. If companies do not currently meet this prerequisite, irrespective of the advertising campaign, companies in the chemical industry would be advised to implement and emphasize measures that allow potential employees good access to owning a car to improve the attractiveness of their current vacancies. (3) *The advertising campaign should not include any components referring to the environmental impact of the chemical industry*. People who were found to attribute less importance to the environment were more willing to work in the chemical industry in the Port of Rotterdam. This implies that an effort to highlight the positive environmental impact of the chemical industry would have an adverse effect on the attractiveness of the industry to potential employees. (4) *The advertising campaign should not include any*

components referring to the presence of growth opportunities in the chemical industry. This requirement is rooted in the finding that people who attribute less importance to growth opportunities are more willing to work in the chemical industry. The implication of this finding is that highlighting the growth opportunities in the chemical industry in an advertising campaign could have adverse effects on attracting more potential employees to the industry.

7.1. Designing a Campaign

7.1.1. Example: recruitment at EY

Based on the requirements mentioned above, this study will present a suggestion for the design of a possible advertising campaign that would attract more potential employees to the chemical industry in the Port of Rotterdam. This suggestion is largely based on a previously conducted recruitment campaign by professional services firm EY in 2016 (Pratt, 2017).

According to Caroline McAniff, head of recruitment at EY, the firm's recruitment numbers had suffered from the perception among graduate students that the firm was an old, conservative, and hierarchical institution. McAniff herself had the same expectations before joining EY and knew firsthand that this perception was not representative of the actual makeup of the firm. After extensive research McAniff concluded that - when looking for a job - people are interested in getting a genuine impression of what it means to work at a certain firm, not a corporate sales pitch. Therefore, to more accurately represent EY to the graduate students that the firm sought after in their recruitment campaign, McAniff gathered compelling stories from recently graduated EY employees that highlighted what working at EY meant to them. In collaboration with a creative agency, nine stories that were believed to resonate with potential graduates were selected for the campaign. These nine employees all had distinct and personal motivations for joining EY, and different reasons for enjoying their work at the firm.

EY then completed a full write-up of all nine stories, and created short, 30-second videos for each of them. These stories and their accompanying video were highlighted on a newly created graduate careers webpage on EY's website. Realizing their target audience has a strong presence on social media platforms - primarily Facebook and Instagram - EY choose to extensively advertise on social media. Through sponsored videos and images of the nine stories on Facebook and Instagram, EY was able to reach the audience they were hoping to recruit.

The result of the campaign was significant. From 2016 to 2017 EY experienced an increase in their total number of graduate applications of 119%. Their graduate careers webpage had been visited 157,000 times, while their social advertising had resulted in over 250,000 views.

7.1.2. A campaign for the chemical industry

The chemical industry in the Port of Rotterdam could benefit from conducting a campaign similar to the campaign described above. This would require companies in the chemical industry to research and collect compelling stories from several recent hires in the industry, and to create several distinct employee profiles out of them. These profiles could be tailored to all the different roles that employees fill as workers in the chemical industry or focus specifically on roles that currently account for most of the vacancies in the industry. When creating these stories and

profiles, it is important to ensure they explicitly convey a positive message regarding the status of a job in the chemical industry, as well as a positive perception of the industry.

The campaign should also make sure to meet all the additional requirements described in the Discussion section of this study, including: (1) *The advertising campaign should be primarily targeted at a male audience*; (2) *The advertising campaign would benefit from highlighting how a job in the chemical industry increases people's access to owning a car*, (3) *The advertising campaign should not include any components referring to the environmental impact of the chemical industry*; and (4) *The advertising campaign should not include any components referring to the presence of growth opportunities in the chemical industry*.

A full write-up and short video could be created for all the profiles, that could be highlighted on a newly-created, industry-wide recruitment webpage for vacancies in the chemical industry. The created content for these stories can be successfully distributed to the chemical industry's target audience through social media and physical advertising in relevant schools and other institutions. This campaign can serve as a way for Deltalinqs and its partners to engage their current employees in the recruitment efforts. By highlighting stories of actual employees in the Port of Rotterdam, and allowing them to participate in recruitment efforts, the campaign would instill a sense of pride in working within the chemical industry. Through word of mouth, this status change has the potential to reach far wider than simple advertisements. Employees will feel as though their voices are being heard, and that through co-creation their contribution extends beyond their designated roles within the organisation (Ramaswamy & Gouillart, 2010). If the stories and the created content that make up the campaign are consistent with the recommendations made in this study, the campaign is expected to have a positive contribution towards the attraction of more potential employees to the chemical industry in the Port of Rotterdam.

7.2. Plan of Action for Deltalinqs

Based on the recommendations above, a short plan of action for Deltalinqs is proposed below. By following the suggested steps Deltalinqs will be able to create a campaign in the same style as the EY campaign (Figure 12 and 13), and therefore improve the image of the chemical industry and people's willingness to work in the (petro-)chemical industry.

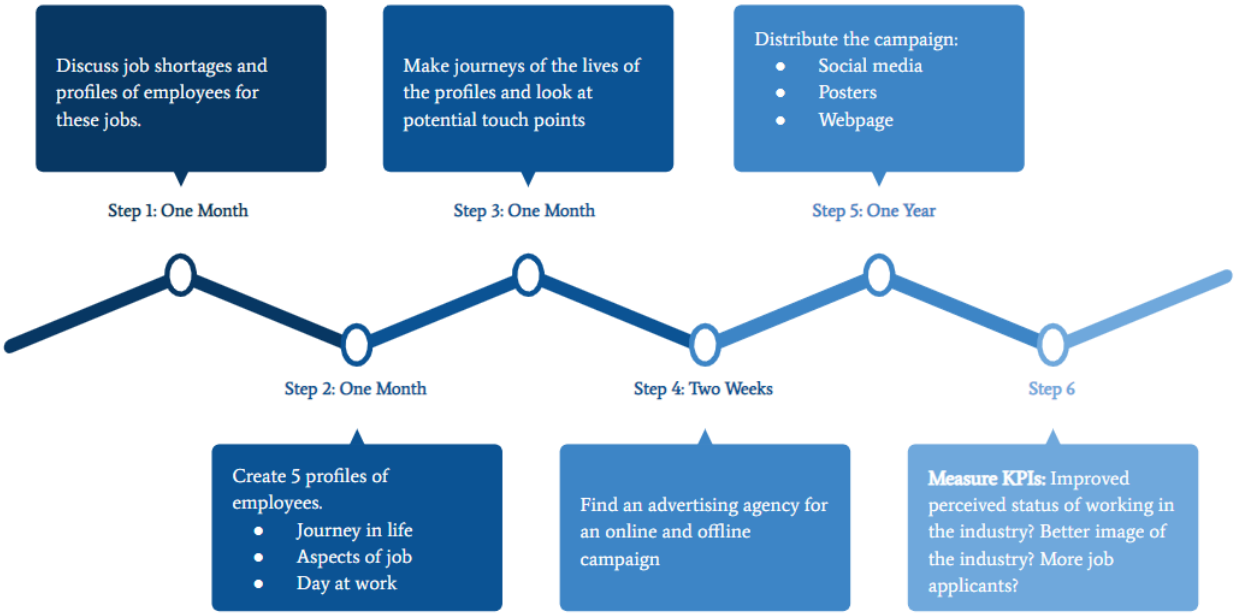

Figure 11: Action Plan Sequence

1. Deltalinqs should hold meetings with its (most important) members and discuss the following questions:
    a. What are the specific jobs that need to be filled at this moment?
    b. For which jobs are shortages expected in the future?
    c. What type of people fill these jobs currently? Also, what type of people would ideally fill these jobs?
2. Out of the answers of these questions at least 5 profiles of typical employees for the (petro-) chemical sector should arise. These profiles need to be determined by Deltalinqs together with its members. These profiles are a concrete tool for systematic investigation of a target audience that fits the preferred employee of the companies (Kaplan, 2016).
    a. Profiles should highlight the following aspects: the journey the employee has had in life. What the aspects are of his job he (preferably) likes. What does a day at work look like? And finally, some demographic information as age, education and residency.
3. These profiles all fit certain journeys in which these potential employees also live. The tool mentioned in the Kaplan article is an easy to use tool for Deltalinqs to make these profiles and their adherent journeys (Kaplan, 2016). With these journeys and their potential touch points with the industry, Deltalinqs can work to make a campaign.
4. When Deltalinqs has created the profiles and journeys of the potential employees they should find an advertising agency that can help them set up an online and offline campaign

to reach as many people that fit the determined profiles. Do not forget to mention the following to the advertising agency, and ensure that it is incorporated in the campaign:

   a. The main goals of the campaign are to:
      i. Increase the perceived status of a job in the chemical industry
      ii. Positively influence the perception of the chemical industry
   b. The target audience of the campaign is primarily male
   c. The campaign should highlight how a job in the chemical industry increases people's access to owning a car
   d. No environmental impact related statements should be incorporated in the campaign
   e. The campaign should not highlight growth opportunities in the chemical industry.
5. The campaign should be distributed in the following ways and locations:
   a. The campaign should have a strong online presence, including on:
      i. Facebook
      ii. Instagram
      iii. A dedicated webpage for promoting the chemical industry as an employer
   b. The campaign should selectively choose for physical, poster advertising, focusing on locations where many potential employees can be found. These include:
      i. Certain educational institutions (e.g. STC)
      ii. Employment agencies
6. The advertising agency should roll out the campaign and measure the following KPI's:
   a. Has the perceived status of a job in the chemical industry improved?
   b. Has the image of the chemical industry improved?
   c. Did more people apply for jobs in the chemical industry in the Port of Rotterdam?

7.3 Resources for plan of action

The above mentioned plan of action will require some resources per step which are outline below.

1. The input from Deltalinqs' members is most important in the first step of the action plan. This is because it needs to be clearly determined which jobs need to be filled in the future, and this cannot be worked without Deltalinqs involving its members.
2. The members are also the most important resource for the second step in which Deltalinqs needs to (together with them) make the profiles of the people in relevant positions. This should be tailored to attract people in positions that are understaffed.
3. Deltalinqs themselves can identify touch points of the potential employees, as they have provided this to us over the length of this research process. However, the help of an advertising agency that has the proper tools to make a touch point timeline will be helpful in visualising this timeline. An advertising agency will also assist in ensuring that all possible touch points and relevant customer segments will be addressed.
4. The advertising agency will need to develop the campaign, feedback should be given by the members of Deltalinqs.
5. The network of Deltalinqs should be leveraged to increase the promotion cycle the advertising agency will prepare. The network can increase the reach of the promotion especially among jobseekers and students.
6. The final step in the action plan needs to be delivered by the advertising agency in measuring their KPI's. The members can also deliver information here through their application rates and fulfilled vacancies.

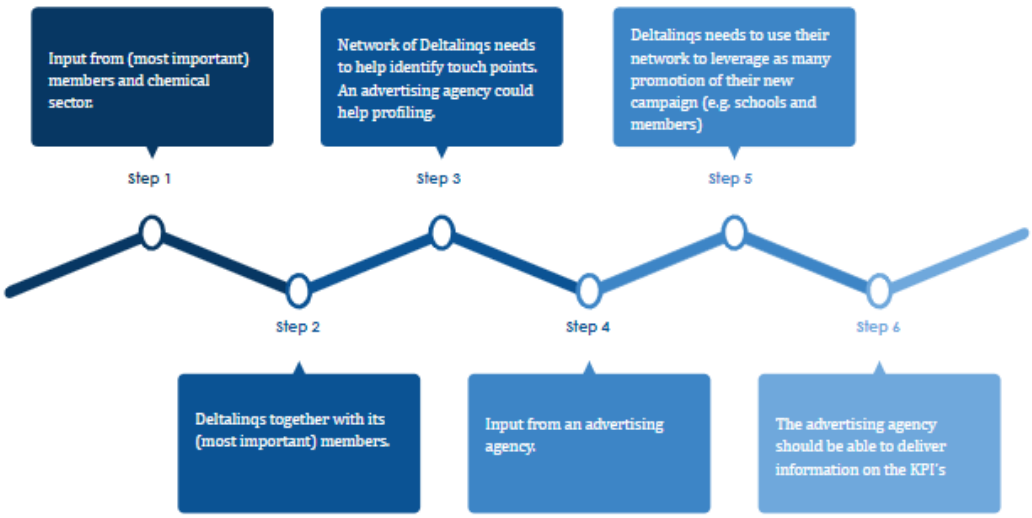

Figure 12: Resources (non-monetary) for action plan

7.4. Section Summary

- People do not have strong opinions of the industry, and there is significant room for improvement. This can be addressed in an advertising campaign that aims to actively recruit potential employees to the chemical industry in the Port of Rotterdam.
- Based on the research results, there are a number of requirements the campaign should meet by: targeting a male audience, emphasizing access to owning a car, omitting references to environmental impact, and shifting focus away from growth opportunities.
- EY's recruitment campaign can serve as a model, demonstrating the impact of highlighting the stories of people that work within the industry.
- Deltalinqs can conduct a similar campaign, by profiling employees in different roles within the industry as way to convey a positive image of the industry and the people within in.
- Actively involving employees in the recruitment efforts has the potential to positively impact the status employees (and those around them) attribute to working in the chemical industry.
- A plan of action has been proposed, where the steps of such a campaign have been laid out.

7.5. Examples of the stories of employees

Figure 13: Source EY Campaign

Timi Graduate Story

Timi is a confirmed 'people person'. He likes people. And people certainly like him. His CV reads a little like a Robert Ludlow novel. Very long, and incredibly exciting.

Timi is (deep breath) an award-winning blogger, photographer, social media consultant, artist, curator, EY consultant and father. There's an office rumour that says he's actually a Time Lord from Doctor Who, because we simply don't know where he gets the time to do so much.

However maybe it's best we allow Timi to tell you himself.

"I am Timi, a 29 year old graduate of DIT. My passions include a wide range of activities from photography to technology trends and the blogging world. After living in Ireland for the last 14 years, I've come to love the atmosphere and the culture of everyday life; the atmosphere and culture of the country but more specifically Dublin. The city has fed my passions and ultimately brought me to where I am now... EY."

Figure 14: Source EY Campaign

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Appendices

Appendix A – overview of variables measured

Overview of all variables

Variables and descriptions	
	Commuting [a]
Comm01	*Bij het zoeken naar een baan houd ik rekening met de reistijd naar het werk.*
Comm02	*Ik ben bereid langer te reizen voor een betere/leukere baan.*
Comm03	*Ik heb liever geen langere reistijd dan 45 minuten.*
Comm04	*Als het te ver is om met de fiets of het OV naar mijn week te gaan dan is het belangrijk dat mijn werkgever transport voor mij regelt.*
Comm05	*Ik zou langere afstanden willen afleggen naar mijn werk als er pendelbussen worden geregeld door mijn werkgever.*
Comm06	*Ik zou langere afstanden willen afleggen naar mijn werk als ik een auto van de zaak krijg.*
Comm07	*Ik zou langere afstanden willen afleggen met een directe OV verbinding.*
Comm08	*Als ik genoeg verdien om mijn eigen auto te kopen zouk langere afstanden willen afleggen naar mijn werk.*
Comm09	*Als de reistijd naar mijn werk langer dan 45 minuten is dan wil ik hiervoor compensatie van mijn werkgever ontvangen.*
	Shift[a]
Shift01	*Ik ben bereid elke dag verschillende shifts te werken.*
Shift02	*Ik vind het belangrijk dat iedere werkdag mijn rooster hetzelfde is.*
Shift03	*Ik vind het belangrijk dat iedere werkweek mijn rooster hetzelfde is.*
	Status[a]
Status01	*Als medewerker zou ik trots zijn om te zeggen dat ik bij een bedrijf in de chemische industrie werk.*
Status02	*De chemische industrie is in het algemeen een bekende sector om in te werken.*
Status03	*De chemische industrie heeft een reputatie als een uitstekende werkgever.*
Status04	*Ik zou de chemische industrie een industrie met veel aanzien vinden om in te werken.*
Status05	*Er zijn veel mensen die in de chemische industrie willen werken.*
Status06	*Ik wil dat mijn baan nuttig/belangrijk is.*

	Perception[a]
Perception01	*Maakt de levensomstandigheden slechter of beter.*
Perception02	*Is niet of wel te vertrouwen.*
Perception03	*Is niet of wel spannend.*
Perception04	*Is niet of wel interessant.*
	Environment[a]
Environment01	*Het is belangrijk voor mij om te werken bij een bedrijf met een positieve impact op het milieu (e.g. weinig CO2 uitstoot).*
Environment02	*De negatieve milieu-impact van een bedrijf verandert mijn bereidheid om bij dat bedrijf te werken.*
Environment03	*Ik waardeer de bezorgdheid van een bedrijf voor hun impact op het milieu.*
Environment04	*Ik beschouw mezelf als een milieubewust persoon.*
	Salary[a]
Salary01	*[Hoe belangrijk vind je] Een bovengemiddeld salaris.*
Salary02	*[Hoe belangrijk vind je] Een aantrekkelijk compensatiepakket (e.g. auto van de zaak).*
Salary03	*[Hoe belangrijk vind je] Aantrekkelijke secundaire arbeidsvoorwaarden (e.g. betaald ouderschapsverlof).*
	Growth[a]
Growth01	*[Hoe belangrijk vind je] Goede doorgroeimogelijkheden binnen de organisatie.*
Growth02	*[Hoe belangrijk vind je] Een springplank naar een betere baan bij een andere organisatie.*
Growth03	*[Hoe belangrijk vind je] Een focus op persoonlijke ontwikkeling (niet werk-gerelateerde capaciteiten) binnen de organisatie.*
	Willingness[a]
Willingness01	*Ik ben niet geïnteresseerd in een baan in de chemische industrie, alleen als laatste redmiddel.*
Willingness02	*De chemische industrie zou voor mij aantrekkelijk zijn om in te werken.*
Willingness03	*Ik zou graag meer te weten komen over werken in de chemische industrie.*
Willingness04	*Ik accepteer een baan aanbieding in de chemische industrie.*
Willingness05	*De chemische industrie zou tot één van mijn eerste keuzes als werkgever behoren.*
Willingness06	*Ik zou veel moeite doen om in de chemische industrie te kunnen werken.*
	Control Variables
Age	*Wat is je leeftijd?* (1 = Onder 18, 2 = 18-24, 3 = 25-34, 4 = 35-44, 5 = 45-54, 6 = 55-64, 7 = 65-74, 8 = 75-84, 9 = 85 of ouder)
Employment Status	*Welke van de volgende situaties beschrijft uw huidige werksituatie het beste?* (1 = Werkloos, op zoek naar werk, 2 = Werkloos, niet op zoek naar werk, 3 = Werkzaam, 4 = MBO student, 5 = HBO student)
Gender	*Wat is je geslacht?* (0 = Vrouw, 1 = Man)
Car	*Heb je een auto tot je beschikking?* (1 = Ja, 2 = Nee)
Education	*Wat is de hoogste opleiding die je hebt afgerond?* (1 = Middelbare school, 2 = MBO 1, 3 = MBO 2, 4 = MBO 3, 5 = MBO 4, 6 = HBO, 7 = WO)
Residence	*Waar woon je?* (0 = Buiten Rotterdam, namelijk... , 1 = In Rotterdam)

[a] *Likert-scale with 7 answer categories: 1 = strongly disagree,...,7 = strongly agree*

Appendix B – overview of interviews

Who	Cees Alderliesten	Warner Rosenboom	Hans Wentink	Tineke de Wit	2 labour policy advisors
First Impression Industry	Slightly negative because: pollution, CO2, incomplete info	Used to be better in the past but since harbour moved out of the city ppl are unaware	Good Impression Among his students. Most 2nd and 3rd year students get connected with the industry. Satisfaction rate is approximately 95%.	Negative perception based on idea that it is dirty and dangerous. Mobility also seen as a negative. Many don't know what it is, and there are misconceptions based on where you're from.	The industry is unknown and therefore unloved. It is important to educate people on the importance of the industry, and to give the industry a sexy image. (Get rid of the idea that the chemical industry stinks --> perhaps through a campaign similar to 'Werken bij Defensie'.
Themes ranking	Compensation Status Growth Safety	No clear ranking High: Compensation, growth opportunities & mobility	Compensation Status Growth opportunities	No clear ranking: Mobility is considered high as well as health and safety	Mobility is prerequisite Growth Safety Compensation
Important quotes	Training & improvements Large company talent pipelines Negative: Inflexibility if too specialised hindering job mobility Many opportunities such as autonomous responsibility, flexibility etc not available in industry as strong need for regulation & control. Idea of dirty, hands on, heavy labour, men's world, old fashioned, no innovation Partly driven by image industry gives of itself General announcements, social media, newspapers, directly from industry (if seeking job)	Don't know if they realise. Only few 20-30% of young ppl willing to invest into studying & advancing careers, many unwilling to continue studies while often not aware that they thereby forgo growth opportunities Migrants (here North Africans) don't want to learn tech job as they want to have more prestigious job (e.g. doctor) but they are not aware that those jobs are unrealistic for their level of education Strong shift towards automation e.g. EMO, coal overdslach became nearly completely automated changing nature of jobs upwards Generally many old ppl in tech jobs & unattractive for young people as in times of crisis, last come is first out	There are potentials for growth. On the job training is provided. Moreover, the type of job is much more high-tech than people normally think. Dutch people from the surrounding area know the industry well. People from other cultures are more reluctant to work in the industry. Industry is seen as: Dirty job, mens work. Working shifts considered heavy. Companies give travel reimbursment. Employees do not get company cars, but salary is high enough to afford a car. The biggest problem is that the job is very technical. Also the degree that is required to work in this position is quite difficult. Moreover, there are funds available to make sure that more	Mobility is still hight, but status and work culture gain importance. Younger people clash with the work culture of older people. They want more growth opportunities, and better compensation and benefits. Status is more important to those coming from immigrant backgrounds Industry is not open and people are not made aware of emphasis on safety in industry. Technical jobs are not sexy. People dont know, especially that there are many levels within a single type of position. Salary is important, but for younger people growth is key. Job attractiveness is Low, if people are considering working	Older generations think of mobility as their own problem, whereas younger generations think it more the responsibility of the company to provide them with a means of transportation. People would understand that the average person working in the chemical industry makes more money than the average chauffeur. This understanding mainly comes from the idea that people in the chemical industry work with dangerous chemicals and therefore have to be compensated for increased safety hazards. 30% of the work in the industry is maintenance work that is handled by subcontractors. If there are few ways to grow within a business (like in those subcontractor companies) it is

		Need to not only influence young ppl but also parents, teachers, mentors -> Direct & indirect	people join the industry.	there, they tend not to care. Mobility is VERY IMPORTANT. But people are very aware of this issue. Obstacle for people with less money. No capacity for women, no showers or bathrooms. Misconception that it is very hands on, when there is more automation. The group her company is part of has made ads to make industry more appealing, but dont target the cities because people tend not to be interested in working in that environment.	important that the base salary is high enough. Also: they get paid extra for working odd hours. The chemical industry does not speak to anyone. People have a general image of the port, but no specific idea of what any of the factories/companies do that are IN that port. But people do think that people who work there have had a decent education and have a decent job. People that work in the industry get the status that they protect people from dangerous chemicals while providing them with products that they desperately need. ("I keep you safe.") These workers do not have a strong sense of autonomy in keeping people safe, but it does give them that feeling. It is important to find a good match between the roughly 80,000 unemployed people in Rotterdam and the available jobs in the chemical (and other) industry. The chemical industry needs to have its own distinct image. It is important to give the people of Rotterdam the impression that they are a part of the port, and that the port belongs to them. Certain schools are trying to achieve this already from a very young age through games.