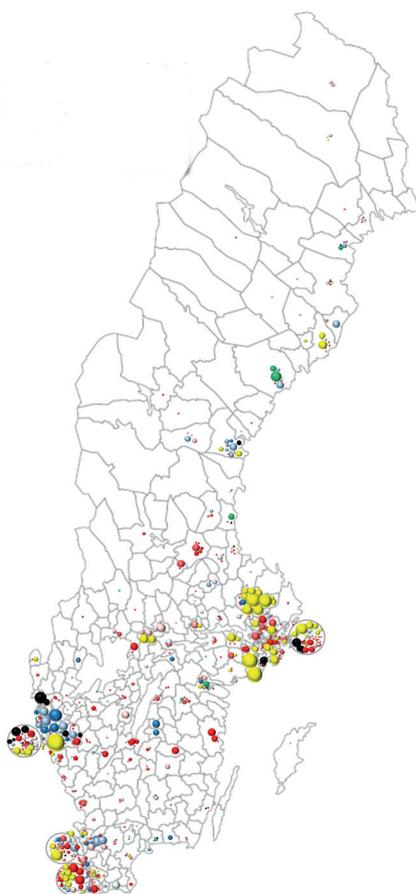


Chemical Industry Companies in Sweden

Update including data for competence analysis

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JOHANNA MOSSBERG



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Author: Johanna Mossberg - CIT Industriell Energi

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Vinnova's vision is for Sweden to be a world-leading country in research and innovation, an attractive place in which to invest and conduct business. We promote collaborations between companies, universities, research institutes and the public sector. We do this by stimulating a greater use of research, by making long-term investment in strong research and innovation milieus and by developing catalytic meeting places. Vinnova's activities also focus on strengthening international cooperation. In order to increase our impact, we are also dedicated to interacting with other research financiers and innovation-promoting organisations. Every year Vinnova invests about SEK 2.7 billion in various initiatives.

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Preface

Operations at Vinnova – the Swedish innovation agency – require a solid knowledge of the Swedish national, regional and sectorial systems for innovation in an international perspective. This includes knowledge of the stakeholders in the innovation system as well as their respective roles, global context, networks and innovation processes. The knowledge base is used in strategy processes, in dialogues with stakeholders in the innovation system, in operative activities and as a support during follow-up, evaluation and effect analyses of Vinnova activities.

The following components are part of the knowledge needed about innovation systems. These affect the ability for innovation, and therefore Swedish competitiveness:

- The economy and industrial trends
- Policies and systems
- Research, development and innovation
- The needs and challenges of society

Within its framework of strategic monitoring Vinnova has embarked on a series of analyses of trends for several branches of industry. Parameters examined include business structure, strategic areas for renewal and cooperation in research, and innovation. Ongoing or recently completed studies include: Life Science; Automotive; Chemicals; Mines and minerals; Metals; Maritime; Forest, pulp and paper; Information and communications technology; Environmental Technology and finally, Energy. The studies are conducted using the same overall methodology, but with certain adaptations to suit the specific characteristics of each branch. Vinnova intends to supplement these studies with analyses of other branches of industry as well as additional aspects of the innovation systems while taking an international context into consideration. Furthermore these studies will be updated in order to reveal trends, renewals and structural alterations. The present study analyses businesses in the chemical industry.

This work has been carried out in close co-operation with stakeholders in the innovation system, either as participants in working groups or reference groups. The design of the processes helps to ensure consensus as well as the distribution and discussion of the results within the system. The processes and their results are an important part of the Vinnova dialogue with the regions and the value Vinnova can offer back to them. The factual material is intended for use in strategic discussions by various stakeholders and stakeholder clusters. In addition to the reports, it is intended to create databases of the collected information, as well as a graphic interface for the presentation of results from the database. This, in turn, will enable the creation of presentations that can be adapted for different contexts and intentions.

The study presented in this report is an extended update of the previous report Vinnova Analysis VA 2013:01 and has been carried out by Johanna Mossberg as principal investigator with valuable support from Anders Åsblad, both of CIT Industriell Energi. The work was performed

in close cooperation with Vinnova and the Vinnova process manager involved was Göran Andersson. The steering group included representatives from IKEM – Innovation and Chemical Industries in Sweden, Chalmers University of Technology, Det Västsvenska Kemi- och Materialklustret and Vinnova. The study was funded jointly by IKEM – Innovation and Chemical Industries in Sweden, Chalmers University of Technology and Vinnova.

Vinnova in May 2016

Inger Gustavsson
Head of Policy & Systems Development Department
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Sammanfattning

Denna rapport ger en översikt över kemiindustrin i Sverige så som den såg ut år 2014 med viss tillbakablick för åren 2007-2014. Rapporten belyser några viktiga karaktärsdrag och diskuterar industristrukturen för kemiindustrin i Sverige. Rapporten är kortfattad och dess huvudsakliga syfte är att, med hjälp av de presenterade figurerna, fungera som en grund för strategidiskussioner och ge insikter och idéer till vidare studier av kemiindustrin och andra delar av innovationssystemet kring industrin. Rapporten är i huvudsak en uppdatering av den tidigare rapporten Vinnova Analysis VA 2013:01 men med tillägg av data för kompetensanalys.

Studien omfattar cirka 515 företag, varav 440 var aktiva under 2014, och ger en ögonblicksbild av företagens verksamhet i Sverige år 2014. Studien ger även en överblick över industrideynamiken i kemiindustrin mellan åren 2007 och 2014. Bolagen har grupperats baserat på branschsegment, typ av verksamhet, region och exportintensitet. Rapporten fokuserar på tillverkande företag inom kemiindustrin och företag som enbart sysslar med handel, marknadsföring och/eller transport av kemiska produkter har exkluderats, likaså företag som tillverkar plastprodukter. År 2014 svarade den kemiska industrin i Sverige för cirka 33 000 heltidsekvivalenter. Mellan åren 2007 och 2010 minskade sysselsättningen med 3 500 heltidsekvivalenter. Efter år 2010 har minskningen dock stagnerat och mellan åren 2010 och 2014 minskade sysselsättningen endast med 1 500 heltidsekvivalenter, och om branschsegmentet "Läkemedel, Reagenser etc." exkluderas har i princip ingen minskning skett mellan år 2010 och år 2014. De största reduktionerna av antal anställda har skett inom branschsegmenten "Läkemedel, Reagenser etc." och "Organiska och oorganiska baskemikalier".

Kemiindustrin i Sverige domineras av ett begränsat antal stora företag och koncerner vilket exemplifieras av att 15 % av företagen står för 80 % av de anställda. De tio största företagen och företagsgrupperna svarar för 49 % av de anställda. AstraZeneca och Akzo Nobel koncernen är de två största arbetsgivarna med totalt mer än 8 000 heltidsekvivalenter – cirka 25% av de anställda. Förutom de stora företagen utgörs industrin av ett begränsat antal medelstora företag och ett stort antal små- och mikroföretag. Kemiindustrin i Sverige är i huvudsak lokaliserad kring de tre storstadsregionerna Stockholm/Uppsala, Göteborg och Malmö/Lund. En högre koncentration av kemiföretag återfinns även i de större städerna längs Norrlandskusten. En majoritet, 74 %, av företagen inom den kemiska industrin visade positiva resultat efter finansiella poster under 2014, och hela 86 % av de anställda jobbade i företag med positiva relativa resultat för samma år. Stora företag är överrepresenterade bland företag med positivt resultat medan företag med negativt resultat är mer jämnt fördelade. Utlandsägda företag visar bättre resultat och har större export än svenskägda företag. En majoritet av företagen (300 +) är svenskägda men en majoritet av de anställda (~ 80 %) arbetar i utlandsägda företag. I genomsnitt är de utlandsägda företagen cirka nio gånger större än de svenskägda (sett till antalet heltidsekvivalenter). Majoriteten av företagen är främst inriktade på produktion och bortsett från företag inom branschsegmentet "Läkemedel, reagenser, etc.", har endast ett fåtal företag egen forskning och utveckling.

Summary

This report gives an overview of the chemical industry in Sweden in the year 2014. The report highlights some important industry features and discusses the structure of the chemical industry. The report is brief and its main aim is to serve as a basis for discussion as well as give insights and ideas for further studies of the chemical industry in Sweden including other parts of the innovation system connected to it. The report is essentially an update of an earlier report, Vinnova Analysis VA 2013:01, but with the addition of data for competence analysis.

This study covers about 515 companies – out of which roughly 440 were active year 2014 – and gives a snapshot of the companies' activities in Sweden in the year 2014. The companies are grouped by business segment, activity category, region and export intensity. Companies involved only in sales, marketing and/or transport of chemical products have not been included, neither has manufacturing of plastic products. In the year 2014 the chemical industry in Sweden accounted for about 33 000 FTE (full time employments). Between the years 2007 and 2010 the employment in the included companies decreased by 3 500 FTE, however, after year 2010 the decrease has stagnated and between years 2010 and 2014 the employment in the included companies only decreased by 1 500 FTE. The decrease is most significant within the business segments “Pharmaceutical products, regents, etc.” and the “Organic and inorganic basic chemicals”.

The chemical industry in Sweden is dominated by a limited number of large companies and corporate groups and 15% of the companies account for 80% of the employees. The ten largest companies and corporate groups account for 49 % of the employees, AstraZeneca and the Akzo Nobel group being the two largest employers. In addition to the large companies, there are a limited number of medium sized companies, and then, a vast number of small and micro-scale companies.

The chemical industry in Sweden is mainly located around its three major metropolitan areas—Stockholm/Uppsala, Göteborg, and Malmö/Lund. There is also a higher concentration of companies in the larger cities on the northern coast of Sweden. A majority, 74%, of the companies in the chemical industry, showed positive results after financial items in 2010, however, as many as 86% of the employees worked in companies with positive relative results 2014. Large companies are overrepresented among companies with positive results. Companies with negative results are more evenly distributed. Foreign owned companies show better results and have higher exports than the Swedish owned. Furthermore, a majority of the companies (300+) are Swedish owned, yet a majority of the employees (~80%) work in foreign owned companies. On average, the foreign owned companies are nine times larger than the Swedish owned, utilising the number of FTEs. The majority of the companies are focused on production, and apart from companies in the business segment “Pharmaceutical products, reagents, etc.”, only very few companies are active in R&D.

1 Introduction

The chemical industry is today producing a broad range of products which we use in our daily lives. More accurately, the chemical industry is providing modern materials and enabling technical solutions in virtually all sectors of the economy. Chemical products are, for example, essential for the development of new and improved products and services in the food industry, the automotive industry and the pulp and paper industry. New and efficient energy technologies, as well as new ways to diversifying the raw material base, having clean water, better food and progress in health care are all examples of challenges that could be addressed by the chemical industry as well as by research and development in the field of chemistry.

Compared to, for example, Germany and the Netherlands, the chemical industry in Sweden may seem small. It is, however, an important export industry in Sweden, and as one of our basic industries, it provides an important foundation for other industries and industrial development.

Accurate knowledge of the extent, structure and development of different industry sectors, combined with information about international industrial and scientific trends, is essential for sound policy decisions and for the design of relevant public measures. For this purpose, Vinnova has initiated a number of consistently performed analyses of different industry sectors. The analysis presented for the chemical industry in this report is a part of this work. Some of the technologies and processes used by the chemical industry are also used by other sectors, such as the pulp and paper industry and the food industry. In this study, however, only companies with their main activities within the business segments described in the section below are included and analysed. This analysis focuses solely on one part of the innovation system, the companies. It does not, however, include or account for other important parts of the innovation system, such as public authorities, universities or other research organisations.

The overview given in this report presents different aspects of the chemical industry in Sweden, and is based on a database created and categorised by the authors in dialogue with Vinnova and Region Västra Götaland. The analysis only reflects the companies' activities in Sweden. The total company population has been identified using NACE1-codes² together with other sources of information, such as membership lists for trade organisations and lists from cluster organisations. It should be noted that there is a delay in the publication of statistics and thus the latest data available when preparing this report was data for the year 2014, except for the data for competence analysis which was only available for the years until year 2013. Furthermore, changes due to mergers, acquisitions and liquidations appear with some delay in the statistics. The analysed companies have been classified into different business segments, activity categories and degrees of exports. The business segments included are: Refinery (including grease), Biorefinery, Basic chemicals (with sub-segments), Production of chemical products

¹ Statistical Classification of Economic Activities in the European Community.

² The NACE-codes used in this analysis are: 19, 20 and 21 including sub-groups.

(also with sub-segments) and “Pharmaceutical products, reagents, etc.” The companies’ activities are categorised under the following headings with increasing R&D content:

- Supporting activities
- Manufacturing
- Product development
- Product development together with R&D operator
- Business with R&D
- R&D units

The methodology and how the companies have been categorised into business segments and activities is presented in the following section.

The analyses of the different industry sectors results in comparable figures which show cluster profiles for regions, business segments and the chemical industry as a whole, development of employment and the development of relative results, etc. The cluster profiles are based on the size of the companies in terms of employees, business segments, geographical location, exports and core activities. Further, this updated report also includes data for competence analysis. The illustrations provided in the report are only a (small) selection and further illustrations can be produced using the databases if needed for in-depth analyses of different parameters, regions, business segments, etc.

This study thus aims to give insights into the size, structure, development and performance of the chemical industry in Sweden between the years 2007 and 2014, and aims to be a foundation for future follow-up studies and analyses.

The report is only one of the subsequent results from the project. The results also include the database and an interactive graphical interface of the aggregated results as well as the data set for competence analysis. The list of companies and some of the information compiled will be made available to individual regions for use in their activities to promote regional development. The main aim of the project is to generate easily accessible information, compiling complex quality assured data to be used as input for strategic discussions among different combinations of organisations and players in the innovation system. It is VINNOVA’s ambition to update the database every several years and in this way follow the development of the chemical industry. This report is the first such update.

2 Scope of the analysis

This study is an analysis of the chemical industry in Sweden. The analysis partly uses statistical data, but should not be viewed as a typical statistical study. Compared to general statistical excerpts and summaries, this study holds a higher quality since both the population and the information about each company have been assessed by experts in the field. The information for each company is based on various sources³ and stored in a database to which a graphical interface is connected.

The text in this report is rather brief and the material and images are primarily designed as a basis for oral presentations and discussions. Thus, the reader is encouraged to draw her own conclusions by studying the graphic illustrations.

The work presented in this report is in large an update of the previous report Vinnova Analysis VA 2013:01 except for Section 3.11 and Chapter 6 which is totally new and provide data and illustrations for analysis of industrial dynamics and competence analysis. The work has been performed in dialogue with a steering group including representatives from university, trade associations and public stakeholders. However, all assessments and comments included in the report are the author's own.

Members of the steering group: Lars Josefsson, Det Västsvenska Kemi- och Materialklustret; Ulla Nyman and Greta Hjortzberg, IKEM; Krister Ström, Chalmers University of Technology; Per Rosander, Ecoplan; Göran Andersson, Vinnova.

2.1 Companies included and process for selection

For the activity category and export matrix, companies which had as their major activity one of the business segments described in Section 2.3 and had at least one employee in 2014 are included. Similarly, the dynamic diagrams included data for companies which have their major activity within the defined business segments and had one or more employees in any of the years 2007-2014.

The population was identified through scanning companies with primary NACE code 19-21⁴ (removing the companies that were not relevant), and through scanning of chemical clusters and cluster initiatives, membership lists of trade associations and relevant knowledge centres and platforms.

³ Statistics, websites, annual reports, personal knowledge and for some companies contact with the individual companies.

⁴ 19:Coke and refined petroleum products, 20:Production of chemicals and chemical products and 21:Basic pharmaceutical products and pharmaceuticals.

2.2 Excluded companies

Companies devoted to sales, marketing, or transport of chemical products are not included. Further, companies focusing on manufacture of plastics products are excluded. Subcontractors to companies within the selection of business segments which do not have their core activity within these fields of expertise are not included. Also excluded are companies in other industrial sectors which may have some chemical industry related activities, but not as their core competence or main activity. Examples of such sectors are energy companies and energy service companies, recyclers and the food industry. Intersections of the chemical industry with other industry sectors are most common for the emerging biorefinery business segment and will increase in all likelihood if more focus is placed on developing and producing chemicals and chemical products based on biogenic feedstock.

The pulp and paper industry

In the case of developing biorefineries the pulp and paper industry and chemical industry have quite a few intersections. In principal, biorefineries producing more or less the same products could be introduced in both the pulp and paper industry and the chemical industry. Further, through the development of biorefineries or biobased products these two sectors could be even more closely linked to each other, exchanging intermediate products with each other and/or developing and applying similar processes throughout. One example is the pulp and paper company Smurfitt Kappa which hosts Chemrec's demonstration plant of black liquor gasification and also sells tall oil to Sunpine. Other examples in the pulp and paper industry are the expanding biorefinery units of SCA and Holmen and Södras initiatives in the biofuel area (although Södras biofuel initiatives primarily are located in Norway).

Consultants and service companies

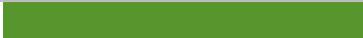
Like most other process industries, larger companies within the chemical industry have during the last decade to some extent started to outsource some of their activities. Consequently, a number of staffing companies providing personnel to the process industry have appeared. The types of services which are most common to outsource include: engineering services, service and maintenance, security and guard, and restaurant and food service. Some companies also use consultants for their research and development activities. The companies providing these services are not included in this study since they usually also provides services to other industry sectors, and thus the portion of the companies devoted to the chemical industry is difficult to separate from the rest⁵. Nevertheless, a limited number of small consultant firms which clearly state that they solely work for the chemical industry have been included.

⁵ During 2016 Vinnova plans to present a similar analysis to this one regarding the consultants and service sector in Sweden. For the chemical this question is to some extent also elaborated on in the previous report, Vinnova Analysis VA 2013:01.

2.3 Business segments

Each company has been individually categorised into a business segment according to each company's *main* business (although in some cases the business may vary somewhat between different company locations). Companies with their main activity in business segments other than those listed below are not included in the study, even if their business includes such activities to some extent⁶. It should be noted that compared to, for example, the automotive industry the chemical industry is very diverse. Even within the different business segments, the myriad of different products available is significant.

Table 1 Presentation of the business segments and their colour in the graphic visualisations

BUSINESS SEGMENT	COLOUR IN VISUALISATIONS
REFINERY (INCL. GREASE)	
BIOREFINERY	
BASIC CHEMICALS	
• PLASTICS IN PRIMARY FORMS	
• ORGANIC AND INORGANIC BASIC CHEMICALS	
• OTHER	
CHEMICAL PRODUCTS	
• PAINT, COATING, ADHESIVES, ETC.	
• DETERGENTS, HYGIENE PRODUCTS, ETC.	
• AGROCHEMICAL, ETC.	
• OTHER	
PHARMACEUTICAL PRODUCTS, REAGENTS, ETC.	

Refinery (including grease)

This business segment includes companies with their main activity in one of the following areas: petroleum refining, graphite production as well as production of oils and grease. The majority of the companies have petroleum refining as their main business, producing e.g., petrol, diesel, oils and bitumen. The by far largest company in this business segment is Preem. Examples of other companies in this business segment are St1 Refinery, Axel Christiernsson, Superior Graphite Europe Ltd., Statoil Fuel & Retail Lubricants Sweden and Nynas.

Biorefinery

In the business segment of chemical biorefineries, companies have been selected which fulfil the following criteria for their main activities: 1) The absolute majority of the raw materials used should be biogenic, 2) The main product should be a “chemical product”, that is, it should be a product which would make the company fall into any of the other business segments if it would not have been for the biogenic raw material, 3) The product or the production process

⁶ One such example is Anticimex AB which produces pesticides in a factory (which would fall under the chemical industry), but have their main activities and number of employees listed under the business of consultancy and insurance.

should be innovative or “new”.⁷ Using this definition companies producing e.g., biofuels are included, whereas companies producing hygiene products are excluded⁸. The largest company in this business segment is Domsjö Fabriker. Examples of other companies in this business segment are Sunpine, Arizona Chemicals, Perstorp Bioproducts, Lantmännen Agroetanol, Värmlandsmetanol, Swedish Biogas and Energifabriken i Sverige. Companies which produces increased amounts of “biorefinery products” but have the majority of their production still fossil based are not included in the biorefinery business segment (e.g. Preem).

In the previous report (Vinnova Analysis VA 2013:01) the main objective of including/defining this business segment was to identify a possible movement or a potential change in the structure of the chemical industry and to give the opportunity to study this change over time⁹. Therefore, some additional analysis regarding the development of this business segment is given in the Appendix. However, the reader should be aware that as of today there exists no broad consensus regarding the definition of biorefineries, and thus the definition of this business segment and the selection of companies included can, and should, be discussed. Some further perspectives regarding this issue and a discussion regarding the use of biogenic feedstock in other business segments are also given in the Appendix.

Basic chemicals

The business segments in this group include companies with their main activity in the field of transformation of organic and inorganic raw materials using chemical processes. The segment comprises the manufacture of basic chemicals which are further processed within other segments or industries.

Plastics in primary forms

This business segment comprises companies which have as their main activity the area of development and manufacture of plastics in primary forms, such as polymers (including those of ethylene, propylene, styrene, vinyl chloride, vinyl acetate and acrylics), polyamides, phenolic and epoxide resins and polyurethanes, alkyd and polyester resins and polyethers, silicones, and also the manufacture of chemical derivatives. The largest company in this business segment is Borealis producing e.g., polyethylene. Examples of other companies in this sub-segment are INOVYN Sverige, Chemiplastica, Styrolution Sweden, and Habia Teknoflour.

Organic and inorganic basic chemicals

This business segment comprises a variety of companies developing and producing organic and inorganic basic chemicals for further use in other segments and industries, e.g., the iron and

⁷ The EU definition of a biorefinery as producing at least two products based on biogenic raw material has thus been discarded as too broad since we aim at identifying chemical biorefineries, and thereby companies such as Skellefteå Kraft with their facility Biostor (which produce power, heat and pellets) have been excluded.

⁸ This definition also excludes companies or applications which have used biogenic raw material for a long time, and where using the biogenic raw material, it has not been judged as a novelty or innovation such as e.g., for production of some pharmaceuticals, pesticides or chemicals (e.g., many of the products produced by Akzo Nobel companies).

⁹ This potential development is also occurring within larger companies which “step-wise” are replacing their fossil feedstock with biogenic feedstock, e.g. Preem and their share of biofuels in relation to their production of fossil fuels. However, since the majority of the business activities determine the classification of business segment, these companies are not visible in the biorefinery business segment, although important for the overall transition towards a larger share of “biorefinery products”.

steel industry (Ask Chemicals Scandinavia) and the pulp and paper industry (Akzo Nobel Pulp And Performance Chemicals and Marenordic). Companies producing mineral fillers are also included (Imerys Minerals). The largest company in this business segment is Akzo Nobel Pulp and Performance Chemicals. Examples of other companies in this sub-segment are Kemira Kemi, Akzo Nobel Functional Chemicals, Perstorp Speciality Chemicals, Element Six, Sellukem, and Kemikalia.

Other

This business segment includes mainly companies producing industrial gases, dry ice and some other speciality chemicals. The largest company in this business segment is AGA Gas and examples of other companies in this sub-segment are Yara Praxair, Air Liquide Gas, Polyone Sweden and Isblästring Sverige.

Chemical products

The segment includes the transformation of organic and inorganic raw materials through chemical processes and the general formation of products (although the manufactures of rubber and plastic products are excluded). It comprises the production of intermediate and end products through further processing of base chemicals.

Paint, coating, adhesives, etc.

This business segment includes production and development of paint, coating, ink, varnish, adhesives, solvents, thinners, prepared pigments, etc. Thus, the population of companies is rather diverse, including everything from small companies producing linseed oil (e.g. RHL i Högsta) to large companies producing industrial coatings and adhesives (e.g. Akzo Nobel Decorative Coating and Akzo Nobel Casco Adhesives). Other examples of companies in this business segment are Tikkurila Sverige, Sioo Woodprotection, Syntema, Plasticolor Sweden, Linotech, Bona, Akzo Nobel Industrial Finishes and Sherwin-Williams Sweden. The largest companies in this sub-segment are Flügger and Sherwin-Williams Sweden.

Detergents, hygiene products, etc.

Here both companies developing and producing hygiene products, such as facial creams (e.g. Nordium Products Sweden), wet wipes (e.g. K.Ungh) and hair care products (e.g., Maria Nila), and detergents and cleaning products for both industry and private consumers (e.g., A Clean Partner International) are represented. Companies producing perfumes and essential oils and fragranced soaps and candles are also included (e.g., Natural Fragrance of Sweden and L:A Bruket). Many companies are contract manufacturers (e.g., Cleano International and PLS Produkter). The largest company in this sub-segment is Cederroth. Examples of other companies in this sub-segment are Svenska Diskbolaget, Kempartner, Klippotekets Fabrik, Ljung Hudvård, Weba Kemi and Krefting och Sandström Lifeclean.

Agrochemical, etc.

Here manufacture and development of pesticides and other agrochemical products (as well as sprout and growth regulators) are included. The products include insecticides, fungicides, herbicides, rodenticides and biocides. The business segment also includes companies which have their main activity in the field of fertilizers and plant nutrition. The largest company in this

sub-segment is Yara. Examples of other companies in this business segment are Nya Bionema, BioBact, SweTree Technologies and Binab Bio.Innovation.

Other

This business segment includes the manufacture of explosives and pyrotechnics, artificial fibres and other chemical products such as photochemical products (including film and photosensitive paper). This business segment also comprises some companies with diverse activities, which due to the lack of one dominating product, could not be placed in other business segments. The largest company in this sub-segment is Orica Sweden¹⁰ and examples of other companies in the sub-segment are Forcit Sweden, Pyroswede, Swedish Match Industries, Eurenco Bofors, Textilfilter Scandinavia and EPC Sverige.

Pharmaceutical products, reagents, etc.

This business segment includes the manufacture of basic pharmaceutical products and medicines. Also included is the production of medical chemicals, reagents and diagnostic products. As stated previously, CRO companies and companies with only marketing and sales are not included. The largest company is Astra Zeneca. There exists a similar study to this one for this business segment regarding the Swedish Life science industry¹¹. A significant amount of the companies in this business segment are contract manufacturers.

2.4 Activity category

Each company, or company site, has been assigned to one activity category according to its activities in specific business units (establishments) in Sweden. Companies with more than 450 employees have been divided into different activity categories and are shown separately in the activity category and export matrix, see Section 2.9 for a further description of the activity category and export matrix. Companies with fewer than 450 employees and several activity categories within the company have been placed in the activity category which is highest on the vertical axis¹². This means that if the company has both product development and manufacturing activities, they appear under “Product development” on the vertical axis.

R&D units and R&D parts of larger companies

Thus, in this activity category, the bubble actually represents the number of persons engaged in R&D work.

Business or production unit - with R&D

Here companies with their own research within one or a few key areas are included. These companies usually also have production activities. The size of the bubble in the bubble diagram, however, reflects the total number of employees, and not only the ones engaged in R&D – unless the company has more than 450 employees as previously mentioned.

¹⁰ Formerly known as Dyno Nobel Sweden.

¹¹ See http://www.vinnova.se/upload/EPiStorePDF/va_14_03.pdf.

¹² For a few companies, however, information was available regarding number of employees in different activity categories and these companies have been divided accordingly. This mainly concerns companies with both production and supporting activity in the same region (but at different sites).

Business or production unit - with product development in cooperation with R&D operator

Here companies that mainly design and manufacture their own or other companies' products/services are included. They do not have their own research, but they have recently been, or are involved in, national research programmes or conduct product development together with universities or research institutes. These connections and cooperation with R&D actors may be a first step for the companies to develop their competitive edge. This category also includes consultants whom have their whole business in the field of supporting chemical companies with their R&D and R&D processes.

Business or production unit - with product development

The companies in this category develop products and services in their own business, i.e. incremental product development without elements of exploratory research.

Production

This activity category refers to companies or sites which manufacture products. This category also includes a small number of consultants who have no R&D content in their business and produce services solely for the chemical industry.

Supporting activities, head office, administration, retail, storage or production of non-chemical products, etc

This activity category refers to activities which the company or company site might engage in, but which are not related to production or development of chemical products. Such activities are e.g., a separate unit for administration, marketing, sales, etc., sites for storage of products/intermediate products (e.g., Nynäs activities in Kalmar, Piteå, Norrköping, etc) or stores where the products produced are sold (common for the business segment "Paint, coating, adhesives", etc. where Flügger, for example, have one production facility and a vast number of retail stores).

2.5 Number of employees

In the graphic illustrations, the size of companies, measured by number of full-time equivalent (FTE) employees, is given as a bubble where the size of the company or operation is proportional to the volume of the bubble¹³.

Following contact with the companies, companies or business units with more than 450 employees have been divided into different activity categories (rather than different business segments). The bubble highest on the vertical axis is downsized according to the number of employees in other activity categories and new bubbles are created for those units. The procedure has been done for the companies which clearly expressed that they have a separate R&D department. Further, companies with operations in different regions are divided into the

¹³ The number of full-time equivalent employees is reported by companies in their annual report to the Swedish Companies Registration Office. The actual number of people employed in companies may be 20-30% higher due to part-time posts, leave of absence etc.

corresponding number of bubbles, where the volume is proportional to the number of employees in each region.

2.6 Regions

For the regional analysis in Chapters 5 Sweden has been divided into five regions: North, Central, West, East and South. For companies with operations in several regions, their activity in each region is shown. The regions are comprised of their respective list of counties below. However, since the data in the database as well as the data for the competence analysis are county specific other combinations of counties could as well be used for regional analysis¹⁴.

Region North

- Norrbotten
- Västerbotten
- Jämtland
- Västernorrland
- Gävleborg
- Dalarna

Region Central

- Uppsala
- Stockholm
- Södermanland
- Västmanland
- Örebro

Region West

- Västra Götaland
- Värmland
- Halland

Region East

- Östergötland
- Jönköping
- Kalmar
- Gotland

Region South

- Kronoberg
- Blekinge
- Skåne

¹⁴ As an example, this has been the case when data has been extracted for a parallel regional analysis performed for the Chemical Industry in Västra Götaland [to be published spring 2016]. For this case county 14 – Västra Götaland has been analysed separately.

2.7 Exports

In the statistics used, the export data for each company is given in the following ranges¹⁵:

- 1 – 249 kSEK/year
- 250 – 999 kSEK/year
- 1 – 1.9 MSEK/year
- 2 – 4.9 MSEK/year
- 5 – 9.9 MSEK/year
- 10 – 49.9 MSEK/year
- 50 – 99.9 MSEK/year
- More than 100 MSEK/year

When preparing this updated report, export data for year 2014 were used. The export data given in absolute numbers have then been divided by the net turnover for each company giving the export in relation to turnover [%]. For the graphical illustrations in this report three different export categories have been used:

- No exports
- Some exports
- Significant exports

Where “Some exports” is defined as exports of 1-50% of annual turnover and “Significant exports” as more than 50% in relation to company turnover. All companies with exports of more than 100 MSEK/year have been placed in the “Significant exports” category, even if their turnover is more than 200 MSEK/year.

2.8 Data for analysis of industrial dynamics – scope and parameters

The data for the analysis of industrial dynamics are gathered from an internal database created by Vinnova. Data was retrieved for all of the companies in the Chemical Industry database. For each company, the data for analysis of industrial dynamics consists of – and can thus be analysed based on – the following parameters:

- Number of employees in the company (redundant information seen to the chemical industry database)
- Country code for group parent (redundant information seen to the chemical industry database)
- Name and corporate identity of group parent
- Number of active Swedish subsidiaries (in group)
- Number of employees in active Swedish subsidiaries (in group)
- Number of foreign subsidiaries (in group)

¹⁵ Where kSEK stands for thousand SEK and MSEK stands for million SEK.

- Total number of employees in group
- Net turnover for the group
- Categorization of the company as:
 - Autonomous SME
 - Belonging to a SME group¹⁶
 - Belonging to a large group with Swedish parent
 - Subsidiary with foreign group parent

Data was given for year 2007 and year 2014.

2.9 Data for competence analysis – scope and parameters

Due to privacy issues, the data for the competence analysis of the chemical industry in Sweden is not possible to present on a company or business unit specific level and this data is thus not comprised in the database but in a separate data file. The data for competence analysis was ordered separately from SCB based on the companies listed in the database and their CFAR numbers. Thus the underlying data is business unit specific, although it is presented in aggregated form.

The population consists of people classified as economically active in the companies and business units for each of the years 2007 to 2013. The database and the data for competence analysis do not provide a perfect match which is indicated by the fact that the total number of employees in the data for competence analysis is slightly lower compared to the number of employees in the database, which can be seen in Table 2. The reason to why the numbers differ is mainly due to the fact that the CFAR number for business units that has been shut down between years 2007 and 2013 was not always possible to identify and thus these units were not included in the data sample.

Table 2 Deviation in number of employees in the chemical industry between data in database and data for competence analysis

YEAR	NUMBER OF EMPLOYEES INCLUDED IN COMPETENCE ANALYSIS SET	DIFFERENCE COMPARED TO DATABASE [%]
2013	33 271	-0.2 %
2010	33 866	-2 %
2007	36 380	-4 %

The data for competence analysis consists of – and can thus be analysed based on – the following parameters¹⁷:

¹⁶ An SME group has been defined as a group where all companies in the group have less than 250 FTEs.

¹⁷ Apart from the parameter business segment which is set by the authors of this report and further described in Section 2.3 the parameters for the competence analysis data are further described in Statistics Sweden, Background Facts 2016:1, Integrated database for labour market research (in Swedish).

Business segment and county

The business segment classification and county is set for each company/business unit as presented in Section 2.3 above.

Age

Attained age by the 31th of December for each given year. The age is presented in intervals and range from 16-19 years and thereafter in 5 year intervals up to 60-64 years and lastly 65+ years.

Gender

Gender is derived from the second last digit of the personal identity number. If the figure is odd the gender is set as male (1), if the figure is even the gender is set as female (2).

Origin

The classification of a person as of foreign versus Swedish heritage follows guidelines established between the Swedish Integration Board, the Migration Board and Statistics Sweden. The guidelines include both a preferred and an alternative classification¹⁸. The data presented for origin in this report is derived following the preferred guidelines which are summarized in Table 3.

Table 3 Definition of foreign versus Swedish origin as used in this report

ORIGIN:	PERSON IS EITHER:	OR:
FOREIGN (1):	Foreign born	Domestic born with two foreign-born parents
SWEDISH (2):	Domestic born with a domestic and a foreign-born parent	Domestic born with two native-born parents

In case a parent's country of birth is missing the following is assumed:

- For a person who is native-born, parent is assumed to be native-born

- For a person who is foreign-born, parent is assumed to be foreign-born

Education

Education is described by two parameters – *education level* and *education group*. Both refer to the highest achieved education for each person and given year.

Education level is defined by 7 different levels (plus a level for those with no information stated):

- 1 Compulsory education less than 9 years
- 2 Compulsory education 9 years (equivalent)
- 3 Secondary education, two years or less
- 4 Secondary education three years
- 5 Post-secondary education, three years or less
- 6 Post-secondary education for three years or longer
- 7 Postgraduate

(* Not available)

¹⁸ See SCB, MIS, Statistics on persons with foreign background, Guidelines and recommendations, Report 2002:3 for a further description of these guidelines and how they are applied.

As can be seen above the first four levels refer to compulsory and secondary education and the three last levels refer to different types of higher education. Higher Vocational Education (HVE) is included in level 5 – Post-secondary education less than three years.

The second parameter for education is *education group* which besides the level of education also describes the focus of education in detail, e.g. natural science, social science, aesthetic, etc. for the secondary educations and at a level of detail of different specializations in the engineering educations etc. There are eleven thematic groups and within each there are a number of different specialisations at different educational levels. The thematic groups are:

- General training
- Higher Preparatory Education
- Education and teacher training
- Humanities and arts
- Social sciences, law, commerce, administration
- Science, mathematics, computer science
- Technology and Manufacturing
- Agriculture and forestry, veterinary care
- Health and social care
- Services
- Unknown/other

In total there are over a hundred different codes (combinations of specialisation and level within the thematic groups) available and the codes used for the data presented in this report is given in Appendix (in Swedish)¹⁹.

Occupation

The occupation is based on the employee's occupation per last of November for the given year. There are nine different groups of professions within which there are a number of different occupations:

- Managers
- Physical, mathematical expertise (theoretical expertise needed)²⁰
- Technicians and associate professionals (shorter higher education needed)²¹
- Clerks
- Service and sales workers
- Work in agriculture, hunting, forestry and fishing
- Craft work in construction and manufacturing
- Plant and machine operators, transport etc.

¹⁹ A further description can be found in the report: MIS 2000:1. Svensk utbildningsnomenklatur, SUN 2000 (in Swedish).

²⁰ Master level engineers, physics, chemists computer specialists are examples of occupations within this group.

²¹ Bachelor level engineers, purchasers and accountants are examples of occupations within group.

Dynamic diagrams

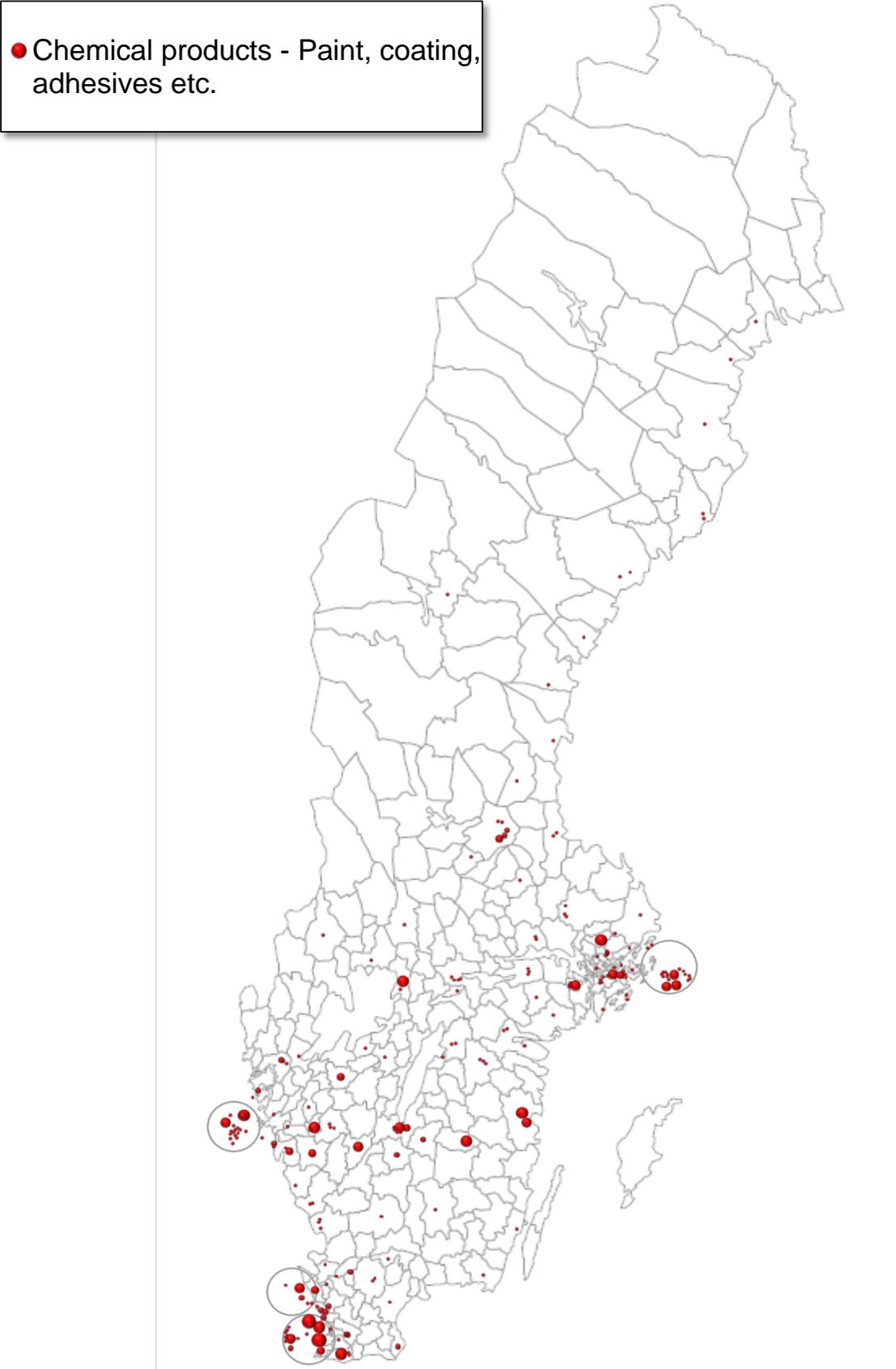
The database used for this report dates back to 2007. It includes some companies which no longer exist as well as the number of employees and financial data for these companies. Thus, dynamic diagrams regarding such indicators can be obtained for the period 2007²²-2014. The data is based on the information that companies submit to the Companies' Registration Office in their annual reports. These values are available in October the year following the fiscal year. Thus, when this report was prepared data for 2014 was the most recent data available. This delay may be perceived as long, however, experience from similar structural analysis has determined that changes in the industry are slow and that change also requires long-term action.

Map visualisation

In the map visualisation (Figure 9), all bubbles in the diagram are distributed by county according to their geographic location. They have been randomly distributed within each municipality. The four circles with bubbles in them just outside the map represent the municipalities of Stockholm, Göteborg, Lund and Malmö where the concentration of companies/bubbles is larger than the area available for visualisation on the map. For illustration purposes, an example of map visualisation is presented in Figure 2.

²² This was when a new industry classification standard of Swedish industry was introduced. A general problem with the introduction of a new industrial classification is the conflict between the interests of the new standard will provide better opportunities to highlight the changes in industry structure, while it is important that as much as possible to maintain reasonably intact time series. For this work consistent time series prior to 2007 were not possible to obtain.

Figure 2 Example of map visualisation (showing only one business segment)



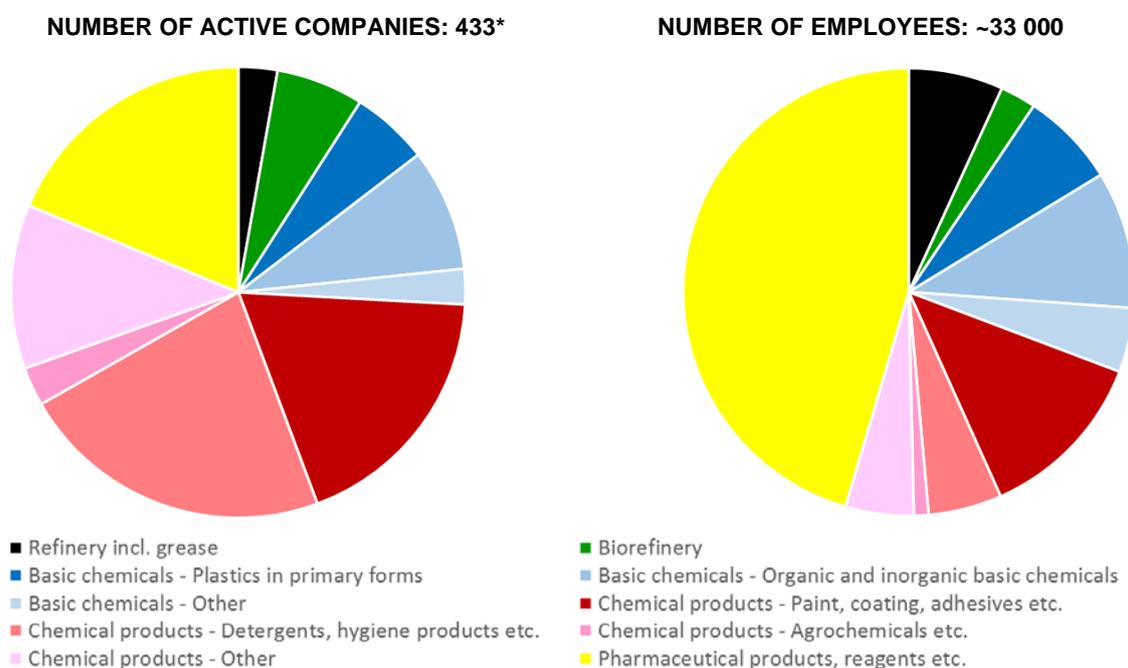
3 Chemical industry in Sweden 2014

3.1 All companies

The total number of companies identified in the present study as active in research and development, product development, consulting or manufacturing within the included business segments of the chemical industry in Sweden is about 440, with a total of 33,000 employees²³. This does not include companies focusing on sales, marketing or transportation of chemical products. Compared to the year 2010 the number of companies is approximately constant but the number of employees has decreased by ~1,000 persons. The development of the chemical industry over time (years 2007-2014) is further described in Sections 3.6 and 3.11.

Figure 3 shows that the companies in the business segment “Pharmaceutical products, reagents, etc.” reflects almost half of the employment in the chemical industry, but only contains about 20% of the number of companies. The chemical industry is dominated by a limited number of large companies, a structure which is further discussed in Section 3.2. More than half of the companies have their main business in production of chemical products, yet these companies are generally rather small and their combined share of employees is only ~25%.

Figure 3 The chemical industry in Sweden 2014 divided by companies and employees in the different business segments



*76 additional companies are included in the database set but are not registered as active or do not have any employees year 2014

²³ These numbers refer to active companies with at least one employee year 2014. For years 2007-2014 the total number of included companies, with activity or employees for at least one year during the period, are 500+.

3.2 Large companies and corporate groups

The chemical industry in Sweden characterized by the fact that it is dominated by a small number of large companies and corporate groups. Essentially for year 2014 15% (64) of the companies jointly employ 26 300 FTE which roughly corresponds to 80% of the total employment in the Swedish chemical industry. Compared to year 2010 – when the 61 largest companies accounted for 80% of the FTEs – there has been a slight change mainly due to the fact that the largest companies have decreased their share of employment more than the industry average. The fifteen largest companies in the chemical industry year 2014 are listed in Table 4 (number of employees also given for years 2010 and 2007). Only four of these companies are Swedish owned and three of them – Octapharma, Apoteket Produktion och Laboratorier and Swedish Orphan Biovitrum – are in the business segment of Pharmaceutical products, etc and one – Domsjö Fabriker – is in the business segment Biorefineries. Out of the employees in the 15 largest companies year 2014 12% (~2 000) work in companies with Swedish ownership. This is substantially less compared to the percentage of employees who work in Swedish owned companies in total in the chemical industry (22 %) – see Section 3.7 for a more detailed analysis of ownership structure.

As can be seen in the table, the number of employees in the fifteen largest companies decreased by roughly 2 500 people between the year 2007 and the year 2010 and by another 1 700 people between years 2010 and 2014. This is equal to 82% of the total decrease of employment in the Swedish chemical industry during these years (2007-2014)²⁴. Table 4 also shows that 2/3 of the fifteen largest companies have decreased their number of employees year 2014 compared to 2007 and out of the 1/3 which have increased their employment between these years a majority are Swedish owned (3 out of 5).

Table 4 The fifteen largest chemical industry companies in Sweden 2014

THE 15 LARGEST COMPANIES 2014 (RANKING YEAR 2010)	BUSINESS SEGMENT (COLOUR)	COUNTRY PARENT COMPANY	NUMBER OF EMPLOYEES		
			2014	2010	2007
1. ASTRAZENECA (1)		GB	5 359	7 277	9 407
2. GE HEALTHCARE BIO-SCIENCES (2)		US	1 565	1 632	1 689
3. PREEM (3)		CY	1 266	1 315	1 445
4. FRESENIUS KABI (5)		DE	1 094	926	887
5. AGA GAS (7)		DE	997	907	915
6. BOREALIS (4)		AE	904	936	1 034
7. AKZO NOBEL PULP AND PERFORMANCE CHEMICALS (6)		NL	807	908	1 231
8. OCTAPHARMA (9)		SE	706	557	514
9. MCNEIL (8)		US	684	756	867
10. APOTEKET PRODUKTION OCH LABORATORIER (11)		SE	512	438	460 ²⁵
11. FLÜGGER (10)		DK	489	474	436
12. PHADIA (13)		LU	470	418	444
13. Q-MED (18)		CH	408	360	445
14. SWEDISH ORPHAN BIOVITRUM (12)		SE	389	434	539
15. DOMSJÖ FABRIKER (21)		SE	388	339	310
TOTAL			16 038	17 731	20 209

²⁴ However, these jobs could have moved to another sector.

²⁵ Started in 2008 with 460 FTE.

Furthermore, Table 4 shows that 2/3 out of the fifteen largest companies in the chemical industry year 2014 are within the business segment of Pharmaceutical products, etc. Table 5 shows the 15 largest companies in the chemical industry excluding the business segment of Pharmaceutical products, etc. For these companies, the changes in FTEs between year 2007 and 2014 are much less, in total only ~10% (compared to ~20% for the fifteen largest if the pharma segment is included) and between year 2010 and year 2014 there has even been a slight increase in numbers of FTEs. Furthermore, when excluding the segment of Pharmaceutical products, etc. most large companies fall into the segments of Basic chemicals and Refineries.

Table 5 The fifteen largest chemical industry companies in Sweden 2014 – excluding business segment Pharmaceutical products, reagents, etc

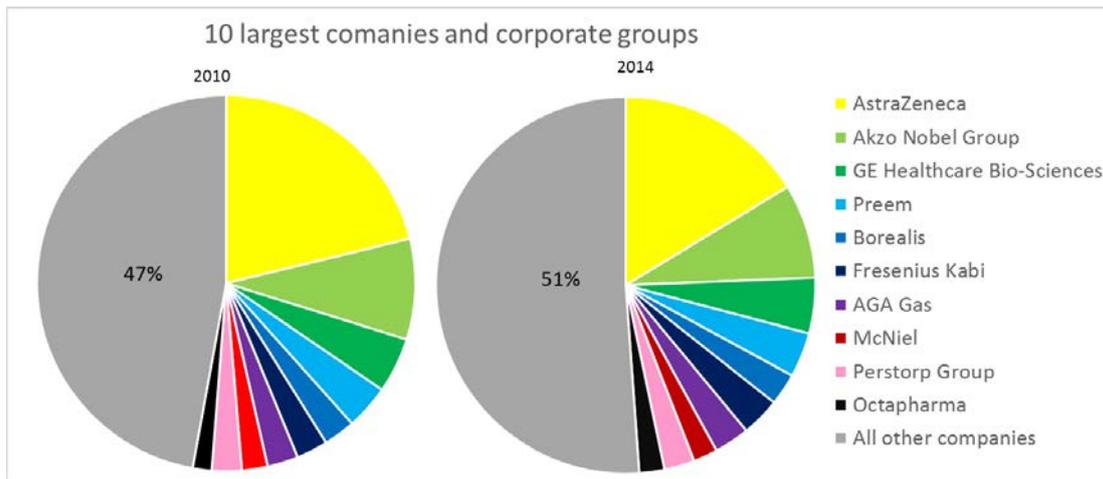
THE 15 LARGEST COMPANIES 2014 EXCL. SEGMENT PHARMA (RANKING YEAR 2010)	BUSINESS SEGMENT (COLOUR)	COUNTRY PARENT COMPANY	NUMBER OF EMPLOYEES		
			2014	2010	2007
1. PREEM (1)		CY	1 266	1 315	1 445
2. AGA GAS (4)		DE	997	907	915
3. BOREALIS (2)		AE	904	936	1 034
4. AKZO NOBEL PULP AND PERFORMANCE CHEMICALS* (3)		NL	807	908	1 231
5. FLÜGGER (5)		DK	489	474	436
6. DOMSJÖ FABRIKER (11)		SE	388	339	310
7. ORICA SWEDEN (9)		AU	367	360	428
8. AKZO NOBEL FUNCTIONAL CHEMICALS (6)		NL	355	407	415
9. AKZO NOBEL SURFACE CHEMISTRY (7)		NL	355	399	328
10. SHERWIN-WILLIAMS SWEDEN (-)		US	316	6	5
11. INOVYN SVERIGE (8)		NO	306	371	361
12. NYNÄS (13)		VE	303	316	174
13. PERSTORP SPECIALITY CHEMICALS (16)		FR	302	285	642
14. CEDERROTH (10)		SE	295	351	385
15. AKZO NOBEL DECORATIVE COATINGS (12)		NL	282	330	393
TOTAL			7 732	7 704	8 502

Together with AstraZeneca, Akzo Nobel is a major employer; in fact in 2014 these two company groups comprised almost 25% of the total employment in the Swedish Chemical industry, see Figure 4. However, compared to year 2010, when these two company groups comprised almost 30% of the total employment, this is a significant decrease. In 2014 AstraZeneca was located in Mölndal and in Södertälje. The Akzo Nobel group are more spread out, conducting business in all five geographic regions described in the present study and at about 10 sites. Furthermore, both these two company groups have significant R&D in Sweden – AstraZeneca in Mölndal; and Akzo Nobel in Sundsvall, Nacka, Stenungsund, Bohus and Malmö. Together with Borealis these two company groups employ a large share of the people in the activity category R&D units and R&D parts of larger companies.

Since 2010 both AstraZeneca and Akzo Nobel have announced cut backs in their operations which are visible in the data presented in this report. For example, Astra Zeneca has closed

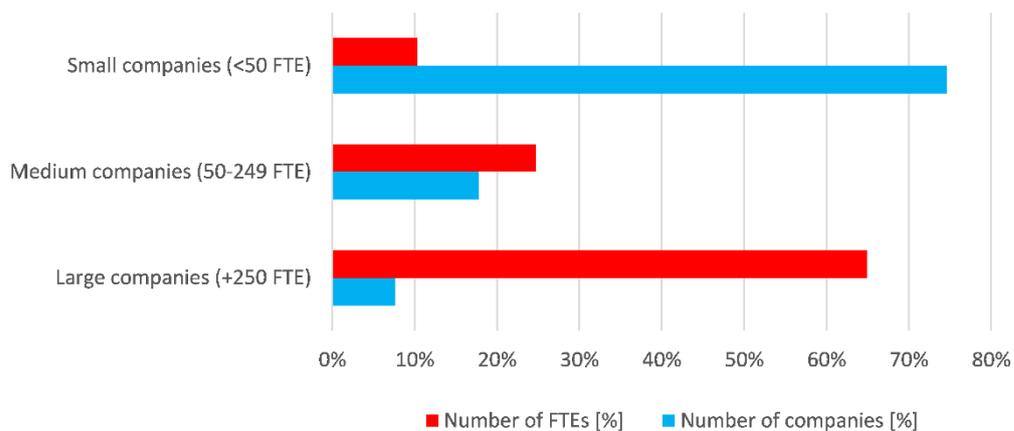
down two R&D-units²⁶, Lund and Södertälje, and Akzo Nobel has closed production facilities in Trollhättan and Borås and cut back on personnel in Malmö (they have, however, since 2010 made further investments in and expansion of their operations in Örnköldsvik run by Akzo Nobel Functional Chemicals). Although these cut backs significantly affect the number of employees in these two companies in Sweden, they are still (as of year 2014) the two largest employers in the Chemical industry in Sweden (see Figure 4).

Figure 4 The ten largest companies and corporate groups and their share of total employment



It can also be noted that the structure of the chemical industry is such that large companies (with more than 250 employees, the largest can be seen in Table 2) constitute 8% of the total number of companies, medium sized companies (with between 50 and 249 employees) constitute 18 % and small companies (<50 employees) constitute 77%, see Figure 5. This structure of the chemical industry infers that changes (expansions or cutbacks) in a limited number of companies or corporate groups can have significant effects on the industry as a whole.

Figure 5 Small, medium and large companies in the chemical industry 2014 and their share of total number of companies and total number of FTEs respectively



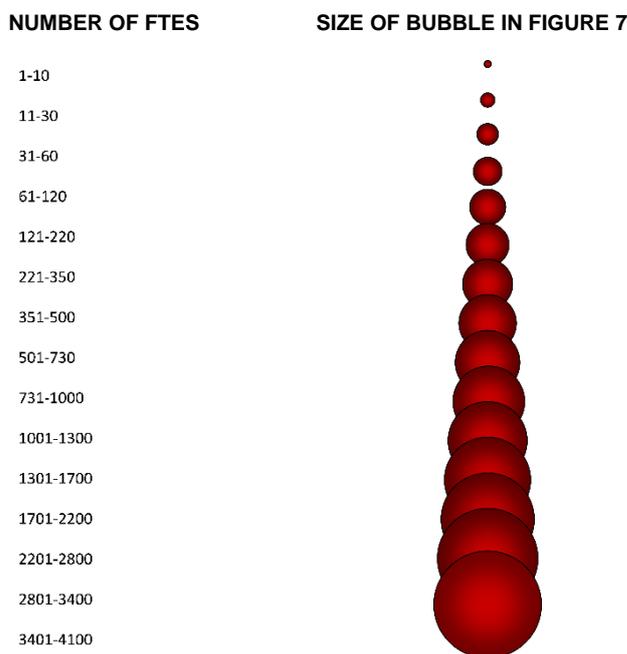
²⁶ Sandström A. "Svensk Life Science industri efter AstraZenecas nedskärningar" Vinnova Analysis VA 2012:07 (2012) [available only in Swedish]

3.3 Activity category and export matrix

The chemical industry's activity and export matrix (bubble diagram) is presented in Figure 6. The size of the bubbles has been adjusted to be comparable with previous similar analyses of the different industry sectors such as the automotive industry, the maritime sector, ICT, etc²⁷.

The figure shows that the majority of the companies are focused on production, and apart from companies in the business segment of "Pharmaceutical products, reagents, etc.", only very few of the companies are active in R&D. This may hamper the ability and interest of the industry in Sweden to collaborate with academia or to commission R&D services from both academia and industrial research institutes. Regarding the chemistry area, the significant knowledge assets and the innovation potential of academia and industrial research institutes in Sweden are both probably far from being fully utilised by the industry. Some level of in-house R&D improves the capability to make use of results from different types of R&D organisations. This is important for the ability to adapt to changing markets and new regulations as well as improving the overall innovative capacity. Since many of the larger companies are foreign owned or part of large global corporate groups, in-house R&D is, however, often performed in other countries. There is an opportunity to strengthen the chemical industry in Sweden by increased R&D and/or increased exports. The figure also shows that the export intensive companies in general are larger than the companies without any export.

Figure 6 Scale for bubbles in Figure 7



²⁷ For a list of these other industry analyses and access to full reports see <http://www.vinnova.se/sv/Om-VINNOVA/VINNOVA-och-omvarlden/Trender-i-Sveriges-kunskapsintensiva-naringsliv/>

Companies with significant exports can be found in the part furthest to the right in Figure 7. The figure shows that the business segment production of Detergents, hygiene products, etc. is underrepresented among companies with significant exports, possibly due to much more local markets for their (end) products compared to the companies producing (intermediate) basic chemicals. Contrary, the refinery industry and most companies producing basic chemicals, have international markets for their products, and are thus well represented in the significant exports category.

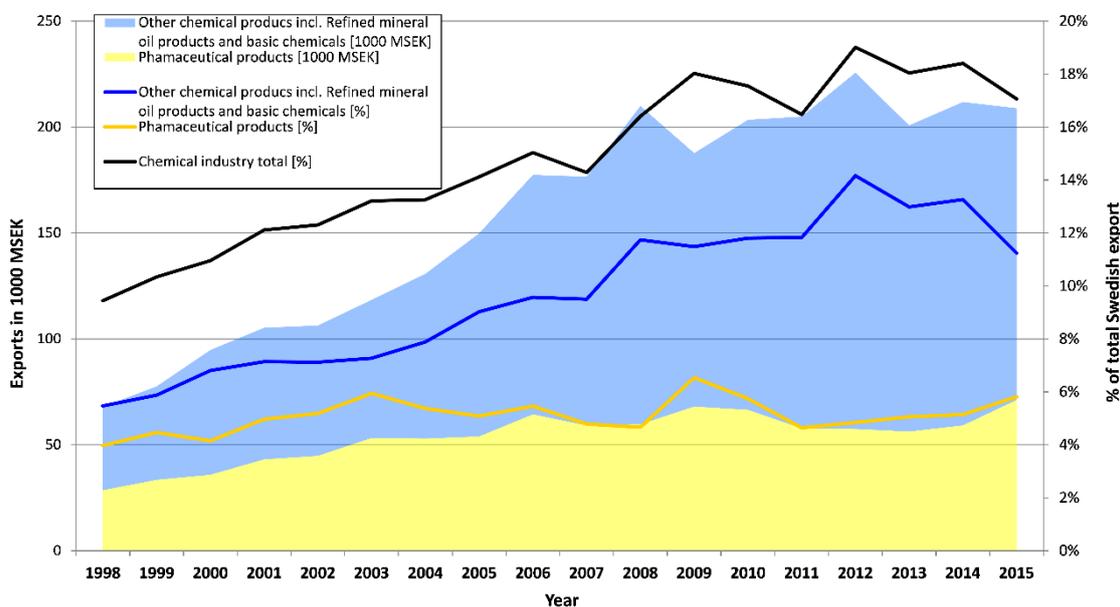
Naturally, large companies are well represented in the category of significant exports and in total 77% of the employees in the chemical industry worked in companies with significant export. Yet, 65 companies in this category have less than 50 employees. Out of these 65 smaller companies, about 75% lacks elements of R&D or advanced product development. The majority of the smaller companies are active in the fields of Pharmaceutical products, reagents, etc. (to a large extent reagents and products for diagnostics) and Paint, coating adhesives, etc. (mainly speciality products, e.g., industrial coatings and adhesives and products for drytech). Examples of smaller companies with significant exports are: IDL Biotech (developing and producing diagnostic tests for use within the area of oncology); Lyckeby Industrial (developing producing adhesives for industrial users); Syrgis Performance Initiators (producing organic peroxides); and Bactiguard (developing coatings which reduce the risk of infection within healthcare).

As seen in Figure 7, the companies with high elements of R&D usually also have significant exports. Accordingly, the companies with no exports are mainly focused on production without any element of R&D.

3.4 Aggregated exports

Aggregated export data for products produced by the chemical industry is presented in Figure 8. It should be noted that these numbers are not directly comparable with the export of the companies included in this study, but give an indication about the importance of the chemical industry as a large export category. The figure shows that, for the year 2015, the chemical industry in total accounted for approximately 17% of the Swedish exports (including pharmaceutical and mineral oil products). This can be compared to, for example, the automotive industry and the pulp and paper industry (excluding wood and wood products) which in the same year accounted for 11% and 8% respectively.

Figure 8 Aggregated export data for products produced by the chemical industry years 1998-2015. The stacked area shows the absolute exports in 1000 MSEK (left axis) and the lines show the exports in relation to total Swedish exports in % (right axis). Yellow represents pharmaceutical products, blue represents other chemical products (the black line represents the chemical industry total)



3.5 Map visualisation

As can be seen in Figure 9, the Swedish chemical industry is primarily located in and around the three Swedish metropolitan areas, Stockholm/Uppsala, Göteborg and Malmö/Lund. However, there are also smaller clusters of companies around cities in northern Sweden, such as Sundsvall.

The figure also shows that the three different cluster regions all have different characteristics with respect to the types of companies located there. For example, the area around Stockholm and Uppsala is heavily populated with companies active in the production and development of Pharmaceutical products, reagents, etc. (yellow), something which mirrors the fact that this area is an important hub for Pharmaceutical and Life Science industry. In this region also strong public actors and universities are located such as Karoliska Institutet and Uppsala University. KTH, Royal Institute of Technology is also an important public actor in the region educating e.g., chemical engineers.

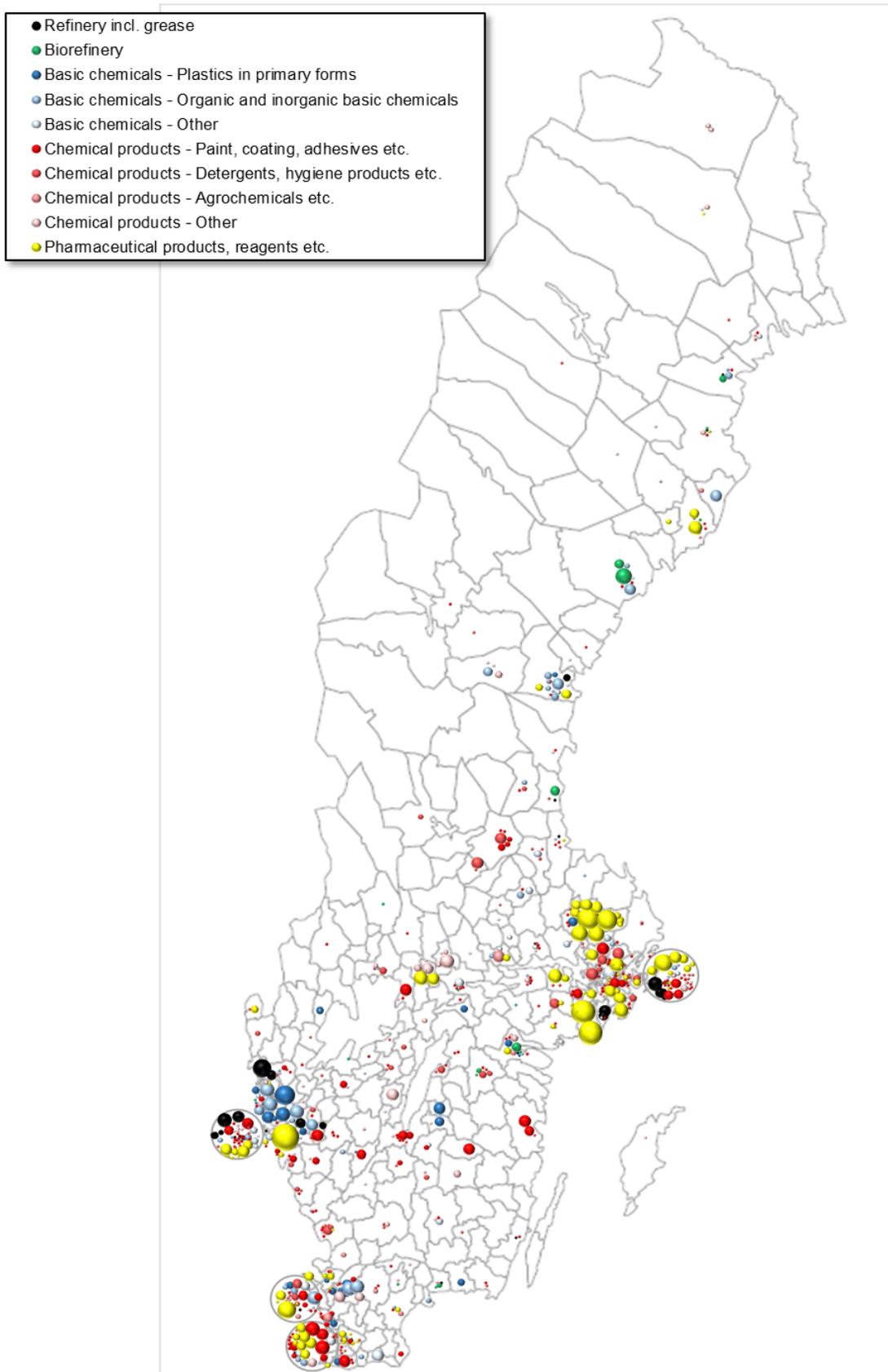
In Västra Götaland and around Göteborg, the majority of companies have their main activities within the Production and development of basic chemicals (blue) and Refinery (black) but Development and production of Pharmaceutical products and reagents etc. is also an significant business segment (currently Astra Zenecas only Swedish R&D site is located in Mölndal). In Stenungsund, the region holds the largest chemical cluster of its kind in Sweden, producing plastic in primary forms and basic chemicals. Sweden's largest RME-plant is also located at this site (owned and run by companies in the Perstorp group). In the region, a cluster initiative for the chemical industry exists (since year 2016 hosted by Johanneberg Science Park), also including other important actors besides the chemical industry companies themselves, such as

Chalmers University of Technology, the Region of Västra Götaland, SP Technical Research Institute of Sweden, consultants such as COWI and companies from other industry sectors, such as Renova and Göteborg Energi.

The third cluster region, Malmö/Lund, have many companies in the Production and development of chemical products (red) Pharmaceutical products, reagents, etc. (yellow) and Basic chemicals (blue), with a slight emphasis towards production and development of chemical products. In the region, a strong public actor related to the chemical industry is Lund University, with strong competencies in e.g., agricultural biotechnology and biorefinery process development, something which is reflected in the population of companies in the region.

The Refinery industry (black) is mainly located in Västra Götaland and around Stockholm, whereas the biorefinery industry is strongly represented along the coast of Norrland. Similar to the strength of companies and research connected to agricultural technologies in southern Sweden, industry and academia in Northern Sweden have a long tradition in developing and producing forest based products. With respect to this fact, an initiative worth mentioning is Bio4Energy, which is a strategic research environment consisting of Luleå University of Technology, Umeå University and Swedish University of Agricultural Sciences (only the campus based in Umeå). Bio4Energy has a handful of associated industrial partners, e.g., SEKAB. Another actor in northern Sweden worth mentioning is SP Processum. SP Processum started in 2003 as a technology park, but has since developed into a biorefinery cluster initiative and is since year 2014 a subsidiary to SP Technical Research Institute of Sweden (a minority share still owned by the previous member companies). The major part of the activities within SP Processum lies within research and development in the areas of biotechnology, energy technology, inorganic and organic chemistry as well as sustainable raw materials.

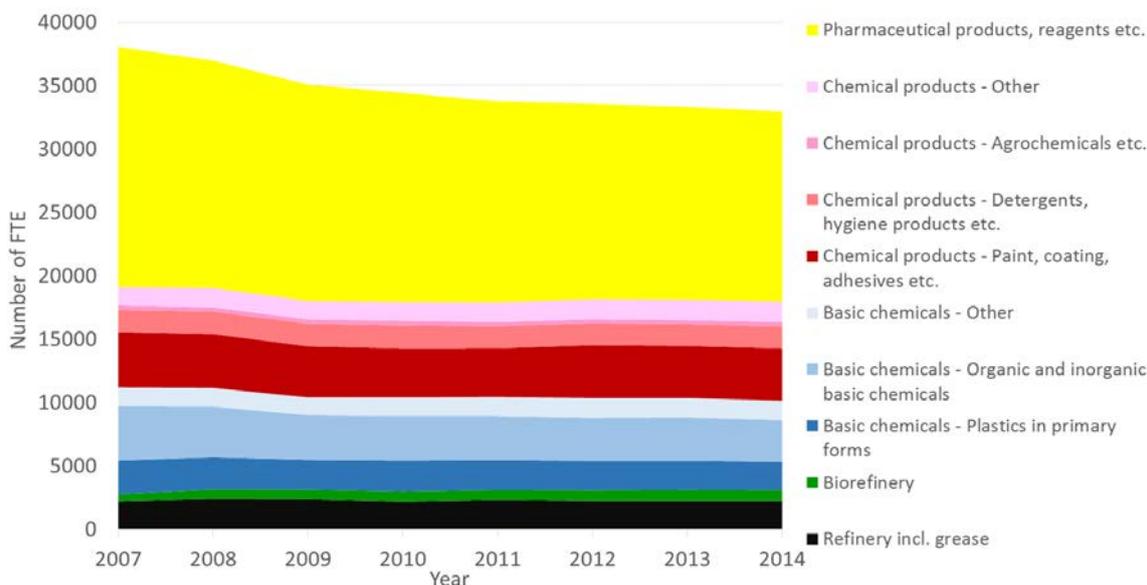
Figure 9 Map visualisation of the chemical industry location in Sweden 2014



3.6 Development during years 2007 to 2014

Between the years 2007 and 2010 the employment in the included companies decreased by 3 600 FTE, however, after year 2010 the decrease stagnated and between years 2010 and 2014 the employment in the included companies only decreased by 1 500 FTE. As seen in Figure 10 and Table 6, the largest reduction occurred in the business segment Pharmaceutical products, reagents, etc.. The cut backs of AstraZeneca first in Lund and then in Södertälje are partly behind these numbers. If this business segment is excluded the numbers of FTEs in year 2014 is roughly equal to the numbers of FTEs in 2010 and thus the decline in number of direct employees in the chemical industry seem to have stagnated. This may be a sign of that the industry has now (year 2014) done most of their consolidation and outsourcing.

Figure 10 Dynamic diagram for employment structure years 2007-2014



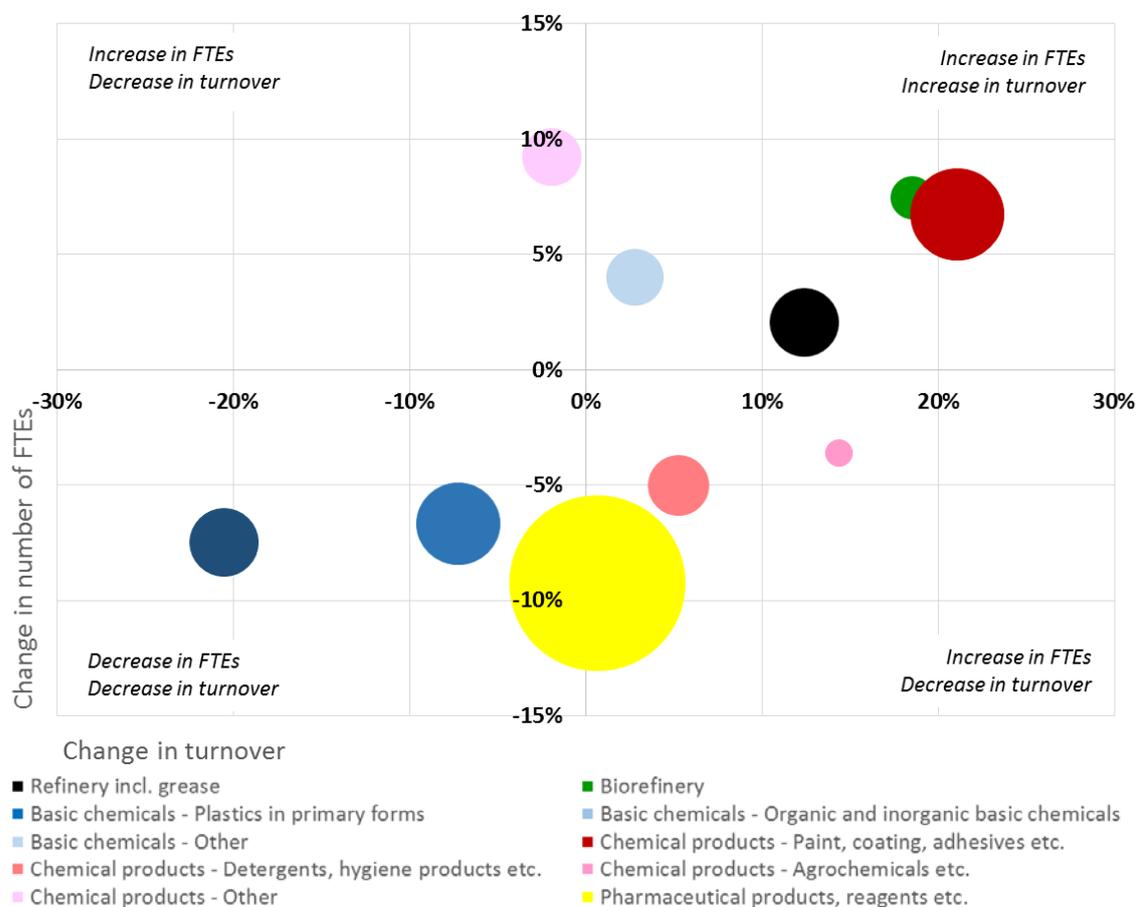
The largest decrease in the number of employees occurred between the years 2008 and 2009, in the aftermath of the economic crisis of 2008. Apart from the business segment Pharmaceutical products, reagents, etc. the largest decrease of employment (in absolute numbers) during the analysed period has occurred within the sub- segment Organic and inorganic base chemicals where, for example, large companies such as Akzo Nobel Pulp and Performance Chemicals, Perstorp Oxo, Element Six and Voestalpine Böhler Welding Nordic have made significant cut backs in their staffing. The decrease in employment is, however, widespread in the whole chemical industry; as can be seen in Table 6.

Table 6 Changes in employment per business segment years 2007-2014 and 2010-2014 respectively

EMPLOYMENT IN BUSINESS SEGMENT	CHANGE 2007-2014 %	CHANGE 2010-2014 %	CHANGE 2007-2014 FTE
REFINERY (INCL. GREASE)	+1%	+2%	+26
BIOREFINERY	+52%	+7%	+290
BASIC CHEMICALS			
- <i>PLASTICS IN PRIMARY FORMS</i>	-15%	-7%	-404
- <i>ORGANIC AND INORGANIC BASIC CHEMICALS</i>	-23%	-7%	-995
- <i>OTHER</i>	+2%	+4%	+35
CHEMICAL PRODUCTS			
- <i>PAINT, COATING, ADHESIVES, ETC.</i>	-5%	+7%	-232
- <i>DETERGENTS, HYGIENE PRODUCTS, ETC.</i>	0%	-5%	+2
- <i>AGROCHEMICAL, ETC.</i>	-9%	-4%	-35
- <i>OTHER</i>	+11%	+9%	+164
PHARMACEUTICAL PRODUCTS, REAGENTS, ETC.	-21%	-9%	-3 959
CHEMICAL INDUSTRY TOTAL (EXCL PHARMA SEGMENT)	-13% (-6%)	-4% (0%)	-5 108 (-1 149)

The relative change in numbers of FTEs and turnover between years 2010 and 2014 are presented in Figure 11. The size of the ball is proportional to the number of employees in the business segment year 2014. The upper right corner represents “growth” both in number of employees and in turnover whereas the lower left corner represents “decline” both in number of employees and in turnover. As can be seen in the figure, the changes are rather moderate, all within +/- 25%.

Figure 11 Relative change in numbers of FTEs and change in turnover between years 2010 and 2014, size of ball proportional to number of employees in the business segment year 2014

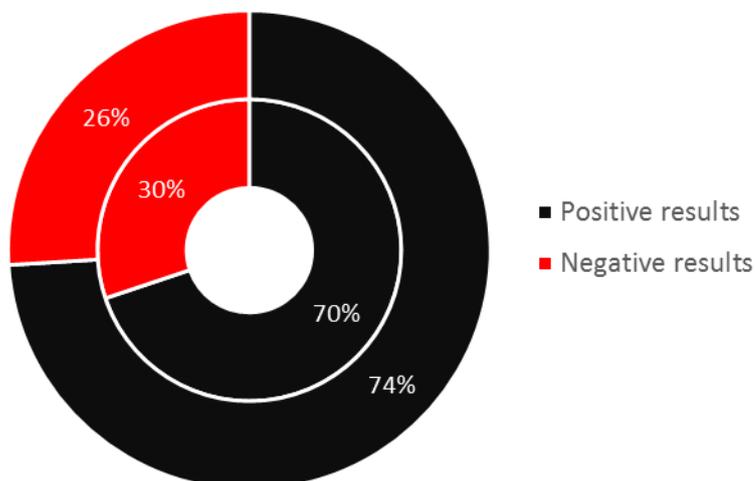


3.7 Relative results and ownership structure

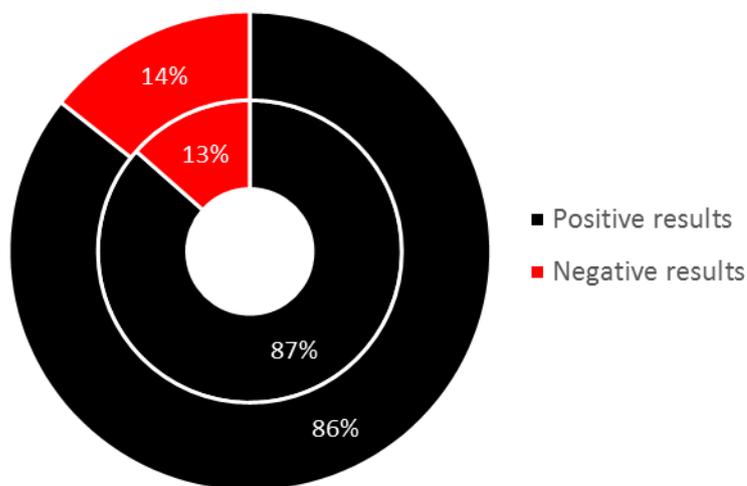
As can be seen in Figure 12, a majority, 74%, of the companies in the chemical industry showed positive results after financial items in 2014 (an increase from 70% in year 2014), however, as many as 86% of the employees worked in companies with positive relative results 2014 (a slight decrease from 87% in year 2010). Small companies are overrepresented among companies with negative relative results. Companies with negative results are (just as for year 2010) evenly distributed between companies with no exports and companies with significant exports and also between companies with only production and companies with a higher R&D content. Concerning business segments, all business segments apart from the segment Biorefineries, have a share of companies with positive relative results of above 70%. However, even if the business segment Biorefineries still year 2014 show the lowest share of companies with positive relative results (below 50%), it is still the business segment which shows the largest increase between years 2010 and 2014 in relative numbers. Further, it can be noted that the companies which comprise also supporting activities (marketing, sales, and other parts of the value chain or other types of production) more often show positive relative results.

Figure 12 Share of (number of) companies with positive versus negative relative results (upper) and share of employees in companies with positive versus negative relative results (lower) for years 2010 and 2014 respectively

Share of companies with positive relative results year 2014 (outer) and year 2010 (inner)



Share of FTEs at companies with positive relative results year 2014 (outer) and year 2010 (inner)

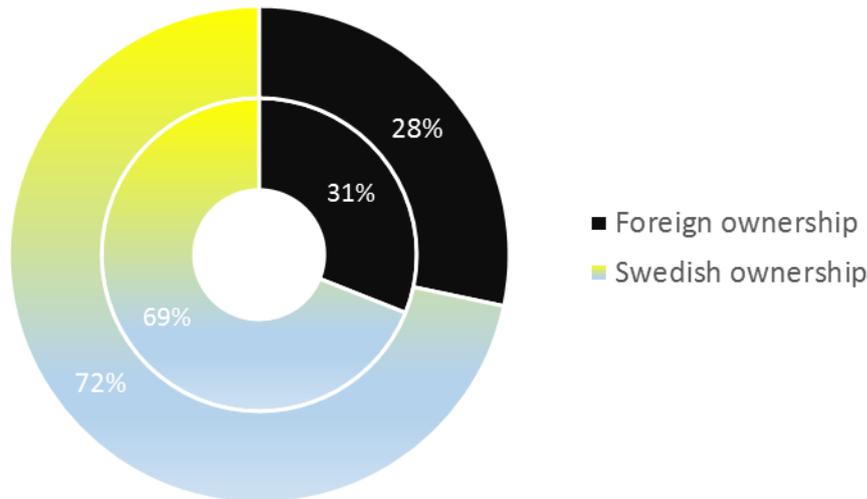


Foreign-owned (in terms of parent company nationality) chemical industry companies are often large companies with significant exports and active in R&D and/or manufacturing (see previous sections in this report, e.g. Section 3.2 for the nationality of the 15 largest companies and their parent company nationalities). The business segments Biorefineries and Detergents, hygiene products, etc. are underrepresented among foreign-owned companies. These two business segments have rather local/national markets for their products. Most companies with no or low exports are Swedish-owned. Similarly, most companies producing basic chemicals have international markets (and thus significant exports) and are foreign-owned.

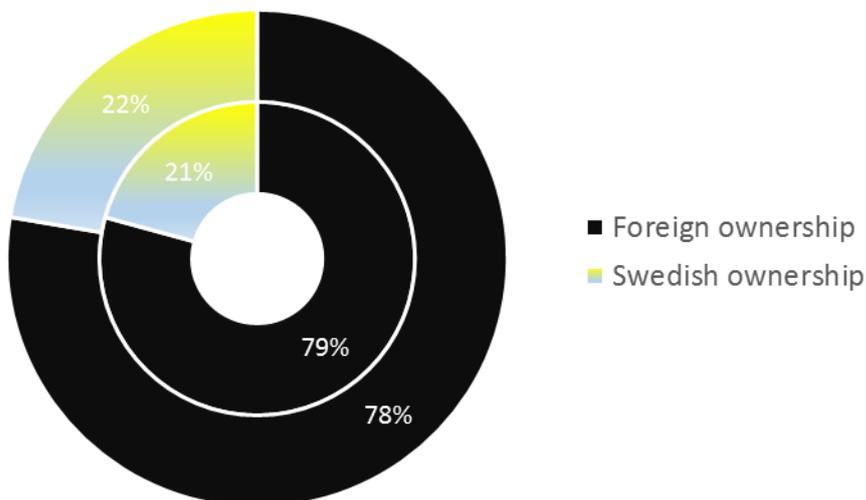
As can be seen in Figure 13, an absolute majority of the companies – 72% - have Swedish ownership and this share has increased since year 2010. Still, the absolute majority of the employees in the chemical industry work in companies with foreign ownership – 78%.

Figure 13 Share of (number of) companies with Swedish versus foreign ownership (upper) and share of employees in companies with Swedish versus foreign ownership (lower) for years 2010 and 2014 respectively

Share of companies with Swedish vs foreign ownership year 2014 (outer) and year 2010 (inner)



Share of FTEs in companies with Swedish vs foreign ownership year 2014 (outer) and year 2010 (inner)



Some key numbers are presented in Table 7 which show a comparison between foreign-owned and Swedish-owned companies in the chemical industry. The table shows that the average foreign-owned company is roughly nine times larger than the average Swedish-owned company

– seen to the number of FTEs. In year 2010 this difference was somewhat smaller, foreign-owned companies were about eight times larger compared to Swedish-owned. Further, the foreign-owned companies are more prone to show positive relative results even if this has evened out somewhat since year 2010.

Table 7 Comparable data for companies with foreign and Swedish ownership year 2014 (2010)

COMPARISON FOR YEAR 2014 (2010)	OWNERSHIP		ALL COMPANIES
	FOREIGN	SWEDISH	
NUMBER OF EMPLOYEES	~25 600 (~27 000)	~7 400 (~7 100)	~33 000 (~34 100)
NUMBER OF COMPANIES	124 (136)	314 (302)	438 (438)
AVERAGE NUMBER OF FTEs PER COMPANY	206 (199)	23 (24)	(78)
SHARE OF EMPLOYEES IN COMPANIES WITH POSITIVE RELATIVE RESULTS	88% (90%)	78% (74%)	86% (87%)
SHARE OF COMPANIES WITH POSITIVE RELATIVE RESULTS	77% (76%)	71% (65%)	74% (70%)

3.8 Industrial research programmes

In Sweden, there are no major industry research programmes or research foundations connected to the chemical industry in the way they are connected to other industry sectors such as the energy sector²⁸, pulp and paper industry²⁹ or iron and steel industry³⁰. Consequently, the chemical industry's trade association is not managing research programmes nor is it coordinating common national industry research in the same way as e.g., the trade organisation for the iron and steel industry does³¹.

Although in year 2014, the strategic innovation programme BioInnovation was established. The goal of BioInnovation is to increase the added value and competitiveness of the Swedish bio-based industry by creating the best possible conditions for the development of new bio-based materials, products and services. The programme is funded by Vinnova, the Swedish Energy Agency and Formas with active participation from the trade organisation for the chemical industry, the forest industry and the textile industry. Further, some of the more general research programmes financed by the Swedish Energy Agency could be applied also to the chemical industry³², as can parts of the research performed around the pilot and demonstration plants for production of the second generation biofuels (e.g. black liquor gasification in Piteå and production of ethanol etc. in Örnsköldsvik), but there are no industry specific programmes.

²⁸ E.g. Energiforsk: www.energiforsk.se.

²⁹ E.g. the Industry research for wood and forest (in Swedish Branschforskningsprogrammet för skogs- och träindustrin): <http://www.vinnova.se/upload/EPiStorePDF/vi-10-03.pdf> and The pulp and paper industry's energy use - research and development 2015-2019: <http://www.energimyndigheten.se/forskning-och-innovation/forskning/industri/massa-och-papper/program/massa--och-pappersindustrins-energianvandning--forskning-och-utveckling-2015-2019/>

³⁰ E.g. Energy use in the Iron and steel industry - research and development 2013-2017: <http://www.energimyndigheten.se/forskning-och-innovation/forskning/industri/jarn-och-stal/program/jarn--och-stalindustrins-energianvandning--forskning-och-utveckling-2013-2017/>

³¹ E.g. Jernkontoret is managing the common Nordic steel research and administrates two large research programmes funded by the Swedish Energy Agency and VINNOVA.

³² E.g. programmes on energy efficiency such as the previous "Effektivisering av industrins energianvändning" and the current "Industrins energianvändning – forskning och utveckling 2015-2019".

Publicly financed industry research programmes which encourage additional funding by participating industry partners is one way R&D operators and industry can approach and learn from each other. The lack of such initiatives in Sweden can be one reason to why information regarding R&D collaboration between public and private actors was difficult to find for the chemical industry during the work for this report.

Despite the lack of industry related research programmes and research foundations, significant research is carried out in the field of chemistry and chemical engineering at many Swedish universities and research institutes, some of which are briefly described in the Appendix, together with related knowledge centres, science parks, etc.

3.9 Participation in the European seventh framework programme

Of the companies included in the present study, 28 have participated in the European Seventh Framework Programme (FP7) (see Table 8). Most large companies with significant R&D in Sweden are represented in Seventh Framework Programme Projects, e.g., AstraZeneca, Perstorp Speciality chemicals, Casco Adhesives and Akzo Nobel Pulp and Performance Chemicals (the latter two are both part of the Akzo Nobel group) whereas some are not, e.g., Borealis and Nynas. AstraZeneca dominates the statistics with participation in 56 projects. Regarding coordination of projects, Viscogel and Bohus Biotech are both coordinator of their respective projects in the ‘research for SMEs’ section of the programme. In Energy, Swedish Biofuel is the coordinator of one project and in addition to this AstraZeneca coordinates some of the projects they participate in. Six companies are involved in more than one project. The table shows that the business segment with the most projects by far is “Pharmaceutical products, reagents, etc.” with 73 participations (equal to 79% of the total number of participations by the Swedish chemical industry). The second most active business segment(s) are “Chemical products” (and its sub-segments) with 10 participant projects. Out of these 14 participants, the development company SweTree Technologies and the consultant firm PP-Polymer stand for almost half (6).

In total, the chemical industry’s participation equals approximately 7% of the total Swedish business participation including SME. Compared to the chemical industry’s share of exports (see Section 3.4), and given that more than half of the participant projects are made by AstraZeneca, the Swedish chemical industry’s participation in the seventh framework programme must be regarded as low.

Table 8 Participation in the European Seventh Framework Programme by chemical industry companies

FP7 PROGRAMME (NAME IN ITALIC FONT INDICATE COORDINATION OF AT LEAST ONE PROJECT)	BUSINESS SEGMENT	ENERGY	ENVIRONMENT	HEALTH	ICT	FOOD, AGRICULTURE AND FISHERIES, AND BIOTECHNOLOGY	NANOSCIENCES, NANOTECHNOLOGIES, MATERIALS & NEW PRODUCTION TECHNOLOGIES	PEOPLE	SMALL AND MEDIUM SIZED ENTERPRISES	SPACE	JOINT TECHNOLOGY INITIATIVE	TOTAL NO. OF PARTICIPANT PROJECTS
AKZO NOBEL INDUSTRIAL COATINGS							1					1
ASTRAZENECA				5	2		1	9			39	56
BACTIGUARD				2					1			3
BOHUS BIOTECH									1			1
CASCO ADHESIVES							1					1
CHEMREC		1										1
AKZO NOBEL PULP AND PERFORMANCE CHEMICALS							1					1
EEURENCO BOFORS										1		1
FUJIREBIO DIAGNOSTICS				1	1							2
GE HEALTHCARE BIO-SCIENCES				1								1
I-TECH						1						1
LAVIVO									1			1
LINOTECH									1			1
NEXAM CHEMICAL											1	1
NORSTEL							1					1
ORGANOCLICK						1						1
PERSTORP SPECIALITY CHEMICALS			1									1
PHADIA											1	1
PLASMATRIX MATERIALS							2					2
POLYKEMI							1					1
POLYPEPTIDE LABORATORIES							1					1
PP-POLYMER				1					1			2
PREEM		1										1
SEKAB E-TECHNOLOGY						2						2
SWEDISH BIOFUELS		1										1
SWEDISH ORPHAN BIOVITRUM				1								1
SWETREE TECHNOLOGIES						3	1					4
VISCOGEL									1			1
CHEMICAL INDUSTRY TOT.		3	1	11	3	7	10	9	6	1	41	92

Source: Vinnova using data from e-corda (extraction date 2015-11-11)

3.10 Participation in Horizon 2020

Horizon 2020 (H2020) is a part of the EU Framework Programme for Research and Innovation. H2020 spans over seven years, from year 2014 to year 2020. Of the companies included in the present study, 8 have so far participated H2020 (see Table 9)³³. Some of the participating companies are fairly large with significant R&D or R&D collaborations in Sweden, e.g., AstraZeneca, Akzo Nobel Pulp and Performance Chemicals and Preem and some are rather small, e.g. Binab Bioinnovation and Norstel. The companies all participate, none of them have the role as coordinator for a project. Two of the eight companies are involved in more than one project. AstraZeneca dominates the statistics with respect to number of participations through participation in 7 projects. However, Sekab E-Technology is the company which has received the largest sum of granted funds (roughly double the amount of granted funds compared to AstraZeneca). The table shows that the business segment with the most projects by far is “Pharmaceutical products, reagents, etc.” with 8 participations (equal to 50% of the total number of participations by the Swedish chemical industry). The second most active business segment(s) are “Chemical products” (and its sub-segments) with 3 participant projects.

In total, the chemical industry’s participation equals approximately 6% of the total Swedish business participation including SME. As to date, the chemical industry’s share of business participation in H2020 is slightly lower compared to the chemical industry’s share of business participation in the European Seventh Framework Programme (which was ~7%, see previous section).

About half of the companies that have participations in H2020 previously also participated in the European Seventh Framework Programme.

Table 9 Participation in Horizon 2020 by chemical industry companies

COMPANY	BUSINESS SEGMENT	TOTAL NO. OF PARTICIPANT PROJECTS
ASTRA ZENECA AB	Pharmaceutical products, reagents, etc.	7
AKZO NOBEL PULP AND PERFORMANCE CHEMICALS AB	Chemical products	2
SEKAB E-TECHNOLOGY AB	Chemical products	2
ASTAREAL AB	Pharmaceutical products, reagents, etc.	1
PREEM AKTIEBOLAG	Chemical products	1
BINAB BIO-INNOVATION AB	Chemical products	1
NORSTEL AKTIEBOLAG	Chemical products	1
EURENCO BOFORS AKTIEBOLAG KARLSKOGA	Chemical products	1

Source: Vinnova Analysis VA 2016:02 using data from eCORDA (extraction date 2015 10 30)

³³ All data for this section are manually extracted from the Vinnova report VA 2016:02 which in turn is based on data from EUs database eCORDA per 30th October 2015.

3.11 Analysis of industrial dynamics years 2007-2014

The industrial dynamics in the chemical industry is illustrated by the structure of ownership and size in Figures 14-16 and Table 10.

As can be seen in Figure 14, between year 2007 and year 2014 the relative share of independent companies (that is companies not belonging to a group) decreased from 36% to 33%. The independent companies are all, however, all SMEs and thus they only constitute a minor share of the number of FTEs, about ~2%.

Figure 14 Share of (number of) companies that were independent versus were belonging to a group for years 2010 and 2014 respectively (only active companies with at least one employee for the actual year included)

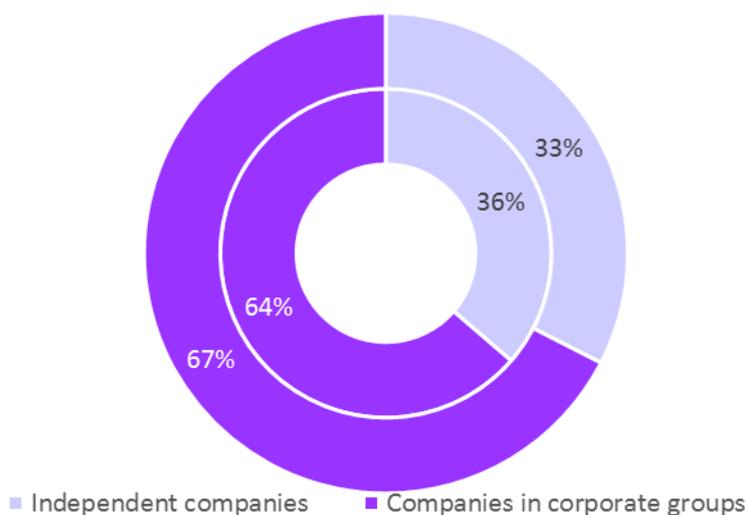
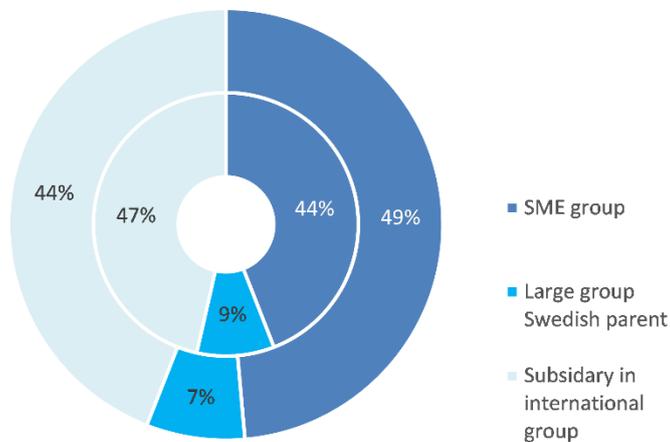


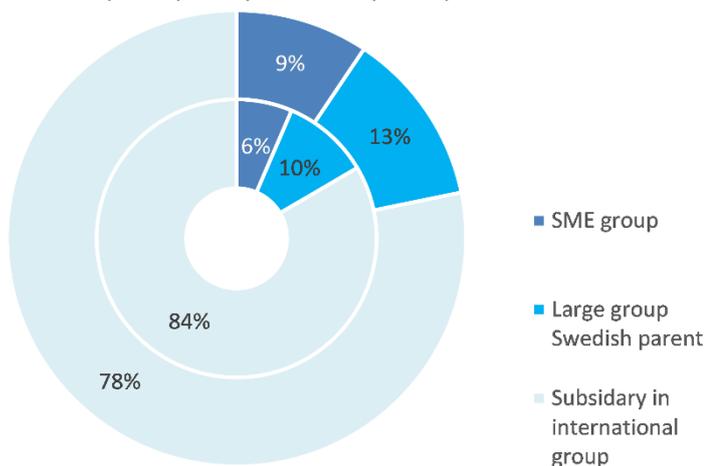
Figure 15 shows the distribution of number of companies and number of FTEs in companies belonging to different types of groups. As can be seen in the figure, a relative increase can be seen for the category of companies belonging to an SME group (that is all companies in group are SMEs) and for the category of companies belonging to a (larger) group with Swedish parent. In Table 10, lists of country affiliations of parent companies for the companies which belong to a company group is presented for year 2007 and year 2014. As can be seen in Table 10 and in Figure 14, the number of companies in corporate groups have increased in both absolute and relative terms and the ownership is also distributed on a larger amount of countries for year 2014 compared to year 2007.

Figure 15 Share of number of companies (upper diagram) and number of FTEs (lower diagram) in companies divided by different types of corporate groups for year 2007 (inner circle) and year 2014 (outer circle) respectively

Share of number of companies divided by type of group, year 2007 (inner) and year 2014 (outer)



Share of FTEs in companies divided by type of group, year 2007 (inner) and year 2014 (outer)



As can be seen in Table 10, Sweden, USA and the Netherlands are the most common countries for affiliation of parent company for the companies in the Swedish Chemical industry. Jointly these three countries accounts for about 70% of the parent county affiliation (year 2007 as well as year 2014).

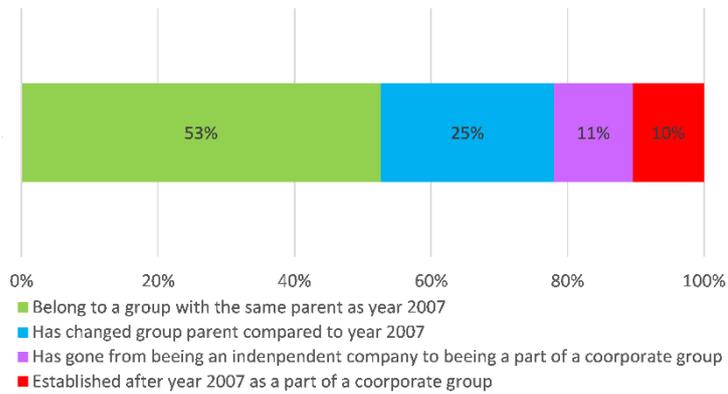
Table 10 List of country affiliations of parent company for the companies which belong to a group, year 2007 and year 2014 respectively

COUNTRY AFFILIATION PARENT COMPANY	NO. OF COMPANIES YEAR 2007	COUNTRY AFFILIATION PARENT COMPANY	NO. OF COMPANIES YEAR 2014
SWEDEN	136	Sweden	160
USA	23	USA	30
THE NETHERLANDS	17	The Netherlands	14
LUXEMBURG	10	Switzerland	10
FRANCE	9	Deutschland	9
DEUTSCHLAND	7	France	9
DENMARK	7	Finland	7
NORWAY	6	Denmark	7
GREAT BRITAIN	6	Great Britain	5
FINLAND	5	Cyprus	4
SWITZERLAND	5	Norway	4
CYPRUS	3	Luxemburg	3
AUSTRIA	2	Austria	2
BELGIUM	2	Belgium	2
JAPAN	2	Singapore	2
BRITISH VIRGIN ISLANDS	2	Ireland	2
AUSTRALIA	1	Italy	2
CHINA	1	Japan	2
INDIA	1	China	1
ITALY	1	UAE	1
NOT AVAILABLE	8	Australia	1
		Bermuda	1
		Canada	1
		Spain	1
		Guernsey	1
		India	1
		Jersey	1
		Venezuela	1
		British Virgin Islands	1
		Not available	1
TOTAL NO. COMPANIES IN CORPORATE GROUPS	254	TOTAL NO. COMPANIES IN CORPORATE GROUPS	286

Finally, regarding industrial dynamics, Figure 16 illustrates the companies which belonged to a company group in year 2014. As can be seen in the figure, 10% of the companies were established after 2007 as a part of a group. About 11% of the companies in a group year 2014 were independent companies in year 2007 and 25% had a different group parent in year 2014

compared to year 2007 (merged or bought). The remaining 53% belonged to a group with the same group parent year 2014 as year 2007.

Figure 16 Illustration of companies in a group in year 2014 divided by their (group) status in year 2007



4 Profiles for business segments

This section presents the cluster profiles for each business segment. For each business segment, a short discussion is given regarding some of the perspectives that can be seen in the figures. The reader is encouraged to make his/her own further interpretations.

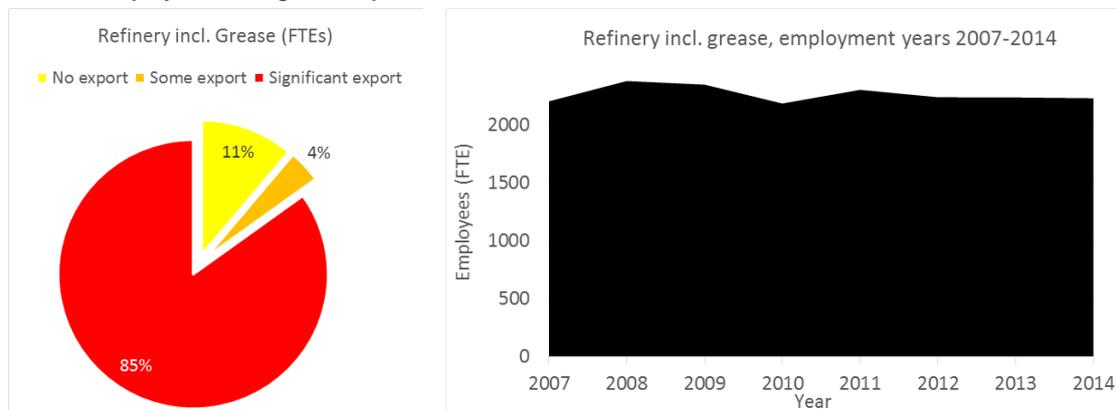
4.1 Refinery (including grease)

In 2014, the refinery industry, including the production of graphite and grease, employed 2 200 people (FTE). The number of FTEs have remained fairly constant over the years 2007 to 2014. The business segment is largely made up by three larger refinery companies, Preem, Nynäs, and St1 Refinery (previously Shell Raffinaderi), one graphite producer (Superior Graphite) and a limited number of companies developing and manufacturing grease (Axel Christiernsson, Statoil Fuel & Retail Lubricants Sweden, etc.). The main activities are carried out in Västra Götaland and the areas around Stockholm, apart from Superior Graphite which has their business in Sundsvall.

Most of the companies have R&D within the company (e.g., Axel Christiernsson) or are working with product development in cooperation with R&D performers (e.g., Preem). One interesting example to put forward is the joint work which has resulted in Preem's Evolution Diesel. This product is based on tall oil from the pulp and paper industry which is refined by the company Sunpine (in the business segment Biorefinery), further processed in Preem's refinery in Göteborg (to HVO) and then blended into the diesel and sold as a partly green product. Here companies have worked together along the value chain and through joint ownership of the company (Sunpine) innovation has been achieved. Since 2015 also St1 Refinery has some of their production biobased, producing ethanol from waste.

Figure 17 Profile business segment Refinery including grease

5 Largest sites/companies: Preem, Nynäs, St1 Refinery, Statoil Fuel & Retail Lubricants Sweden, Exxonmobil
Share of employment 5 largest companies: 88%



4.2 Biorefinery

This business segment consists of two types of companies, larger exporting companies (Lantmännen Agroetanol, SEKAB, Arizona Chemicals, Domsjö Fabriker, etc.) and smaller companies devoted to development and demonstration of biorefinery technologies in which consultants and research partners also are represented (e.g., Taurus Energy, Lignoboost Demo). The business segment additionally includes facilities currently under development such as Network Biogas (previously Nordisk Etanol och Biogas).

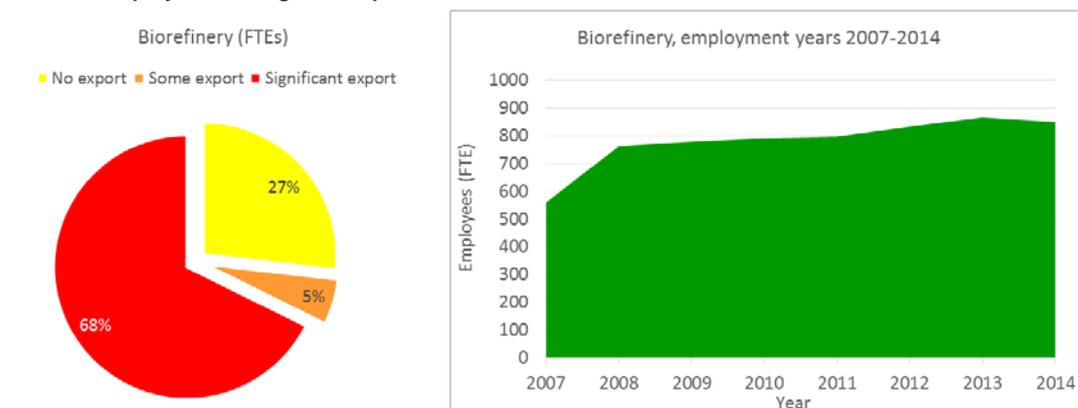
In total year 2014 the biorefinery business segment employed 850 FTEs out of which 75% were located in northern Sweden (in this report defined as region North see Section 2.6). The number of FTEs has grown by 42% between the years 2007 and 2010 and by an additional 7% between years 2010 and 2014. Most of the companies engage in R&D and/or product development, commonly in clusters or in cooperation with other R&D actors or companies. Less than 50% of the companies showed positive results for 2014, however, the share of companies with positive results have radically improved since year 2010 (when only ~22% of the companies showed positive relative results). Year 2014 only about 17% of the employees worked in companies with foreign ownership, a very low share compared to the industry average of 78%.

Currently, most companies are focused on development and manufacturing of biofuels, for example Perstorp Bioproducts, which is Sweden's largest producer of RME. Further, Domsjö Fabriker is Sweden's largest producer of biogas, although their main product is celluloses used for manufacturing of textiles (viscose). However, some of the companies develop and manufacture chemicals or materials (e.g., Arizona Chemicals and Organoclic) and some are focused on process development (e.g., Bioendev and the process for torrefaction and Värmlandsmetanol and the process for producing methanol from wood).

Figure 18 Profile business segment Biorefinery

5 Largest sites/companies: Domsjö Frabriker, Arizona Chemicals, Lantmännen Agroetanol, Sekab Biofuels & Chemicals, Sunpine

Share of employment 5 largest companies: 84%



4.3 Basic chemicals

In this business segment, products are produced which are used for further processing in other business segments and industry sectors. The market for these products are global, and consequently, most companies in this business segment have some or significant exports. In year 2014, this business segment employed 7 063 FTEs. Between the years 2007 and 2010 the employment in this business segment decreased by 12% but after year 2010 the decrease has slowed and between years 2010 and 2014 the decrease in FTEs was only ~2%. The companies are mainly located around Göteborg, Malmö/Lund, and Sundsvall. The companies in this business segment are rather diverse. For example, there is only one producer of polyethylene, PE, in Sweden (Borealis) and only one producer of polyvinylchloride, PVC (INOVYN).

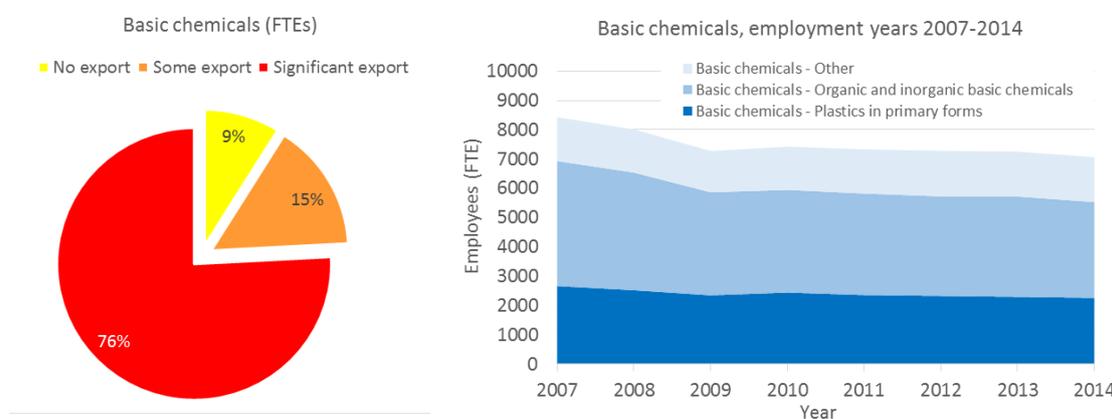
Within this business segment, R&D is almost exclusively performed by foreign-owned large companies and corporate groups such as Borealis, Akzo Nobel Group and Perstorp Group. Exceptions are the, rather new, companies BIM Kemi and Nexam Chemical, known for their innovation.

One corporate group worth mentioning, especially concerning environmental issues, is Akzo Nobel which has been acknowledged for its sustainability work e.g., by the continuously high rankings on the Dow Jones Sustainability index. Apart from Astra Zeneca, the Akzo Nobel group is also the main employer within the chemical industry, see Section 3.2.

Figure 19 Profile business segment Basic Chemicals

5 Largest sites/companies: Aga Gas, Borealis, Akzo Nobel Pulp and Performance Chemicals, Akzo Nobel Surface Chemistry, Akzo Nobel Functional Chemicals

Share of employment 5 largest companies: 48%



4.4 Chemical products

This is the largest business segment with regards to the number of companies. Most companies included are, however, fairly small themselves. The products produced by companies in this business segment are very diverse. The main activities are, however, similar among the companies. Most companies have their main activities in manufacturing and incremental product development. Within the sub-segment “Detergents and hygiene products, etc.” contract manufacturers are more common than within the other sub-segments. The companies are evenly

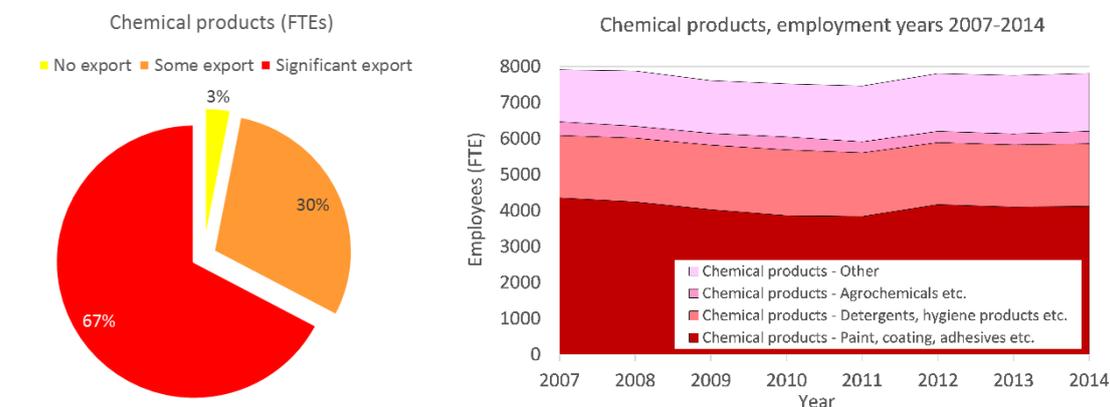
spread in all five regions and employed 7 817 FTEs in year 2014, an increase of ~500 FTEs compared to the year 2010, and reduction of 2% compared to the year 2007.

The R&D carried out within the companies in this business segment is partly directed towards developing new products based on biogenic feedstock. Furthermore, R&D is both carried out in larger companies with significant exports (e.g., Akzo Nobel Decorative Coating) and smaller companies lacking export (e.g., I-Tech developing novel antifouling solutions). However, the vast majority of companies in this business segment do not have R&D activities.

Figure 20 Profile business segment Chemical Products

5 Largest sites/companies: Flügger, Orica Sweden, Sherwin-Williams Sweden, Cederroth, Akzo Nobel Decorative Coating

Share of employment 5 largest companies: 22%



4.5 Pharmaceutical products, reagents, etc.

With respect to its 15 000 FTEs in the year 2014, this is the largest business segment in the chemical industry. A majority of the companies in this business segment is covered more in depth in previous, similar, analyses of the Life Science industry³⁴. The absolute majority of the companies are located in central Sweden around Stockholm and Uppsala although the segment shows the largest increase in employees (FTEs) in the area around Göteborg/Mölnådal.

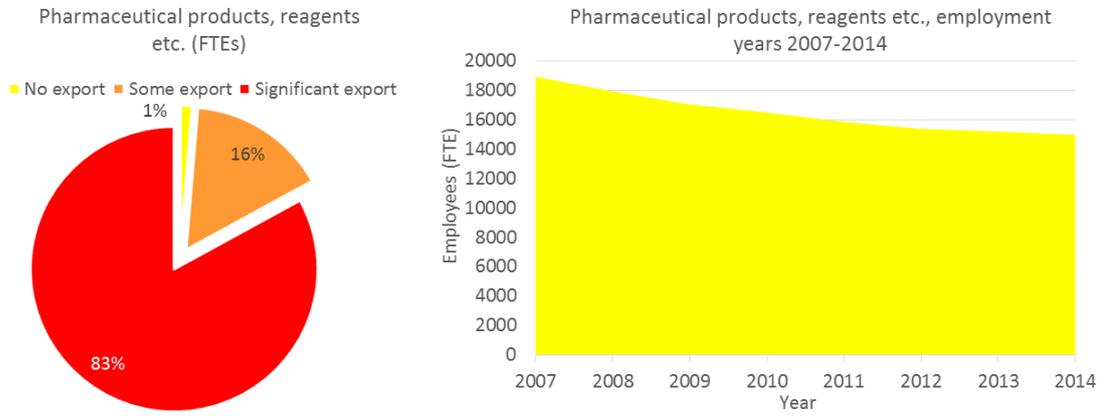
Within the chemical industry, this is the business segment with by far the most R&D activities. It is, however, also the business segment which has reduced its employees the most between the years 2007 and 2014, in absolute and relative terms. The repeated cut backs made by AstraZeneca are the largest contributor to this development, since AstraZeneca is – still – by far the largest company, both within the business segment and within the chemical industry as a whole. From this perspective it is interesting to note that the company Fresenius Kabi has moved parts of its R&D back to Sweden in the last couple of years. Apart from the R&D intensive companies, this business segment also comprises many contract manufacturers.

³⁴ E.g. Global trends with local effects – Swedish Life Science Industry 1998-2012, Vinnova Analysis VA 2014:3 and Svensk Life Science industri efter AstraZenecas nedskärningar, Vinnova Analys VA 2012:07 available at <http://www.vinnova.se/sv/Om-VINNOVA/VINNOVA-och-omvarlden/Trender-i-Sveriges-kunskapsintensiva-naringsliv/>.

Figure 21 Profile business segment Pharmaceutical products, reagents, etc

5 Largest sites/companies: AstraZeneca, GE Healthcare Bio-Sciences, Fresenius Kabi, Octapharma, McNeil

Share of employment 5 largest companies: 63%



5 Regional cluster profiles

Figure 22 shows the share of employees in the chemical industry out of the total population in the working age for the different counties in Sweden. It should be noted that in addition to a high employment ratio in the counties close to the three regions with the highest density of companies (Stockholm, Uppsala, Skåne and Västra Götaland, see e.g., Figure 9), the chemical industry also employs a large share of the population in the counties of Västernorrland (1%) and Örebro (0.8%). The average number for the whole of Sweden is 0.5%.

Figure 22 Percentage of employees in the chemical industry per county out of total population in the working age, year 2014

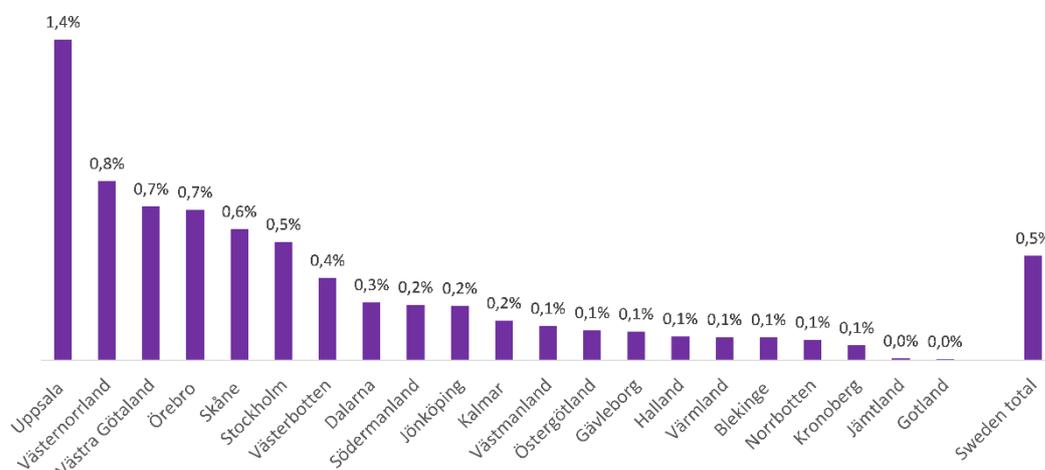
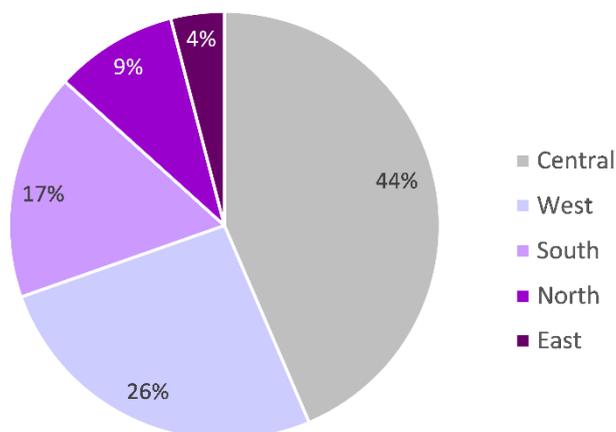


Figure 23 shows how the number of employees (FTEs) are distributed between the five regions analysed (see Section X for definition of regions). As can be seen in the figure region Central and region West together stand for 70% of the total employment in the Chemical industry (year 2014). Sections 5.1-5.5 presents the regional cluster profiles for the five regions analysed.

Figure 23 Employment in the chemical industry year 2014 divided per region

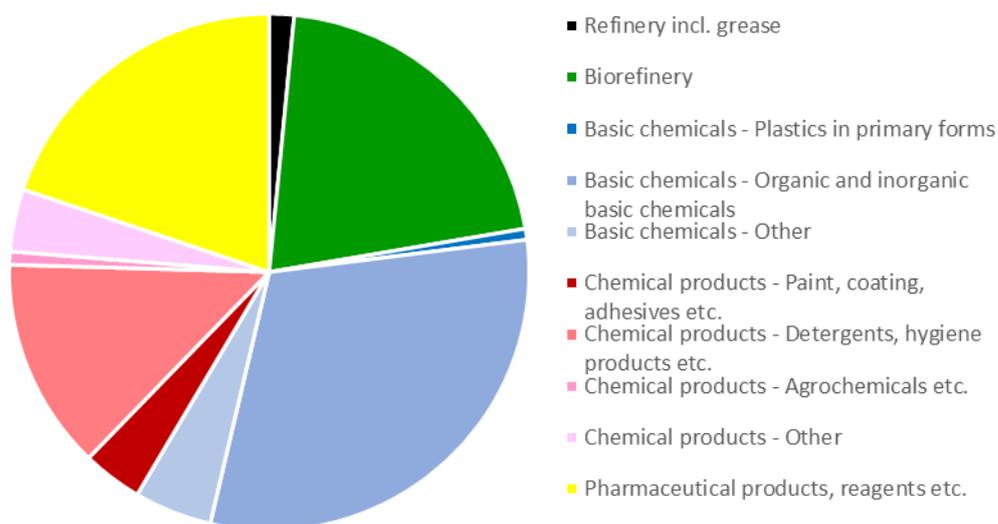


5.1 Region North

In Region North, a large share of the employees work in chemical industry companies which are biorefineries (e.g., Domsjö Fabriker, Sekab, Sunpine) or use biogenic feedstock (Akzo Nobel Group). Most of the business segments are well represented in the region. The region represents 14% of the business units/sites in the chemical industry, but only 9% of the employees, indicating that the companies and company sites located in the region are smaller compared to the average.

Figure 24 Overview of the cluster profile for Region North

EMPLOYEES IN REGION NORTH DIVIDED BY BUSINESS SEGMENT



NUMBER OF EMPLOYEES 2014 (2010)	3 043 (3 238)	Share of chemical industry in Sweden total	9% (9%)
NUMBER OF BUSINESS UNITS/SITES 2014 (2010)	118 (105)	Share of chemical industry in Sweden total	16% (15%)
SHARE OF BUSINESS OR PRODUCTION UNITS IN REGION NORTH WITH PRODUCT DEVELOPMENT OR R&D			22%
SHARE OF EMPLOYEES IN REGION NORTH EMPLOYED IN COMPANIES WITH POSITIVE RESULTS 2010 (86% IN ALL OF SWEDEN)			85%
SHARE OF EMPLOYEES EMPLOYED IN SWEDISH OWNED COMPANIES IN REGION NORTH (22% IN ALL OF SWEDEN)			40%

FIVE LARGEST SITES/COMPANIES: DOMSJÖ FRABRIKER, GE HEALTHCARE BIO-SCIENCES, AKZO NOBEL PULP AND PERFORMANCE CHEMICALS, CEDERROTH, AKZO NOBEL FUNCTIONAL CHEMICALS

EMPLOYMENT SHARE FIVE LARGEST SITES/COMPANIES IN REGION NORTH: 42%

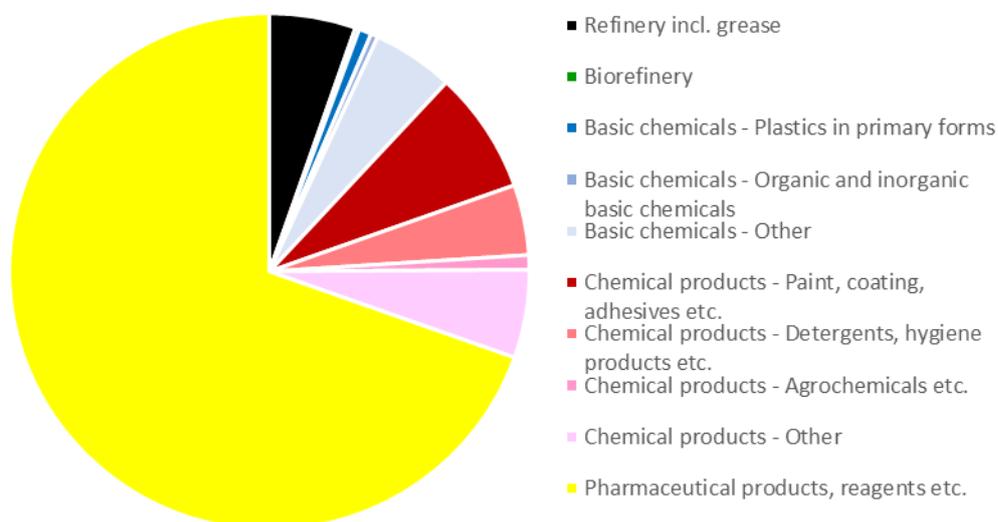
Many of the companies in the region engage in product development and/or R&D. With respect to this, the cluster of companies in Örnsköldsvik (where e.g., Domsjö Fabriker and Sekab are located) should be mentioned as an innovative and research oriented environment where companies share both feedstock and R&D resources. As has already been mentioned, other regional cluster initiatives and research environments include SP Processum and Bio4Energy.

5.2 Region Central

Region Central is dominated by companies which develop and manufacture pharmaceutical products and chemical products for medical purposes and many of the companies have significant R&D activities. Almost half (44%) of the employees in the chemical industry work in this region in year 2014 and the companies are larger than average. The second largest business segment is production of different chemical products, which in total represents 18% of the employees in the chemical industry in the region. Examples of companies in Region Central which are active in other business segments than pharmaceuticals and medical products are Nynäs with its oil refinery in Nynäshamn, Organoclick, which develops fiber based materials, Akzo Nobel Casco Adhesives, which develops adhesives and has their headquarters in Stockholm, and Orica Sweden which manufactures explosives.

Figure 25 Overview of the cluster profile for Region Central

EMPLOYEES IN REGION CENTRAL DIVIDED BY BUSINESS SEGMENT



NUMBER OF EMPLOYEES 2014 (2010)	14 354 (15 599)	Share of chemical industry in Sweden total	44% (46%)
NUMBER OF BUSINESS UNITS/SITES 2014 (2010)	225 (211)	Share of chemical industry in Sweden total	31% (31%)
SHARE OF BUSINESS OR PRODUCTION UNITS IN REGION CENTRAL WITH PRODUCT DEVELOPMENT OR R&D			28%
SHARE OF EMPLOYEES IN REGION CENTRAL EMPLOYED IN COMPANIES WITH POSITIVE RESULTS 2010 (86% IN ALL OF SWEDEN)			88%
SHARE OF EMPLOYEES EMPLOYED IN SWEDISH OWNED COMPANIES IN REGION CENTRAL (22% IN ALL OF SWEDEN)			21%

FIVE LARGEST SITES/COMPANIES: ASTRAZENECA, GE HEALTHCARE BIO-SCIENCES, FRESENIUS KABI, OCTAPHARMA, PHADIA

EMPLOYMENT SHARE FIVE LARGEST SITES/COMPANIES IN REGION CENTRAL: 44%

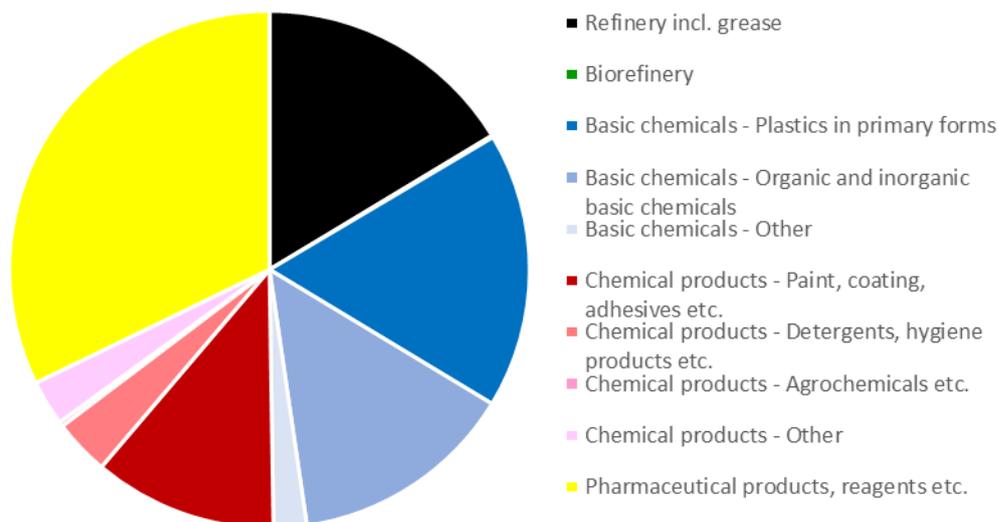
5.3 Region West

In the western part of Sweden, the basic chemical industry and the refinery industry are the main employers within the chemical industry. Another large employer is AstraZeneca that have a large development unit in Mölndal close to Göteborg. In relation to Swedish chemical industry as a whole, many of the companies show positive results, however, the share of employees in companies with positive results are just below the national average. Further, compared to the chemical industry as a whole region West also shows a growth within the business segment Pharmaceutical products etc. for the years 2010-2014. Also, the companies in Region West are to a greater extent than average foreign-owned.

Cluster initiatives have been formed in the region and the large chemical companies in Stenungsund (Borealis, INOVYN, Akzo Nobel, Perstorp and AGA) work together with a joint vision on Sustainable Chemistry by 2030 and together with other regional actors through a regional initiative, “Det Västsvenska Kemi- och Materialklustret”. Furthermore, within the region, Green chemistry and biobased products have been appointed as one of five strategic areas and is identified as a regional strength.

Figure 26 Overview of the cluster profile for Region West

EMPLOYEES IN REGION WEST DIVIDED BY BUSINESS SEGMENT



NUMBER OF EMPLOYEES 2014 (2010)	8 567 (8 285)	Share of chemical industry in Sweden total	26% (24%)
NUMBER OF BUSINESS UNITS/SITES 2014 (2010)	170 (159)	Share of chemical industry in Sweden total	24% (23%)
SHARE OF BUSINESS OR PRODUCTION UNITS IN REGION WEST WITH PRODUCT DEVELOPMENT OR R&D			29%
SHARE OF EMPLOYEES IN REGION WEST EMPLOYED IN COMPANIES WITH POSITIVE RESULTS 2010 (86% IN ALL OF SWEDEN)			83%
SHARE OF EMPLOYEES EMPLOYED IN SWEDISH OWNED COMPANIES IN REGION WEST (22% IN ALL OF SWEDEN)			18%
FIVE LARGEST SITES/COMPANIES: ASTRAZENECA, BOREALIS, PREEM, AKZO NOBEL PULP AND PERFORMANCE CHEMICALS, INOVYN SVERIGE			
EMPLOYMENT SHARE FIVE LARGEST SITES/COMPANIES IN REGION WEST: 54%			

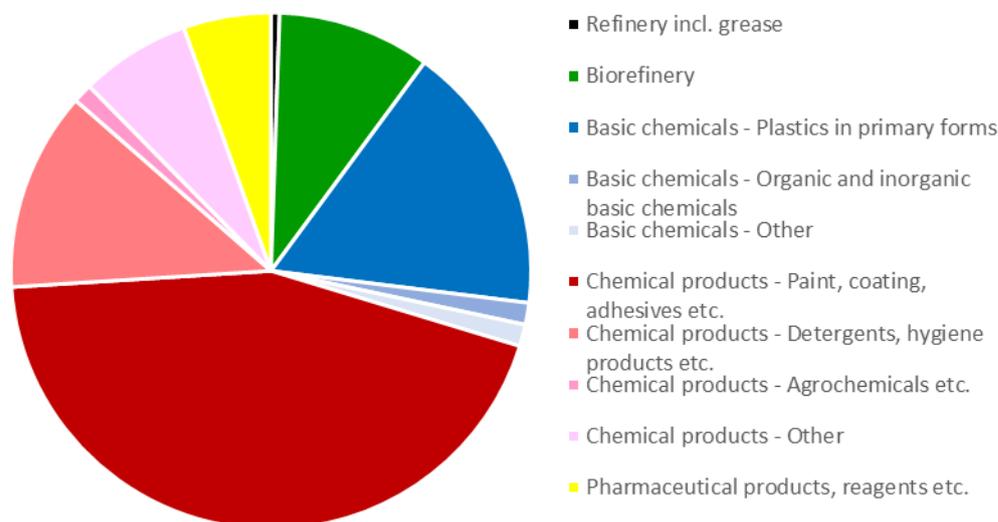
5.4 Region East

Out of the five regions, Region East has by far the smallest share of chemical industry. Here the chemical industry employed 1 323 people in year 2014 in 53 companies. This is an increase compared to year 2010 when 42 companies employed 1250 people in region East. Most companies produce different chemical products and only a few are active in product development and R&D. Compared to the industry as a whole, the companies in this region are small.

Compared to the industry as a whole, many of the employees work in companies with negative relative results and the companies are to a greater extent Swedish-owned compared to the other regions.

Figure 27 Overview of the cluster profile for Region East

EMPLOYEES IN REGION EAST DIVIDED BY BUSINESS SEGMENT



NUMBER OF EMPLOYEES 2014 (2010)	1 323 (1 254)	Share of chemical industry in Sweden total	4% (4%)
NUMBER OF BUSINESS UNITS/SITES 2014 (2010)	59 (53)	Share of chemical industry in Sweden total	8% (8%)
SHARE OF BUSINESS OR PRODUCTION UNITS IN REGION EAST WITH PRODUCT DEVELOPMENT OR R&D			10%
SHARE OF EMPLOYEES IN REGION EAST EMPLOYED IN COMPANIES WITH POSITIVE RESULTS 2010 (86% IN ALL OF SWEDEN)			68%
SHARE OF EMPLOYEES EMPLOYED IN SWEDISH OWNED COMPANIES IN REGION EAST (22% IN ALL OF SWEDEN)			38%

FIVE LARGEST SITES/COMPANIES: SHERWIN-WILLIAMS SWEDEN, AKZO NOBEL INDUSTRIAL FINISHES, CARPENTER SWEDEN, AXALTA POWDER COATING SYSTEMS NORDIC, LANTMÄNNEN AGROETANOL

EMPLOYMENT SHARE FIVE LARGEST SITES/COMPANIES IN REGION EAST: 47%

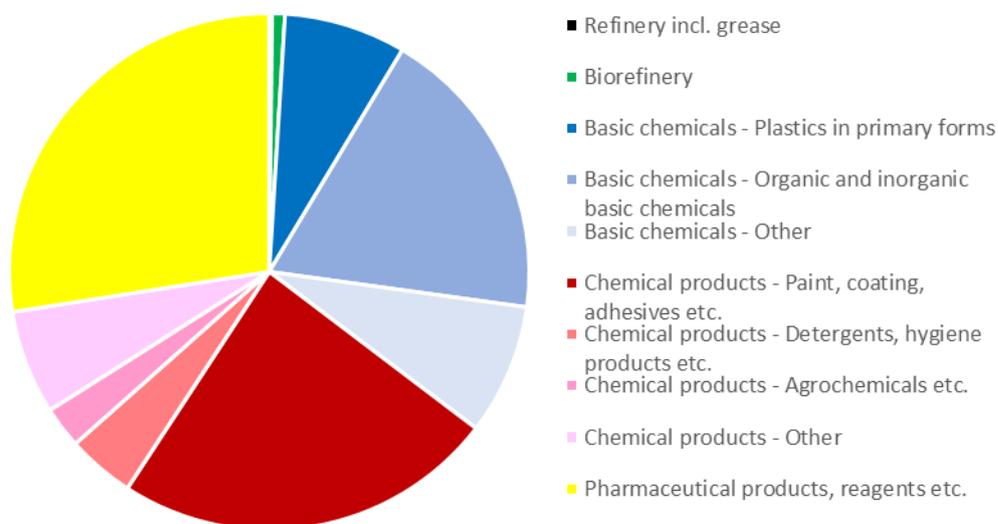
5.5 Region South

In Region South there is an even distribution between companies producing basic chemicals, different chemical products, and pharmaceutical products. Most of the companies are located in and around Malmö, Lund, and Perstorp. In total, the region represents 17% of the employees and roughly 30% of the companies within the chemical industry in Sweden (year 2014).

Compared to year 2010 the business segment Pharmaceutical products etc. stands for a significantly lower share of the employees in the chemical industry in region South by year 2014.

Figure 28 Overview of the cluster profile for Region South

EMPLOYEES IN REGION SOUTH DIVIDED BY BUSINESS SEGMENT



NUMBER OF EMPLOYEES 2014 (2010)	5 653 (5 763)	Share of chemical industry in Sweden total	17% (17%)
NUMBER OF BUSINESS UNITS/SITES 2014 (2010)	160 (162)	Share of chemical industry in Sweden total	22% (23%)
SHARE OF BUSINESS OR PRODUCTION UNITS IN REGION SOUTH WITH PRODUCT DEVELOPMENT OR R&D			29%
SHARE OF EMPLOYEES IN REGION SOUTH EMPLOYED IN COMPANIES WITH POSITIVE RESULTS 2010 (86% IN ALL OF SWEDEN)			86%
SHARE OF EMPLOYEES EMPLOYED IN SWEDISH OWNED COMPANIES IN REGION SOUTH (22% IN ALL OF SWEDEN)			19%

FIVE LARGEST SITES/COMPANIES: MCNEIL, PERSTORP SPECIALTY CHEMICALS, PERSTORP, KEMIRA KEMI, AKZO NOBEL INDUSTRIAL COATINGS

EMPLOYMENT SHARE FIVE LARGEST SITES/COMPANIES IN REGION SOUTH: 30%

6 Competence mapping in the Chemical industry 2007-2013

This chapter presents data for the people who work in the chemical industry in Sweden. The parameters illustrated in the different figures are presented in Section 2.9. The illustrations given in this section is a (small) selection and further analysis and illustrations can be produced if needed for in-depth analyses of different parameters, regions, business segments, etc. For each illustration a short description is given, this way, the reader is encouraged to make his/her own further interpretations.

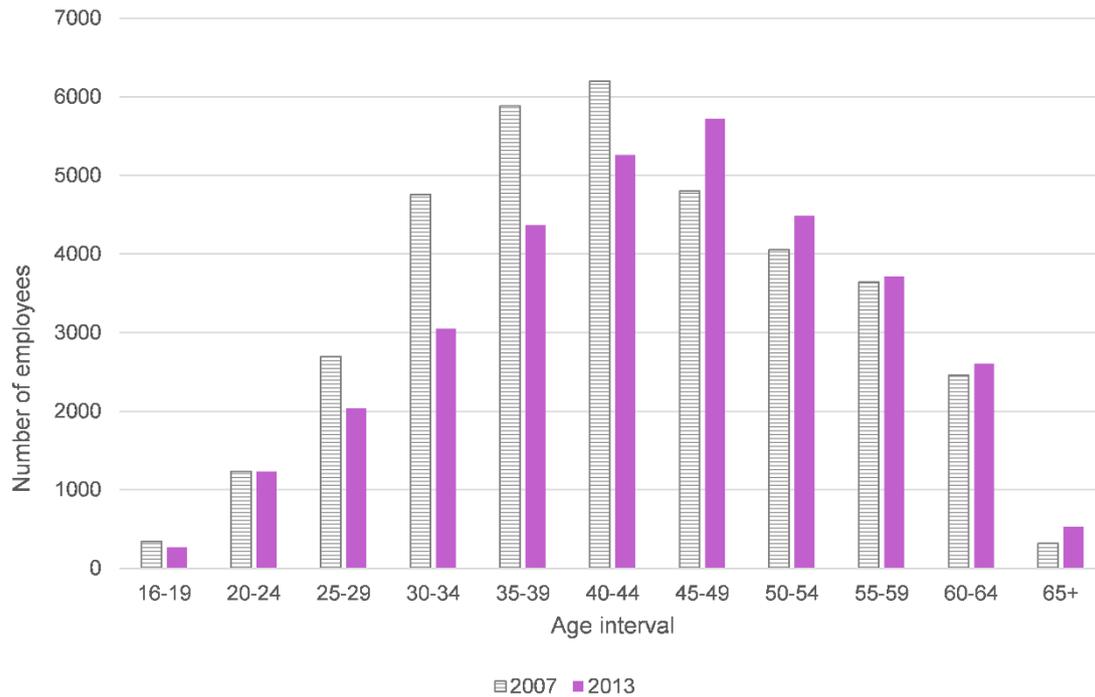
It should be noted that the data set used for the figures and analysis in this chapter (ordered from SCB) is not exactly the same as the database data (extracted by Vinnova) used in the rest of the report. Both sources cover the same population of companies i.e. companies active in the chemical industry in Sweden. The difference between the two materials is primarily that the database data (Vinnova) is presented per enterprise, whilst the SCB material (this chapter) is reported based on the people who work in the sector and sub-sectors and size groups of enterprises. Although the enterprise population is the same in both data sets, there are minor discrepancies between them (see Section 2.9). These deviations have, however, been judged so limited that there is no problem as long as the data from the two sources are not hard-linked together. Further, at the time of writing this report the competence analysis data was not available for year 2013 and thus this chapter only includes data/figures for years 2007-2013 (compared to the database which includes data also for year 2014).

6.1 Age structure

Figure 29 shows the age structure for the employees in the chemical industry for year 2007 and 2013 respectively. As can be seen in the figure, the employees in the chemical industry are on average older year 2013 compared to year 2007. In principal, the number of employees in all age intervals below 45 years have decreased whereas the number of employees in the age intervals above 45 years have increased. The changes in the age structure could partly depend on the structural changes that the chemical industry have gone through during years 2007 to 2013. During this time there have been both larger outsourcings of different functions and shut downs and cut-backs on staff in some larger companies and company groups³⁵. Due to priority rules, younger people in the workforce with fewer years of employment are in general more affected by such changes.

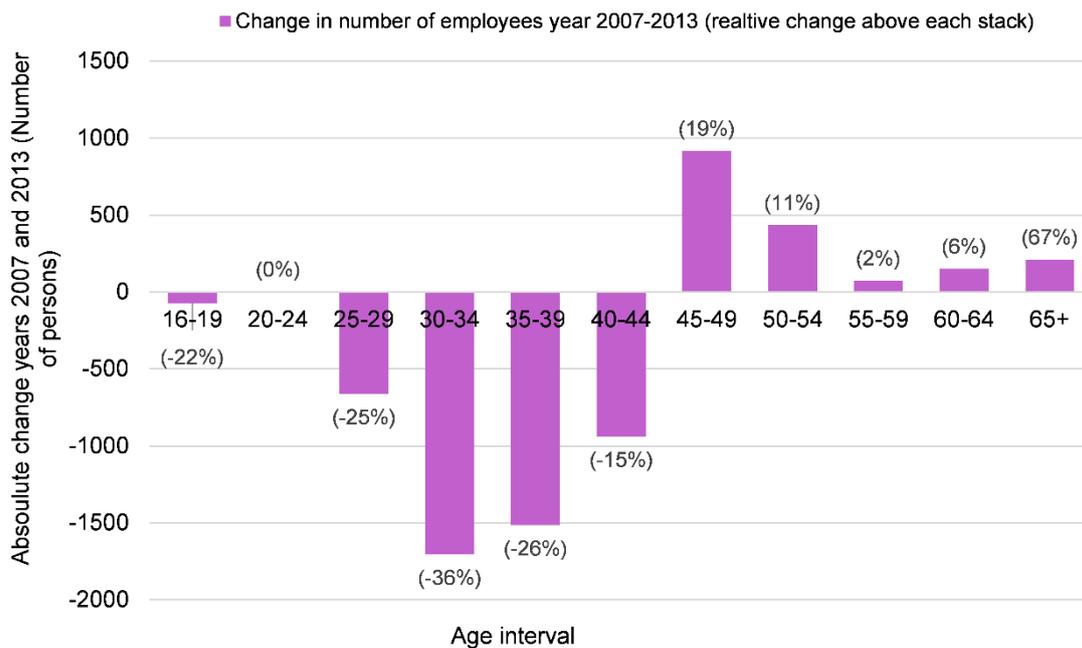
³⁵ See the previous report, Vinnova Analysis VA 2013:01, for a more in-depth discussion on this.

Figure 29 Age structure employees in the chemical industry year 2013 versus year 2007



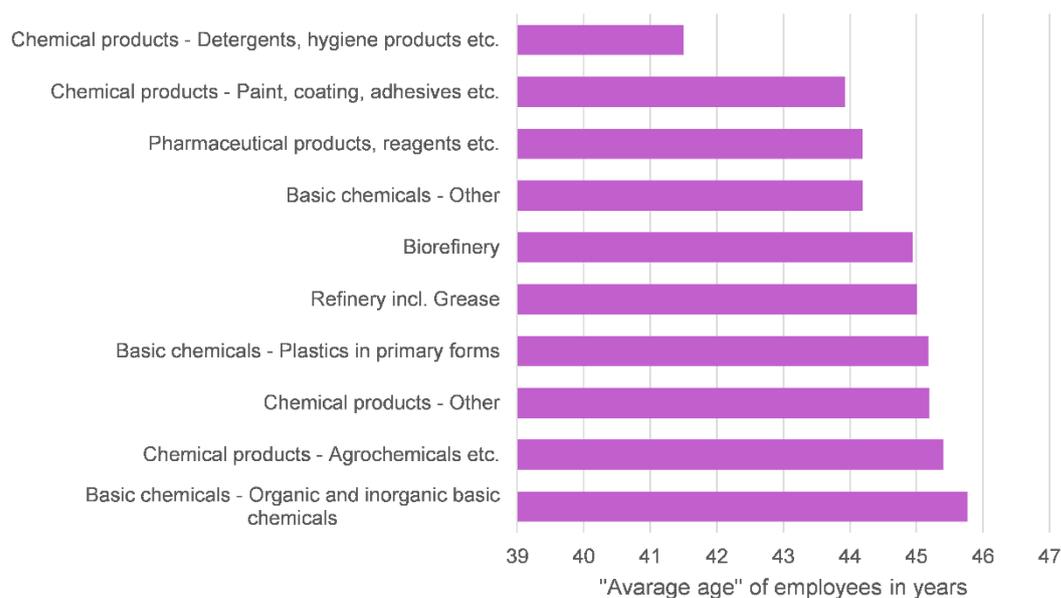
The absolute and relative changes in number of employees per age interval between year 2007 and 2013 are presented in Figure below. The absolute largest increase in relative terms can be noted for the interval of 65+ year old employees, +67%. In absolute numbers however the increase is largest for the age interval of 45-49 years. The largest decreases can be seen for the employees in the age intervals between 30-39 years old, both in relative and absolute terms.

Figure 30 Change in number of employees per age interval between year 2007 and year 2013



Year 2013, the “average age” of an employee in the chemical industry was 44.4 years³⁶, compared to year 2007 the average age has increased by 1.7 years. Figure 31 shows the “average age” for the different business segments. As can be seen in the figure, there is a relatively similar average age for all business segments apart from the business segment of Chemical products – Detergents, hygiene products etc. where the average employee is younger. This business segment is also the business segment with the second largest share of female employees, see Figure 36.

Figure 31 "Average Age" of employees by business segment in the chemical industry in Sweden 2013

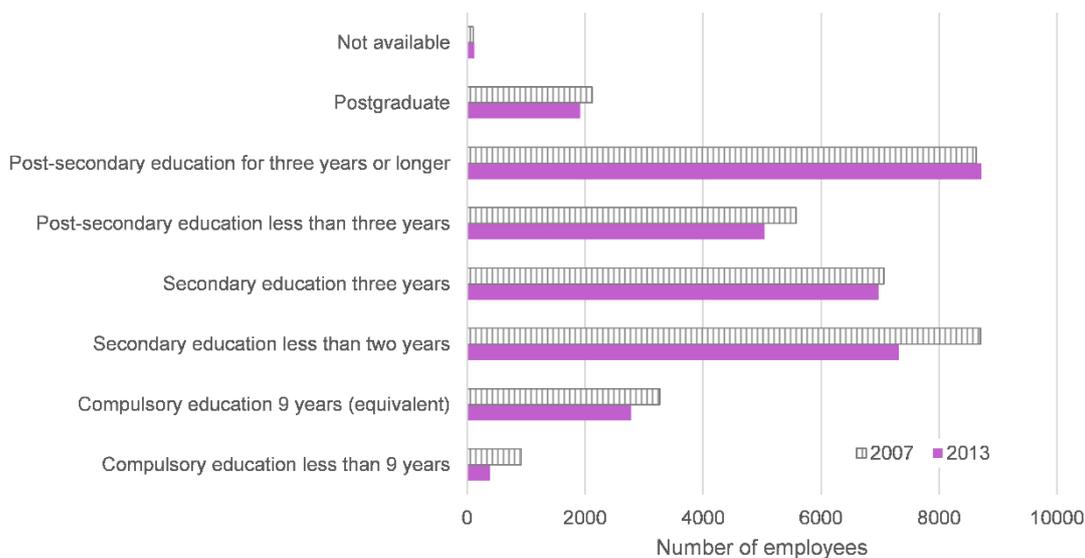


6.2 Education structure

Figure 32 shows the employees in the chemical industry divided for different education levels (highest finished education) for the years 2007 and 2013 respectively. It can be noted that only the group of longer post-secondary education – e.g. the civil engineering and master in engineering educations – increased during this time period. The largest decreased can be seen for the employees with secondary or compulsory education as their highest level of education.

³⁶ Calculated as a weighted average based on the number of employees in each age interval and using the mean age value for each interval.

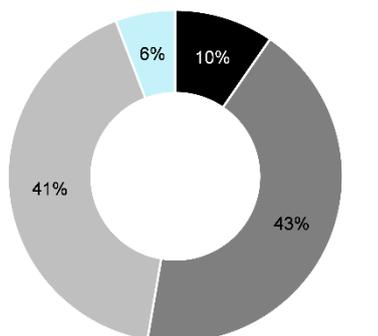
Figure 32 Education level structure (highest education) for employees in the chemical industry years 2007 and 2013



Year 2013, 47% of the employees in the chemical industry had post-secondary or postgraduate education, 43% had secondary education and 10% had compulsory education as their highest achieved education, see the upper left quadrant in Figure 33. For the employees with secondary education most (52%) had a focus on natural science and technology or civic education, finance and administration (45%), see the upper right quadrant of Figure 33. The orientation of the post-secondary education for the employees in the chemical industry is quite heavily tilted towards engineering and technology whereas the postgraduates in the chemical process industry to a larger extent are oriented towards science and medical education and health care, see the two lower quadrants in Figure 33. In total 1 918 people in the chemical industry held a postgraduate education in year 2013. Most of them, as previously stated in the areas of chemistry, medical education and health care or engineering and technology, however, it can be noted that one person has a postgraduate education in arts and four in psychology.

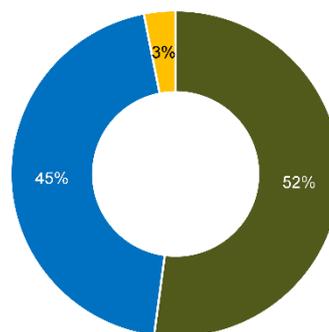
Figure 33 Education level structure (highest)

Education levels aggregated, chemical industry 2013



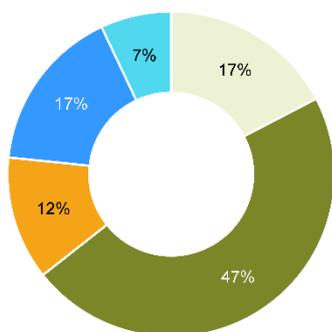
■ Compulsory education ■ Secondary education
■ Post-secondary education ■ Postgraduate level

Secondary education, chemical industry 2013



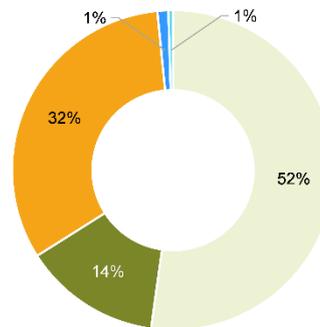
■ Science / Technology / Industry / Natural resource / Transport
■ Civic education / Finance / Administration / Commerce / Aesthetics
■ Health / Care / Health care

Post-secondary education, chemical industry 2013



■ Science
■ Engineering / Technology
■ Medical education / health care / etc.
■ Social science / finance / administration, etc.
■ Social work / Other

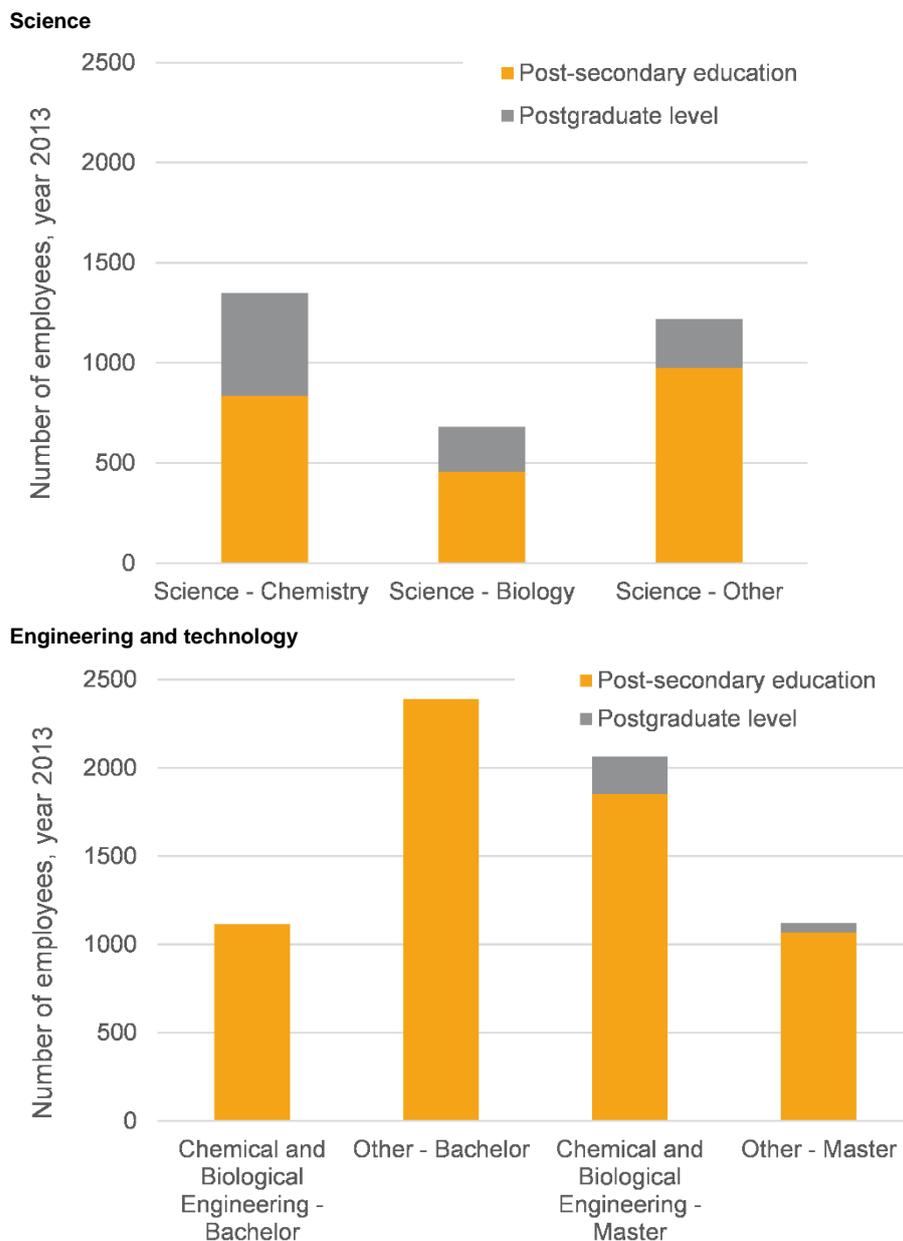
Postgraduate level, chemical industry 2013



■ Science
■ Engineering / Technology
■ Medical education / health care / etc.
■ Social science / finance / administration, etc.
■ Social work / Other

Naturally, chemistry and chemical engineering are prominent orientations within the science and engineering educations held by the employees in the chemical industry. Figure 34 shows the employees with a science background divided by a focus on chemistry, biology or other (upper) and the employees with an engineering and technology background divided by a focus on chemical engineering or other for bachelor and master level (lower). For the postgraduate in science, about half are within the area of chemistry and a quarter in the area of biology. For the post-secondary and postgraduate in engineering and technology, the share of chemical and biological engineers is larger for the master and postgraduate educated employees compared to the bachelor level educated employees.

Figure 34 Chemistry and chemical engineering shares of science and engineering educated employees at post-educational and postgraduate level in the chemical industry 2013

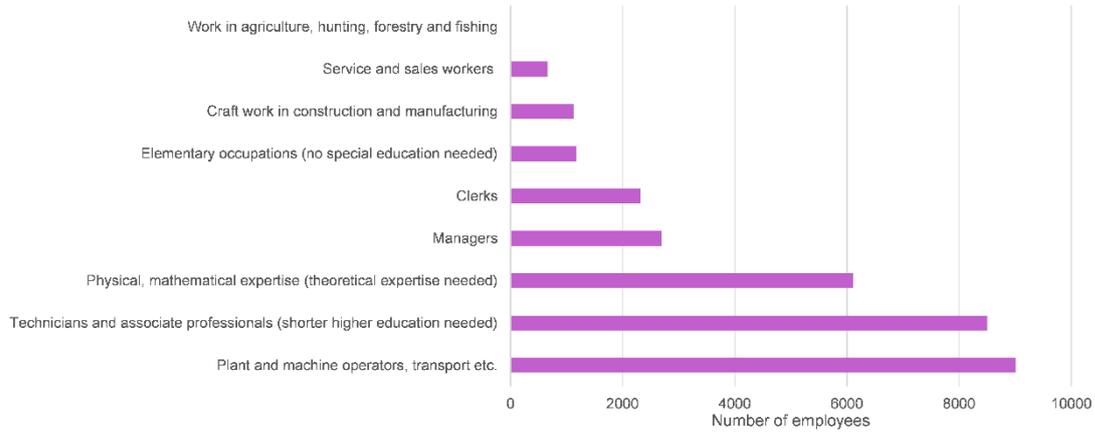


6.3 Occupation structure

Figure 35 shows the occupation structure for the employees in the chemical industry year 2013 divided by the nine different groups of professions described in Section 2.9. As can be seen in the figure, the most common group of professions is Plant and machine operators, transport, etc. closely followed by Technicians and associate professionals (occupations typically demanding some sort of shorter education) and Physical, mathematical expertise (occupations which demand theoretical expertise). Together these three groups of professions make up roughly 70% of the workforce. There are actually 7 people within the group Work in agriculture, hunting,

forestry and fishing employed in the chemical industry in year 2013, all animal producers/stockmen (far too few to be visible in the figure).

Figure 35 Occupation structure, employees in the chemical industry year 2013 per main group of profession



As described in Section 2.9, the nine main groups of professions (presented in Figure 35) are made up by occupations with different focus and educational level. Tables 11-13 lists the Top 10 occupations for all employees in the chemical industry (Table 11), employees with post-secondary or postgraduate education (Table 12) and employees with secondary or compulsory education (Table 13). Similar lists can be found for male and female employees, see Table 14 and Table 15.

Table 11 Top 10 occupations in the chemical industry 2013

RANKING	OCCUPATION (ALL EMPLOYEES)	EMPLOYEES 2013
1	Engineers and _____	5104
2	Macine operators (all types)	4395
3	Process operators (all types)	4122
4	Managers (all types)	2695
5	Civil engineers, architects, etc.	2097
6	Finance and sales associate professionals incl. vendors and retail demonstrators	2071
7	Business economists, staff officers, accountants, administrative assistants etc.	1832
8	Physicists, chemists, etc.	1764
9	Stores and transport clerks	882
10	Hand packers and other factory workers	881

Table 12 Top 10 occupations in the chemical industry 2013 – for employees with post-secondary or postgraduate education

RANKING	OCCUPATION (POST-SECONDARY OR POST DRADUATE EDUCATION)	EMPLOYEES 2013
1	Engineers and technicians	3422
2	Managers (all types)	1936
3	Civil engineers, architects, etc.	1849
4	Physicists, chemists, etc.	1662
5	Business economists, staff officers, accountants, administrative assistants etc.	954
6	Finance and sales associate professionals incl. vendors and retail demonstrators	884
7	Process operators (all types)	705
8	Macine operators (all types)	589
9	Computer technicians, operators and specialists	500
10	Specialists in biology, agriculture, forestry, etc.	341

Table 13 Top 10 occupations in the chemical industry 2013 – for employees with compulsory or secondary education

RANKING	OCCUPATION (COMPULSORY OR SECONDARY EDUCATION)	EMPLOYEES 2013
1	Macine operators (all types)	3563
2	Process operators (all types)	3438
3	Engineers and technicians	1671
4	Finance and sales associate professionals incl. vendors and retail demonstrators	1180
5	Hand packers and other factory workers	789
6	Stores and transport clerks	760
7	Managers (all types)	741
8	Machinery mechanics and fitters	492
9	Other office staff	470
10	Motor vehicle and machine drivers and operating engineers	301

6.4 Gender structure

Figure 36 shows the age structure for the employees in the chemical industry year 2013 divided by males and females. As can be seen in the figure, the gender structure shows a fairly even distribution between men and women over the different age intervals. Compared to year 2007 (not visible in the figures), the decrease in female employees follows the average decrease shown in Figure 29 except for the fact that women are overrepresented both in the decrease of employees aged 25-34 and in the total decrease of employees (seen to their share of the workforce).

Figure 36 Age structure employees in the chemical industry year 2013 – males and females

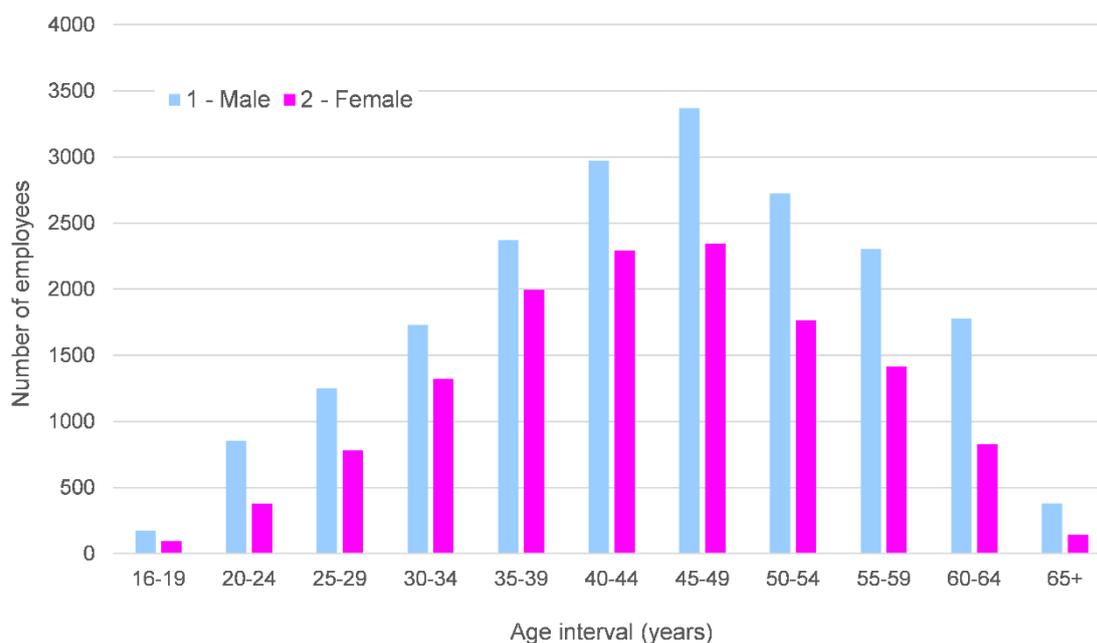


Figure 37 shows the share of women and men in the different business segments. It should be noted that two of the business segments – Pharmaceutical products etc. and Chemical products – detergents etc. – can be viewed as gender equal since the distribution between male and female employees are within the 40-60% range. The share of women in the workforce varies quite significantly between the different business segments, from 53% in the business segment Pharmaceutical products etc. to only 21% in the business segment Biorefinery.

Figure 37 Share of men and women in the different business segments in the chemical industry year 2013

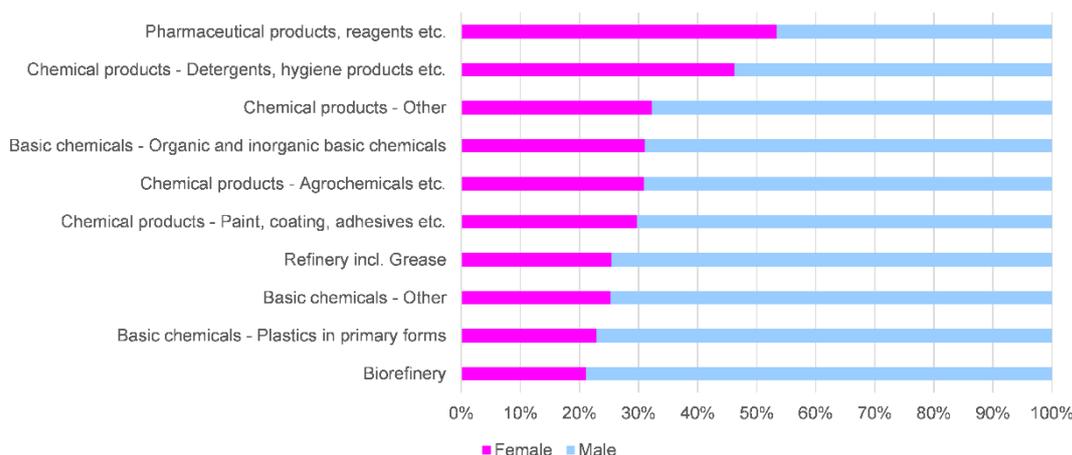
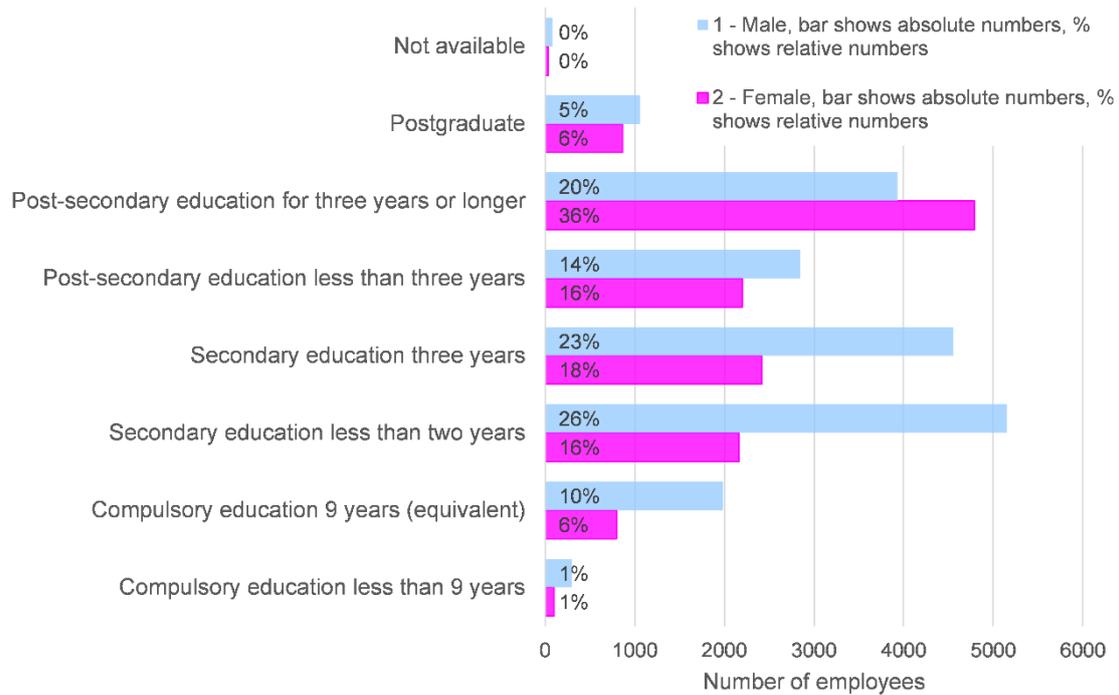


Figure 38 shows the distribution of men and women in the chemical industry divided by educational level for the year 2013. As can be seen in the figure, the women have – on average – far higher education than the men and for the longer post-secondary education they are

actually in majority. Seen to the share of women, the three highest educational levels – postgraduate and the two levels of post-secondary education – can be viewed as gender equal since they have a share of men/women in the 40-60% range. The most uneven distribution is found for the two levels of compulsory education, were only 25-29% are women.

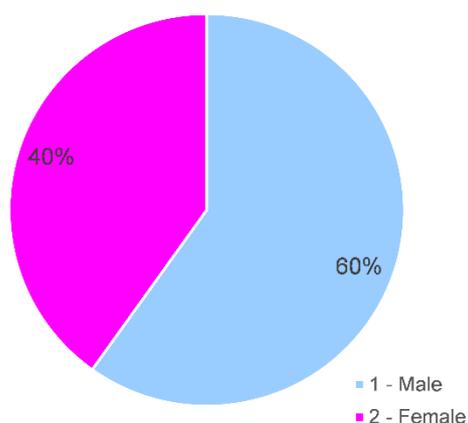
Figure 38 Men and women in the chemical industry divided for different education levels, year 2013. Bars show the absolute number of employees for each educational level and the %-value shows the share of employees for each education level in relation to the total number of employees (male or female)



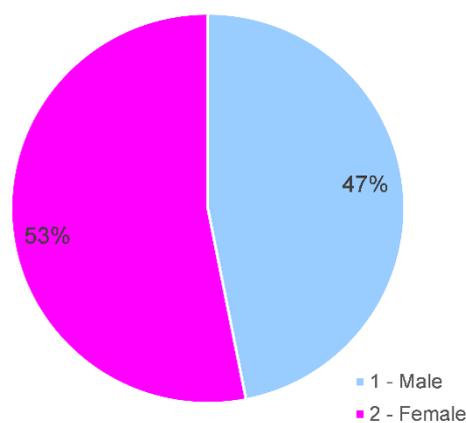
In Figure 39, an overview of the share of women versus men are presented for the chemical industry as a whole (upper left quadrant) compared to 1) for the three highest levels of education (upper right quadrant), 2) for all categories of managers in the chemical industry (lower left quadrant) and 3) for all categories of technicians and engineers (lower right quadrant). As can be seen in the figure, women are under-represented in the management category compared to the industry as a whole. However, amongst those with higher education as well as amongst technicians and engineers women are a better represented compared to the chemical industry average.

Figure 39 Share of men and women in the chemical industry 2013 – all employees versus employees with post-secondary or postgraduate education

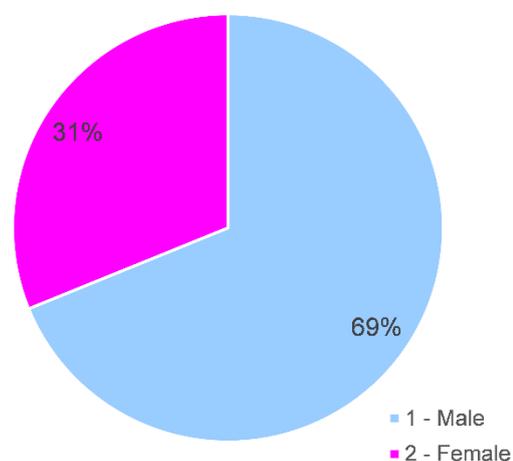
For all employees in the chemical industry 2013



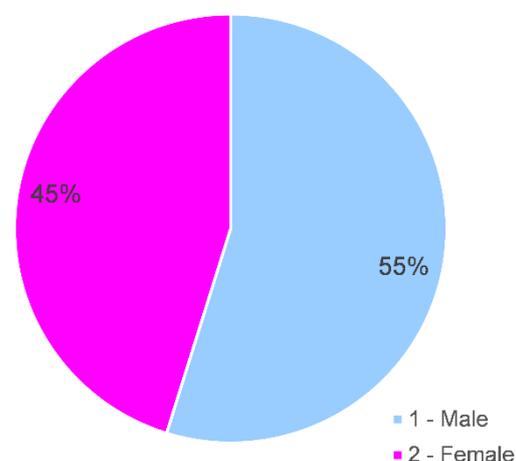
For the employees with post-secondary or postgraduate education



For managers of all sorts



For civil engineers, engineers and technicians



Tables 14 and 15 presents the top 10 occupations for women and men in the chemical industry year 2013. As can be seen in the tables, the lists differ both in terms on which occupations they include but also regarding the ranking for each occupation. As an example, Process operator is the most common occupation for men while it is only on ninth place on the women's list.

Table 14 Top 10 occupations in the chemical industry 2013 – Women

RANKING	OCCUPATION (WOMEN)	EMPLOYEES 2013
1	Engineers and technicians	2376
2	Machine operators (all types)	1601
3	Finance and sales associate professionals incl. vendors and retail demonstrators	837
4	Physicists, chemists, etc.	902
5	Business economists, staff officers, accountants, administrative assistants etc.	912
6	Civil engineers, architects, etc.	879
7	Managers (all types)	840
8	Office secretaries and other office staff	755
9	Process operators (all types)	632
10	Specialists in biology, agriculture, forestry, etc.	239

Table 15 Top 10 occupations in the chemical industry 2013 – Men

RANKING	OCCUPATION (MEN)	EMPLOYEES 2013
1	Process operators (all types)	3490
2	Engineers and technicians	2728
3	Machine operators (all types)	2556
4	Civil engineers, architects, etc.	1218
5	Managers (all types)	1855
6	Finance and sales associate professionals incl. vendors and retail demonstrators	1234
7	Physicists, chemists, etc.	862
8	Stores and transport clerks	658
9	Hand packers and other factory workers	624
10	Machinery mechanics and fitters	531

6.5 Origin

Figure 40 shows the distribution of employees with Swedish-origin versus foreign-origin in the chemical industry divided by educational level for the year 2013. The share of employees with foreign-origin is highest for the level of Compulsory education less than two years (42%). For the other educational levels the share varies between 14% and 25%.

Figure 40 Employees with Swedish versus foreign origin divided for different education levels, year 2013. Bars show the absolute number of employees for each educational level and the %-value shows the share of employees for each education level in relation to the total number of employees with Swedish-origin and foreign-origin respectively

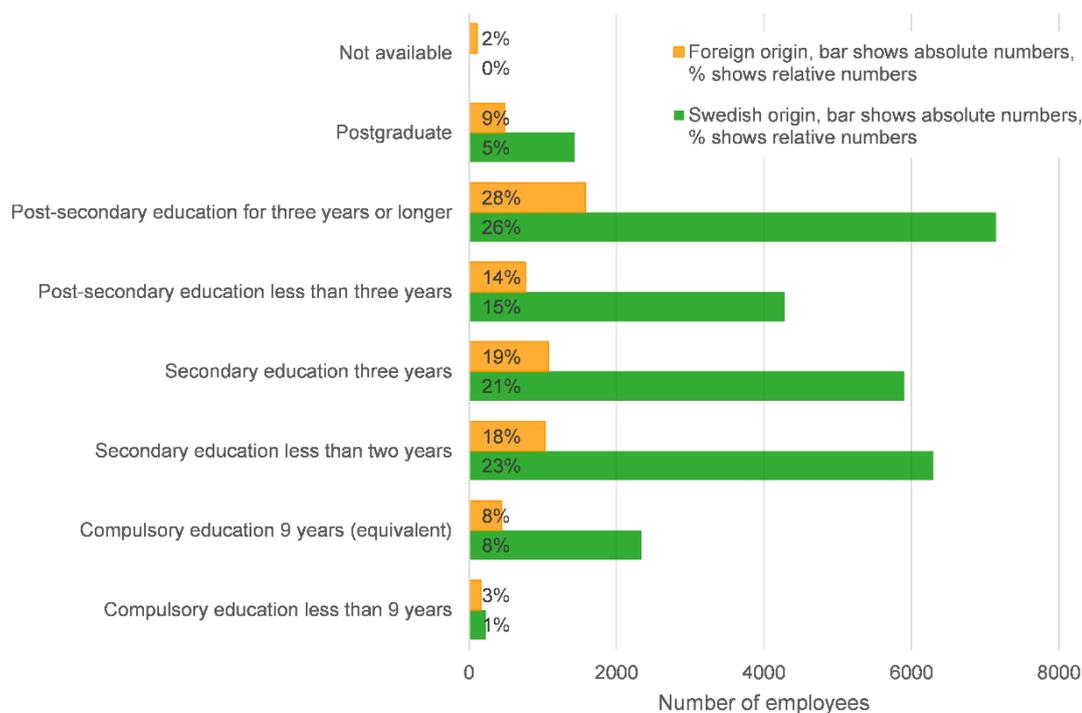
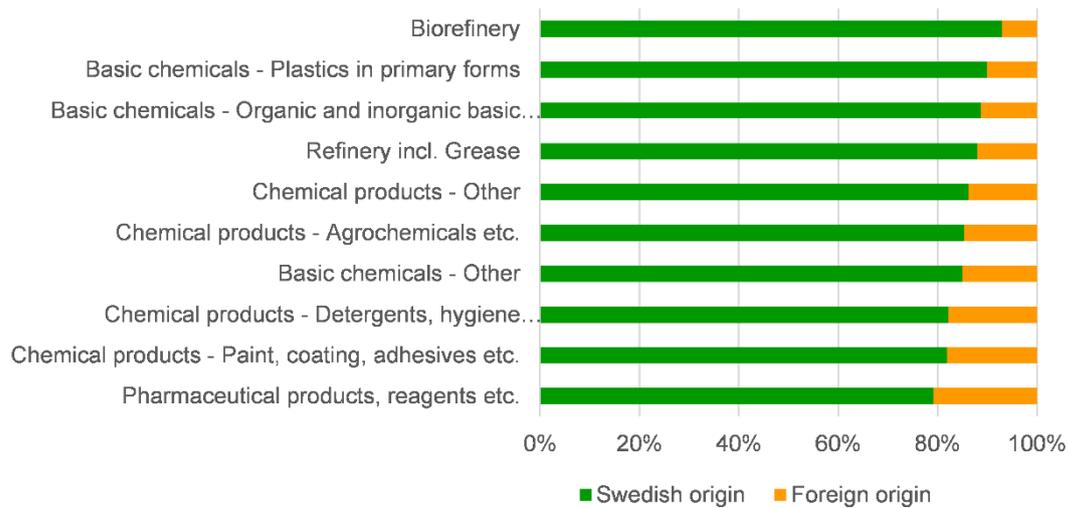


Figure 41 shows the share of employees with Swedish-origin versus foreign-origin in the different business segments. In a similar matter as for the share of women, the share of employees with foreign-origin varies between the different business segments, from 21% for the business segment of Pharmaceutical products etc. to 7% for the business segment Biorefinery. The business segment Biorefinery is thus the business segment with the lowest share of employees with foreign-origin as well as the lowest share of women (see Figure 37).

Figure 41 Share of employees with Swedish versus foreign origin for different business segments, year 2013



Appendices

Biogenic feedstock and the business segment biorefineries

By definition all companies in the business segment Biorefinery have biogenic feedstock. There are, however, many more companies which to different extents utilise biogenic feedstock. Companies may also produce products based on different types of feedstock at different production sites, and in this report they have been categorised into business segments based on their main product. One example that should be mentioned is the Akzo Nobel sites in Sundsvall where the feedstock is fully biogenic. Depending on the choice of definition, these sites may be classified as biorefineries or “green chemistry”. In this study, however, they have been categorised into the business segment “Organic and inorganic base chemicals” since the companies’ main activities are in this field and also since the use of biogenic feedstock is not a novelty for manufacturing of the produced products. Other companies with mainly biogenic feedstock (but not classified as biorefineries) are manufacturers of limewash, linseed oil, skincare products and pharmaceutical companies. Thus, the chemical industry is “greener than it looks” in the visualisations.

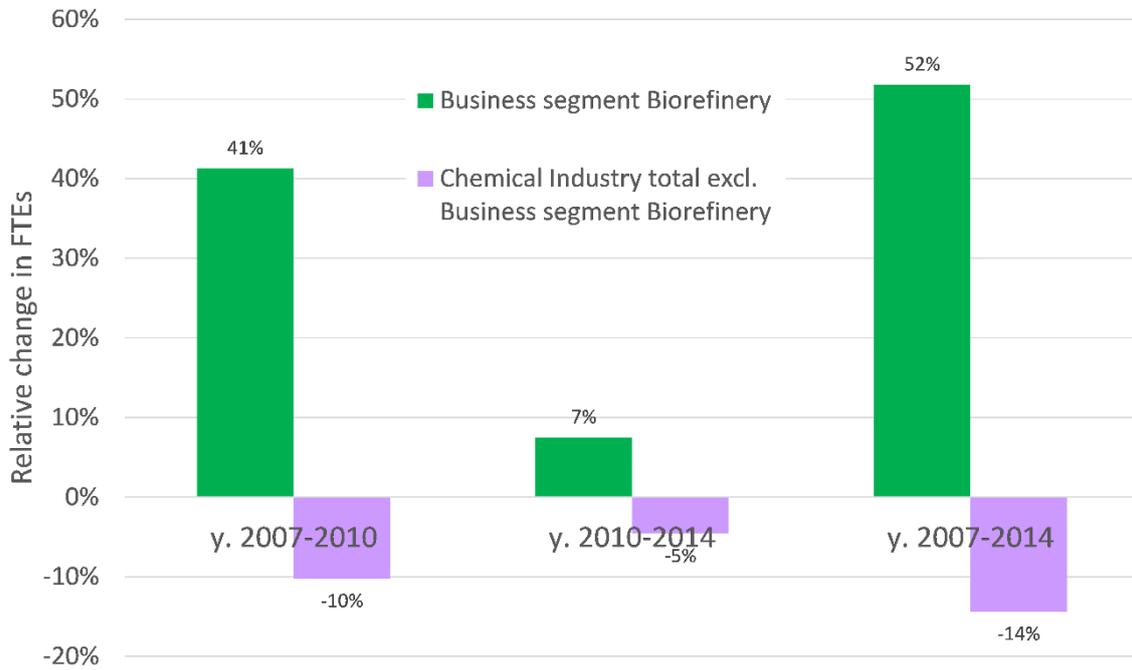
It should be noted that it is difficult to fully and correctly identify all companies which fully or partly utilise biogenic feedstock. It is also a complicated task to define what “enough” is in order to be called a biorefinery, and what can be included in the term “green chemistry”. Many companies also have renewable (sometimes biogenic) sources for the energy they use in their support processes, e.g., Nynas that source some of their process heat from a biomass based heat and power plant. Thus, the aim in this work has been a attempt to identify a business segment which may, or may not grow, and thereby has begun a foundation to study the dynamics of changes in the coming years.

Development of the business segment Biorefinery

The development of the business segment Biorefinery in short:

- Significant (and somewhat increasing) proportion of companies in this business segment focused at developing and producing biofuels.
- Significant increase in number of companies and increase in number of FTEs in several companies during years 2007-2014, although the increase somewhat stagnates after year 2010.
- Radically improved corporate profitability (43% of the companies with positive relative results in year 2014 vs. 22% in year 2010).
- Revenue per employee increased over the period, 10% higher in year 2014 vs. year 2010.

Figure 42 Relative change of FTEs in business segment Biorefinery compared to the rest of the Chemical industry for the period 2007-2010, 2010-2014, and the full period 2007-2014 respectively



Universities, research institutes, knowledge centres, etc. related to the chemical industry

At KTH, located in Stockholm, the School of Chemical Science and Engineering is one of the larger schools at the university. The school is comprised of both fundamental and applied sciences and is divided into four departments, Chemical Engineering (with a focus on energy research and production of fuels), Chemistry (with the focus areas of Bioactive Molecules, Functional Materials & Surfaces, and Energy & Environment), Fibre and Polymer Technology (mainly related to the pulp and paper industry and its systems and processes) and Engineering Pedagogics. At KTH one can find the following centres related to the chemical industry: BiMaC - Centrum för biofibermaterial, Biomime - Swedish Center of Biomimetic Fiber Engineering, CMD - Centre of Molecular Devices, CODIRECT - The Centre for Controlled Delivery and Release, Industrial NMR Centre, S2P2 - Surface Science Printing Program, WWSC - Wallenberg Wood Science Centre. Further, the following large research institutes are also located at the KTH campus: SP Chemistry, Materials and Surfaces (previously the Institute for Surface Chemistry), Innventia, and Swerea KIMAB.

At Chalmers University of Technology, located in Göteborg, the research most closely related to the chemical industry is performed by department of Biology and Biological Engineering and the department of Chemistry and Chemical Engineering (previously the Department of Chemical and Biological Engineering). The research ranges from natural science and bioscience, applied chemistry and biotechnology to chemical engineering. The department of Chemistry and Chemical Engineering performs its activities through its four divisions: Chemistry and Biochemistry, Applied Chemistry, Energy and Materials and Chemical Engineering. The department of Biology and Biological Engineering performs its activities through its four divisions: Food and Nutritional Science, Industrial Biotechnology, System and Synthetic Biology and Chemical Biology. At Chalmers one can find the following national centres of interest for the chemical process industry: WWSC - Wallenberg Wood Science Centre (also at KTH), Centre for Chemical Process Engineering (CPE), Competence Centre for Recycling (CCR), Competence Centre for High Temperature Corrosion (HTC), Competence Centre for Catalysis (KCK), Plastic for a Sustainable Society (PLUS), SUMO Biomaterials, Center for Systems Biology and SUPRA centre. The previous rector of Chalmers – Karin Markides – has a background in chemical engineering and Chalmers is active in regional initiatives such as “Det västsvenska kemi- och materialklustret” , which aims at promoting and supporting the chemical industry in western Sweden.

In Gothenburg also the faculty of science at University of Gothenburg performs research in the area of chemistry, mostly through the department of Chemistry and Molecular Biology. The research at the department is divided into 7 different areas/clusters: Analytical Chemistry, Biochemistry and Biophysics, Fundamental Chemistry, Microbiology, Environmental Chemistry, Molecular Biology and Genetics, Organic and Medicinal Chemistry. Also, the VINN Excellence Centre BIOMATCELL (which combines the expertise of materials science and medical devices, with state-of-the art knowledge of biological components) is hosted by the University of Gothenburg.

In Lund the chemistry research is organised under the umbrella of “Kemicentrum” which is comprised of three departments from both the Faculty of Engineering (LTH) and The Faculty of Science (LU). This makes Kemicentrum one of the largest research centres within the chemistry area in Northern Europe. The three departments are: the Department of Chemistry, the Department of Food Technology, Engineering and Nutrition and the Department of Chemical Engineering. In addition to Kemicentrum, many other research centres and institutes are also located at the Lund University campuses, e.g., Biomedical Centre (BMC), Centre for Biomechanics (CBML) and Centre for Research on Pharmaceuticals and Medical Devices. Lund University also is the host for LU Biofuels, which is a multi-disciplinary research platform that brings together researchers working on biofuels from faculties, departments and centres across the entire university.

At Umeå University, in northern Sweden, the Department of Chemistry is one of the largest departments. The research at the department is divided into three main research areas: Biological Chemistry (focusing on biologically important molecules, macromolecules like proteins, nucleic acids, carbohydrates and lipids, as well as small organic molecules), Environmental and Biogeochemistry (focusing on chemical compounds in the environment) and Technical Chemistry (focusing on accelerating the development of integrated biorefining and energy technologies). The department cooperates with more than 30 companies, and a number of small spin-off companies are located in close proximity to Umeå University and the University Science Park, Uminova Science Park. Apart from its location in Umeå, Umeå University has campuses also in Örnsköldsvik and Skellefteå.

The strategic research environment Bio4Energy aims to create highly efficient and environmentally-sound biorefinery processes. Bio4Energy consists of Luleå University of Technology, Umeå University, and the Swedish University of Agricultural Sciences (Umeå campus). Bio4Energy has a handful of associated industrial partners, e.g., SEKAB. Bio4Energy works with seven research platforms, each of which corresponds to a link in the biorefinery value chain: Feedstock, Wood Pre-processing, Thermochemical conversion technologies, Biopolymers and Biochemical conversion technologies, Chemical Catalysis and Separation Technologies, Systems Analysis and Bioeconomy and Environment and Nutrient Recycling.

SP Processum started in 2003 as a technology park in Örnsköldsvik (at the same premises as e.g., Domsjö Fabriker, SEKAB and MoRe Research), but has since developed into a national biorefinery cluster initiative. Processum has long been a member owned company but is since year 2013 a jointly owned subsidiary of SP Technical Research Institute of Sweden and the member companies (60/40). The major part of the activities within Processum lies within R&D in the areas of biotechnology, energy technology, inorganic and organic chemistry as well as sustainable raw materials.

SP Technical Research Institute of Sweden is Sweden’s largest industry research institute and the parent company in a group consisting of a number of wholly- or partly-owned subsidiary companies. The Swedish state, through RISE Holding (Research Institutes of Sweden, government owned), is the sole shareholder of the company. SP operates at about 30 sites in Sweden, but has its headquarters and main facilities outside Borås. SP Chemistry, Materials and

Surfaces (a merge between the previous subsidiary YKI, Institute for Surface Chemistry, and the technical area Chemistry and Materials) is the unit with the strongest links to the chemical industry. However, other technical areas and subsidiaries also have relevant activities, such as SP Energy and Bioeconomy, SP Food and Biosciences, SP Energy Technology Centre (a part of SP in 2014), SP Fire Research, JTI - Swedish Institute of Agricultural and Environmental Engineering.

Swerea SICOMP, a part of the RISE Holding owned Swerea group, is a research institute in the field of polymer fibre composites. Their business includes applied composite research, development, as well as training, within seven areas of expertise: Materials and Raw Materials, Corrosion and Surface Engineering, Materials Production, Manufacturing Processes, Production Systems, Product Engineering and Energy and Environment. Swerea SICOMP is located in Göteborg, Piteå and Linköping.

Innventia is a research institute which is owned partly by six forest industry companies and partly by RISE Holding (Research Institutes of Sweden, government owned). Innventia has three business areas: Biorefining, Material Processes and Packaging Solutions. Out of these three business areas it is the business area of Biorefining which is the one mostly related to the chemical industry. However, all activities at Innventia are primarily based on or related to the pulp and paper industry. The headquarters are located on the campus of KTH in Stockholm, but Innventia also has operations in Trondheim (the subsidiary PFI), London and at Bäckhammars Bruk where they are operating a demonstration plant for lignin extraction.

The Swedish Knowledge Centre for Renewable Fuels (f3) is a nationwide centre, which through cooperation and a systems approach aims to enhance the development of “fossil free fuels” (otherwise known as renewable fuels) for transportation. The centre does not perform or support fundamental research, but performs syntheses of current research about the production of renewable fuels as well as supplemental research, such as comparative systems analyses of fuels, processes, raw materials and plant design. From the chemical industry, e.g. Perstorp, and Preem are partners in f3. The research activities in the centre are jointly performed by research operators and industrial partners (although often led by the research partner).

Other innovation environments and science parks where the chemical industry is (partly) represented are: Shift2Bio, Uppsala Science Park and SLU Holding, Solander Science Park, Åkroken, Paper Province, the Biofuel region and others.

Process for identifying the companies

NACE-CODES	Exerps for NACE 19, 20, 21 (and 22)
TRADE ORGANISATIONS AND SIMILAR	IKEM - Innovation and Chemical Industries in Sweden, The Swedish Bioenergy Association (Svebio)
CLUSTER AND CLUSTER INITIATIVES	SP Processum, Hållbar Kemi 2030, The Biofuel Region
KNOWLEDGE CENTRES, PLATFORMS AND SCIENCE PARKS	f3, Shift2Bio, Solander sciencepark, Åkroken, Paper Province, SFC
PROJECT/EU-PROJECT	BioDME, SUPRABIO, Projects connected to LUBiofuels
OTHER	NyTekniks 33-Listan, the magazine <i>Bioenergy's</i> list of existing and planned plants for biofuel production in Sweden

List of codes for education groups

Scheme for the deployment of SUN 2000 codes in education groups³⁷.

EDUCATION GROUP	SPECIALISATION	CODE	
GENERAL TRAINING	<i>Tertiary level</i>		
	Public School Education or equivalent education	01Z	
	Primary education or equivalent training	02Z	
HIGHER PREPARATORY EDUCATION	<i>Secondary level</i>		
	Social sciences and humanities education	03A	
	Natural Sciences	03N	
	Arts and humanities	23E	
	Business and administration	33E	
PEDAGOGY AND TEACHER TRAINING	<i>Secondary level</i>		
	Education	13Z	
	<i>Post-secondary level</i>		
	At least 30 credits in pedagogy and teacher training, no degree	14P	
	Preschool teacher	15B	
	After-school activities teacher	15F	
	Teacher training without subject specialization	15G	
	Teacher training with subject specialization	15H	
	Specialization in practical and artistic subjects	15P	
	Specialization in special education	15S	
	Specialization in vocational subjects	15V	
	Education not further defined	15X	
	ARTS AND HUMANITIES	<i>Secondary level</i>	
		Fashion, interior and industrial design, and handicrafts	23X
		<i>Post-secondary level</i>	
At least 30 credits in arts and humanities, no degree		24P	
Fine arts, music and performing arts, language acquisition, history and archaeology, philosophy and ethics		25H	
Arts not elsewhere classified		25K	
Audio-visual techniques and media production		25M	
Religion and theology		25T	
Arts and humanities not further defined		25X	
SOCIAL SCIENCES, LAW, BUSINESS AND ADMINISTRATION		<i>Secondary level</i>	
	Business and administration	33H	
	<i>Post-secondary level</i>		
	At least 30 credits in social sciences, law, business and administration, no degree	34P	
	Library, information and archival studies	35B	
	Economics, business and administration	35E	
	Social and behavioural sciences	35F	
	Law	35J	
	Journalism and reporting	35M	
	Psychology	35P	
	Sociology and cultural studies, political sciences and civics, management and administration	35S	
	Social sciences, law, business and administration not further defined	35X	

³⁷ For a further description see MIS 2000:1. Svensk utbildningsnomenklatur, SUN 2000 (can be downloaded through: http://www.scb.se/statistik/OV/OV9999/2003M00/X27OP0001_01.pdf).

EDUCATION GROUP	SPECIALISATION	CODE	
NATURAL SCIENCES, MATHEMATICS, INFORMATION AND COMMUNICATION TECHNOLOGIES	<i>Secondary level</i>		
	Vocational education in natural sciences, mathematics, information and communication technologies	43Z	
	<i>Post-secondary level</i>		
	At least 30 credits in natural sciences, mathematics, information and communication technologies, no degree	44P	
	Biology	45B	
	Information and Communication Technologies (ICTs)	45D	
	Physics	45F	
	Earth sciences	45G	
	Chemistry	45K	
	Mathematics, statistics, computer science	45M	
	Natural sciences	45Q	
	Natural sciences, mathematics and statistics not further defined	45X	
	TECHNOLOGY, MANUFACTURING AND PROCESSING, ENGINEERING AND ENGINEERING TRADES	<i>Secondary level</i>	
		Technical college graduate, 2-3 years	53A
Construction		53B	
Information and communication technologies, electricity and energy		53E	
Motor vehicles, ships and aircraft		53F	
Industrial		53I	
Building and civil		53R	
Technology, manufacturing and processing not further defined		53X	
<i>Post-secondary level</i>			
At least 30 credits in technology, manufacturing and processing, engineering and engineering trades, no degree		54P	
Architecture and town planning		55A	
Master of science (MSc) in industrial engineering and management		55B	
MSc in civil engineering, urban management, surveying		55C	
MSc in mechanical engineering, vehicle engineering		55D	
MSc in engineering physics, electrical engineering, computer and science engineering		55E	
MSc in chemical engineering, biotechnology, materials engineering, geotechnical engineering		55F	
MSc in engineering not further defined		55G	
Bachelor of science (BSc) in civil engineering, urban management, surveying		55H	
BSc in mechanical engineering, vehicle engineering, industrial engineering and management		55I	
BSc in engineering physics, electrical engineering, computer and science engineering		55J	
BSc chemical engineering, biotechnology, materials engineering, geotechnical engineering		55K	
BSc in engineering not further defined		55L	
Technical college graduate, 4 years		55Q	
Engineering and engineering trades not further defined		55X	
AGRICULTURE, FORESTRY, FISHERIES AND VETERINARY		<i>Secondary level</i>	
		Agriculture	63Z
		<i>Post-secondary level</i>	

EDUCATION GROUP	SPECIALISATION	CODE
	At least 30 credits in agriculture, forestry and veterinary, no degree	64P
	Crop and livestock production	65J
	Forestry	65S
	Veterinary	65V
	Agriculture, forestry, fisheries and veterinary not further defined	65X
HEALTH AND WELFARE	<i>Secondary level</i>	
	Child care and youth services	73B
	Nursing	73O
	Health and welfare not further defined	73X
	<i>Post-secondary level</i>	
	Dental studies, dental assistant	73T
	At least 30 credits in health and welfare, no degree	74P
	Pharmacy, pharmacist	75A
	Occupational therapy	75B
	Medical diagnostic and treatment technology	75D
	Child care and youth services	75F
	Medicine	75H
	Pharmacy, prescriptionist	75J
	Physiotherapy	75L
	Nursing	75N
	Specialist nursing	75S
	Midwifery	75M
	Social services	75O
	Social work and counselling	75P
	Dental studies, dental hygienist	75T
	Dental studies, dentist	75V
	Health and welfare not further defined	75X
SERVICES	<i>Secondary level</i>	
	Hotel, restaurants and catering	83R
	Transport services	83T
	Services not further defined	83X
	<i>Post-secondary level</i>	
	At least 30 credits in services, no degree	84P
	Protection of persons and property	85P
	Transport services	85T
	Services not further defined	85X
UNKNOWN	<i>Secondary level, unspecified</i>	93Z
	<i>Post-secondary level, unspecified</i>	95Z
	Unknown	99Z

Full list of occupations for employees in the chemical industry

Below the full list of all occupations listed for employees in the chemical industry are presented, the number of employees refer to year 2013. The occupations are given in Swedish (as they were in the data material used for this report) and in English (translated by the author of this report) and presented in alphabetical order with respect to their Swedish names.

OCCUPATION - SWEDISH	OCCUPATION - TRANSLATED	NO. EMPLOYEES YEAR 2013
AGENTER, FÖRMEDLARE M.FL.	Agents and trade brokers	106
ANDRA LÄRARE OCH INSTRUKTÖRER	Other teachers and instructors	14
ANDRA PEDAGOGER MED TEORETISK SPECIALISTKOMPETENS	OTHER teaching professionals	1
ARKIVARIER, BIBLIOTEKARIER M.FL.	Archivists, librarians, ETc.	57
BARNMORSKOR; SJUKSKÖTERS KOR MED SÄRSKILD KOMPETENS	MIDWIVES; Nursing professionals	21
BIBLIOTEKSASSISTENTER M.FL.	LIBRARY ASSISTANTS, ETc.	9
BIOMEDICINSKA ANALYTIKER	Biomedical scientists	197
BOKFÖRINGS- OCH REDOVISNINGSSASSISTENTER	ACCOUNTANCY AND ACCOUNTS ASSISTANTS	342
BREVBÄRARE M.FL.	POSTMAN, ETc.	6
BYGGNADS- OCH ANLÄGGNINGSSARBETARE	Building frame and	23
BYGGNADSHANTVERKARE	BUILDING CRAFTSMEN	144
CHEFER FÖR MINDRE FÖRETAG OCH ENHETER	Managers of small enterprises and units	124
CHEFER FÖR SÄRSKILDA FUNKTIONER	Specialist managers	1822
CIVILINGENJÖRER, ARKITEKTER M.FL.	ENGINEERS, ARCHITECTS AND OTHERS	2097
DATASPECIALISTER	computer specialists	458
DATATEKNIKER OCH DATAOPERATÖRER	Computer technicians and computer operators	305
DJURUPPFÖDARE OCH DJURSKÖTARE	breeders and animal caretakers	7
DREJARE, GLASHYTTEARBETARE, DEKORATIONSMÅLARE M.FL.	TURNER, glassworks workers, decorators, etc.	9
DRIFT- OCH VERKSAMHETSCHEFER	Production and operations managers	560
DRIFTMASKINISTER M.FL.	OPERATION machinists, etc.	45
ELMONTÖRER, TELE- OCH ELEKTRONIKREPARATÖRER M.FL.	Electricians, telecommunications and electronics equipment mechanics and fitters	244
FINMEKANIKER M.FL.	Toolmaker, etc.	9
FORDONSFÖRARE	vehicle drivers	19
FOTOGRAFER; LJUD- OCH BILDTEKNIKER, SJUKHUSTEKNIKER M.FL.	PHOTOGRAPHERS; Optical and electronic equipment operators	5
FRISÖRER OCH ANNAN SERVICEPERSONAL, PERSONLIGA TJÄNSTER	HAIRDRESSERS AND OTHER personal services	1
FYSIKER, KEMISTER M.FL.	Physicists, chemists OTHERS	1764
FÖRETAGSEKONOMER, MARKNADSFÖRARE OCH PERSONALTJÄNSTEMÄN	Business economists, marketers and CIVIL SERVANTS	1011
FÖRSKOLLÄRARE OCH FRITIDSPEDAGOGER	preschool teachers and Helpers	1
FÖRSÄLJARE, DETALJHANDEL; DEMONSTRATÖRER M.FL.	SALES, RETAIL, Demonstrators	476
GJUTARE, SVETSARE, PLÅTSLAGARE M.FL.	CASTER, welder, body shops, etc.	112
GODSHANTERARE OCH EXPRESSBUD	freight workers and couriers	107

OCCUPATION - SWEDISH	OCCUPATION - TRANSLATED	NO. EMPLOYEES YEAR 2013
GRAFIKER M.FL.	GRAPHIC ARTIST, etc	5
GROVARBETARE INOM BYGG OCH ANLÄGGNING	LABOURER in construction	1
GRUV- OCH BERGARBETARE, STENHUGGARE	Mining and miners, stone cutters	11
GYMNASIELÄRARE M.FL.	UPPER SECONDARY SCHOOL TEACHERS, etc.	8
HANDPAKETERARE OCH ANDRA FABRIKSARBETARE	HAND Manufacturing laborers	881
HÄLSO- OCH SJUKVÅRDSSPECIALISTER	HEALTHCARE SPECIALISTS	164
INGENJÖRER OCH TEKNIKER	Engineers and technicians	5104
JOURNALISTER, KONSTNÄRER, SKÅDESPELARE M.FL.	Journalists, artists, performing artists	52
JURISTER	LAWYERS	52
KASSAPERSONAL M.FL.	Cashiers, etc.	2
KONTORSSEKRETERARE OCH DATAREGISTRERARE	Office secretaries, etc.	273
KUNDINFORMATÖRER	Client information workers	78
KÖKS- OCH RESTAURANGBITRÄDEN	Helpers in restaurants	20
LAGER- OCH TRANSPORTASSISTENTER	Stores and transport clerks	882
LANTMÄSTARE, SKOGSMÄSTARE M.FL.	Agronomy and forestry technicians, etc.	1
MASKIN- OCH MOTORREPARATÖRER	Machinery mechanics and fitters	547
MASKINFÖRARE	machine operator	260
MASKINOPERATÖRER, GRAFISK INDUSTRI, PAPPERSVARUINDUSTRI	Machine operators, printing, paper products	19
MASKINOPERATÖRER, GUMMI- OCH PLASTINDUSTRI	Machine, rubber and plastics industry	278
MASKINOPERATÖRER, KEMISK-TEKNISK INDUSTRI	Chemical-technical industry	3738
MASKINOPERATÖRER, LIVSMEDELSINDUSTRI M.M.	Machine operators, FOOD INDUSTRY ETC.	41
MASKINOPERATÖRER, METALL- OCH MINERALBEHANDLING	Machine METAL AND MINERAL PROCESSING	54
MASKINOPERATÖRER, TEXTIL-, SKINN- OCH LÄDERINDUSTRI	Textile-, fur- and leather industry	17
MASKINOPERATÖRER, TRÄVARUINDUSTRI	Wood-products machine	10
MATEMATIKER OCH STATISTIKER	Mathematicians and statisticians	48
MEDHJÄLPARE INOM JORDBRUK, TRÄDGÅRD, SKOGSBRUK OCH FISKE	Labourers in agriculture, horticulture, FORESTRY AND FISHERIES	1
MONTÖRER	fitters	167
MÅLARE, LACKERARE, SKORSTENSFEJARE M.FL.	Painters, chimney sweeps, etc.	2
MÖBELSNICKARE, MODELLSNICKARE M.FL.	CARPENTERS, etc.	1
PILOTER, FARTYGSBEFÄL M.FL.	PILOTS, SHIP'S OFFICERS, etc.	2
PROCESSOPERATÖRER VID STÅL- OCH METALLVERK	PROCESS OPERATORS - steel and metal	4
PROCESSOPERATÖRER, GLAS OCH KERAMISKA PRODUKTER	Process operators -GLASS AND CERAMIC PRODUCTS	6
PROCESSOPERATÖRER, KEMISK BASINDUSTRI	Process operators - the basic chemical industry	3900
PROCESSOPERATÖRER, TRÄ- OCH PAPPERSINDUSTRI	Process operators - wood and paper	212

OCCUPATION - SWEDISH	OCCUPATION - TRANSLATED	NO. EMPLOYEES YEAR 2013
PSYKOLOGER, SOCIALSEKRETERARE M.FL.	Psychologists, social workers, etc.	2
REDOVISNINGSEKONOMER, ADMINISTRATIVA ASSISTENTER M.FL.	Accountants, administrative assistants, etc.	821
RENHÅLLNINGS- OCH ÅTERVINNINGSPERSONAL	Waste Management and related laborers	5
SAMHÄLLS- OCH SPRÅKVETARE	Social scientists and linguist	1
SJUKGYMNASTER, TANDHYGIENISTER M.FL.	Physical therapists, dental hygienists, etc.	215
SJUKSKÖTERSKOR	NURSES	22
SLAKTARE, BAGARE, KONDITORER M.FL.	Butchers, bakers, confectioners	11
SMEDER, VERKTYGSMÅKARE M.FL.	Blacksmiths, toolmakers, etc.	8
SPECIALISTER INOM BIOLOGI, JORD- OCH SKOGSBRUK M.M.	Specialists in Life science, agriculture and forestry, ETC.	378
STORHUSHÅLLS- OCH RESTAURANGPERSONAL	Housekeeping and restaurant staff	8
STÄDARE M.FL.	Cleaners	113
SÄKERHETS- OCH KVALITETSINSPEKTÖRER	Safety and quality inspectors	102
SÄKERHETSPERSONAL	SECURITY PERSONNEL	29
SÄLJARE, INKÖPARE, MÄKLARE M.FL.	Finance and sales associate professionals	1595
TECKNARE, UNDERHÅLLARE, PROFESSIONELLA IDROTTSUTÖVARE M.FL.	Artistic, entertainment and sports associate professionals	4
TIDNINGSDISTRIBUTÖRER, VAKTMÄSTARE M.FL.	MAGAZINE DISTRIBUTORS, caretaker OTHERS	15
TULL-, TAXERINGS- OCH SOCIALFÖRSÄKRINGSTJÄNSTEMÄN	Customs, tax and related government associate professionals	5
UNIVERSITETS- OCH HÖGSKOLLÄRARE	University and higher education teaching professionals	1
VERKSTÄLLANDE DIREKTÖRER, VERKSCHEFER M.FL.	Directors and chief executives	189
VÅRD- OCH OMSORGSPERSONAL	Health professionals and care takers	152
ÖVRIG KONTORSPERSONAL	Other office clerks	728
ÖVRIGA MASKINOPERATÖRER OCH MONTÖRER	Other machine operators and fitters	238
ÖVRIGA SERVICEARBETARE	OTHER SERVICE WORKERS	28
<i>UPPGIFT SAKNAS</i>	<i>DATA NOT AVAILABLE</i>	<i>1664</i>

List of companies – active and with employees year 2014

Number of employees refers to year 2014, active companies with 0 employees year 2014 are thus not included in the list (although still included in the database for the years they did have employees). Similarly, companies that were no longer active year 2014 (merged, bankrupted, or just deregistered) are also not listed below but included in the database for the years they were active.

Refinery (including grease)

>250 employees

Preem AB

Nynas AB

51-250 employees

St1 Refinery AB

Statoil Fuel & Retail Lubricants Sweden AB

Exxon Mobile Sverige AB

Axel Christersson AB

Petrolia AB

11-50 employees

Lantmännen Aspen Petroleum AB

Göteborgs smörjmedelsfabrik (Scanlube) AB

Superior Graphite Europé Ltd, USA, Sweden filial

1-10 employees

Svensk oljeåtervinning AB

Next-Oil AB

Ecopar AB

Biorefinery

>250 employees

Domsjö Fabriker Aktiebolag

51-250 employees

Arizona Chemical Aktiebolag

Sekab Biofuels and Chemicals AB

Lantmännen Agroetanol AB

11-50 employees

Binol AB

Sunpine AB

Sekab E-Technology AB

Swedish Biogas International AB

Sveprol Bio Production AB

1-10 employees

Ecobränsle i Karlshamn Aktiebolag

Organoclick AB

Meva Energy AB

Swedish Biofuels AB

Kristianstads biogas AB

Lignoboost Demo AB

Norups Gård Bioraff AB

Swedish Biogas International Örebro AB

Taurus Energy AB

Bioendev AB (Bio Energy Development North AB)

Swedish Biogas International Lidköping AB

Ren Fuel K2b AB

Sbi Jordberga AB

Värmlandsmetanol AB

Perstorp Bioproducts AB

Swedish Biogas International Katrineholm AB

Swedish Biogas International Västerås AB

Chemrec AB

Energifabriken i Sverige AB

Basic chemicals

>250 employees

Borealis Aktiebolag

Akzo Nobel Pulp and Performance Chemicals AB

AGA Gas Aktiebolag

Akzo Nobel Functional Chemicals AB

Akzo Nobel Surface Chemistry Aktiebolag

INOVYN Sverige AB

Perstorp Speciality Chemicals AB

Perstorp Oxo AB (incl. Perstorp Oxo Belgium)
Perstorp AB
Kemira Kemi Aktiebolag

51-250 employees
Air Liquide Gas Aktiebolag
Polykemi Aktiebolag
Element Six Aktiebolag
Carpenter Sweden AB
Akzo Nobel Base Chemicals Aktiebolag
Solenis Sweden AB
Imerys Mineral AB
Celanese Emulotions Norden AB
BASF AB
Habia Teknoflour Aktiebolag
Chemiplastica AB
Sealed Air Svenska Aktiebolag
Voestalpine Böhler Welding Nordic AB
PA Resins AB
INEOS Compounds Sweden AB
Elasto Sweden AB
Ineos Compounds Sweden AB
BIM Kemi Sweden AB
SKW Metallurgy Sweden AB
Styrolution Sweden AB

11-50 employees
Riflex Film Aktiebolag
Norcarb Engineered Carbons AB
Wibax Aktiebolag
Aluf Flour Aktiebolag
Rohm and Haas Nordiska AB
Carbide Sweden AB
Polyone Sweden AB
Schulman Nordic AB
Nolato Silikonteknik AB
Yara Praxair AB
Wibax AB
Feralco Nordic AB
Trinseo Sverige AB
Chemiplastica AB
United Initiators AB
Arom-Dekor Kemi AB

Tetra Chemicals Europe AB
Marenordic AB
Ask Chemicals Scandinavia Aktiebolag
Thevinyl Aktiebolag
Nexam Chemical AB
Kemikalia AB
Unicolor AB
Nils Malmgren Aktiebolag

1-10 employees
Premium Profiles AB
Addvanze AB
Lab.service i Sundsvall Aktiebolag
PQ Sweden AB
Archemi Aktiebolag
Polyone Sweden AB
Wibax Tech Aktiebolag
Sellukem AB
Getica AB
Kombidelta AB
Nimitz AB
Vindelkol AB
TA Chemistry Aktiebolag
Recyclean Biosystems AB
Chromafora AB
Elastomix AB
Isblästring Sverige AB
PU Consulting AB
Extroil AB
Cryotech AB
Gas Solutions Sweden AB
Lundin Polymertek AB
Pol-Dynamic AB
Epoxyfabriken i Skövde AB

Chemical products
>250 employees
Flügger AB
Orica Sweden AB
Sherwin-Williams Sweden AB
Cederroth AB
Akzo Nobel Decorative Coatings AB
Akzo Nobel Industrial Coatings AB
Casco Adhesives AB

Tikkurila Sverige AB

51-250 employees

Yara AB

Eureco Bofors Aktiebolag

Becker Industrial Coatings AB

Flint Group Sweden AB

CCS Healthcare AB

Swedish Match Industries Aktiebolag

International Färg Aktiebolag

Gelita Sweden Aktiebolag

Akzo Nobel Industrial Finishes AB

DAW Nordic AB

Nordium Products Sweden AB

Bona Aktiebolag

Bostik Aktiebolag

Aerosol Scandinavia Aktiebolag

Teknos Aktiebolag

Axalta Powder Coating Systems Nordic AB

Johnson Matthey Formox AB

Henkel Adhesive Technologies Norden
Aktiebolag

Clariant Masterbatches Norden Aktiebolag

Depend Cosmetic Aktiebolag

Rekal Svenska Aktiebolag

Lahega Kemi Aktiebolag

Chemoswed AB

Carlfors Bruk AB

Sika Sverige Aktiebolag

Hardford Production AB

Colorex Sweden AB

Kemetyl Aktiebolag

EPC Sverige AB

Hagmans Kemi Aktiebolag

Sterisol AB

11-50 employees

Aromatic Aktiebolag

Auson Aktiebolag

Flowcrete Sweden AB

Stockholms Analytiska Laboratorium
Aktiebolag

Forcit Sweden AB

Umicore Autocat Sweden AB

Aurena Laboratories AB

Maria Nila AB

Norstel Aktiebolag

Sun Chemical AB

Herdins Färgverk Aktiebolag

A Clean Partner International AB

Victoria Scandinavian Soap AB

Eko-Service Skandinavien AB

Aktiv Kemi i Småland AB

PLS Produkter Aktiebolag

Simfas Sweden AB

Silvandersson Sweden Aktiebolag

Grace Catalyst AB

Cleano Production AB

SweTree Technologies AB

Kimit Aktiebolag

Onefill Technologies Sweden AB

Norab Aktiebolag

Aktiebolaget Lennart Månsson
International

Gjöco AB

Landora Färg AB

K. Ungh Aktiebolag

Dermanord-Svensk Hudvård AB

FFAB Legopack Aktiebolag

Plasticolor Sweden Aktiebolag

Liwa Färg AB

Stora Kopparbergs Bergslags Aktiebolag
AB Röa

Southcoat AB

Ljungby Komposit AB

Syntema i Vaggeryd Aktiebolag

Svenska Lim AB

L:A Bruket AB

Bycosin AB

Tinter Färgblandarna Aktiebolag

Almén Cosmetic Group AB

Skigo AB

Arboritec Aktiebolag

Linköpings Tekniska Fabrik AB

Jape Produkter AB

Svenska Latex AB

Lars-Erik Johansson Bilprodukter
 Aktiebolag
 Vasco Aktiebolag
 Svenska Krämfabriken AB
 Macserien Produktion AB
 Solaster Production AB
1-10 employees
 Syntema i Eskilstuna Aktiebolag
 Målarkalk Aktiebolag
 Engwall O. Claesson Aktiebolag
 Sioo Woodprotection AB
 Kempartner Aktiebolag
 Scandinavian Hair Company AB
 Sanego AB
 Designed Chemistry AB
 Lotrec Aktiebolag
 Protega AB
 Aktiebolaget Konsumentkemi
 Nordic Biocosmetic Production AB
 Vio Ljusfabrik Aktiebolag
 Syntema i Göteborg AB
 Svenska Diskbolaget Aktiebolag
 H L C Produkter AB
 MICO AB
 Blue & Green AB
 Vesta SI Europe AB
 Tikkurila Drytech AB
 Sunchem Aktiebolag
 Wibo Färg Aktiebolag
 Ecofix AB
 Yngve Niklasson Aktiebolag
 Westlén Industrier AB
 Klockargårdens i Norberg AB
 Gyllebo Gödning Aktiebolag
 Björnax Aktiebolag
 Joel Svenssons Vaxfabrik Aktiebolag
 Deflamo AB (Publ.)
 Envirostripp Chemicals AB
 PP-Polymer Aktiebolag
 Schmidts Polérmedel Aktiebolag
 Trikem AB
 T.H. Meyer AB
 Temax AB
 Natural Fragrance of Sweden AB
 Alron Chemical Co Aktiebolag
 Tergent AB
 Gyttorp Cartridge Company AB
 Kemiverken i Skänninge Aktiebolag
 GFFAB, Pyromedia & Pyroteknik,
 Fyrverkerispecialisterna AB
 Xylophane AB
 Syntema i Linköping Aktiebolag
 Ingenjörfirma Gustaf Båke Aktiebolag
 Tinter i Skaraborg AB
 Färgbygge Sverige AB
 Aktiebolaget Prols-Fabrik
 Emin Svenska Aktiebolag
 Plantamed Aktiebolag
 K9 Competition AB
 Invekta Green Aktiebolag
 Unique Cosmetics Sweden AB
 Kombidelta AB
 Blekinge Bioprodukter AB
 Emutec AB
 Qloss AB
 Screentech i Haparanda Aktiebolag
 Rosinco AB
 Syntema i Malmö Aktiebolag
 I-Tech AB
 Falu Vapen Färg AB
 Bacca Byggkemi AB
 Thord Ohlssons Kemiska Produkter
 Chemex Aktiebolag
 Pica Kemi AB
 Valbo Kem AB
 Lernberger Stafsing AB
 Biobact Aktiebolag
 Fuji Hunt Nordic Aktiebolag
 Svenska Brandia Aktiebolag
 Kopparbergs Pigment AB
 Codec Färg Aktiebolag
 Industriqulören i Eskilstuna Aktiebolag
 Colorpoint Osby Kemi AB
 Ovolin AB
 Viking Färg AB
 Nordic Custom Support AB

Relaco i Klippan Aktiebolag
Klippotekets Fabrik Aktiebolag
Recykling i Gävle Aktiebolag
Vensotec Systemkemi Aktiebolag
Chempos Aktiebolag
Zefin Chemical AB
NMK Svenska Försäljning AB
Luxit Organic Care AB
Swetech i Karlskoga Aktiebolag
Specialkemi Väst AB
Chemirof AB
Viken Park AB
Handels & Partifirman Svedo A
Hermansson AB
Borkmanns Antik & Byggnadsvård AB
Inkit AB
B.K. Industri Kell Olsson Aktiebolag
Skillingarydssalvan Aktiebolag
GRP Produkter Aktiebolag
Weba Kemi Aktiebolag
Condico Miljöprodukter i Lessebo
Aktiebolag
Amfolyten Aktiebolag
Wise Naturkosmetik AB
Protomega Chemicals Sweden AB
Ekholm Vision AB
Ljung Hudvård AB
Daxxin AB
Zula Diagnostics AB
Krefting & Sandström Lifeclean AB
Waltreco Aktiebolag
Masens Kemiska Tekniska Aktiebolag
Pyro - Smålands Krutbruk Aktiebolag
KTM-Krim.Teknisk Materiel Aktiebolag
Ferm Affärspartner AB
Accentify AB
Condry Construction Improvement AB
Limtek & Mikab AB
Q-Bond Aktiebolag
RMC Sverige AB
Uniol-Produkter Aktiebolag
Aksab Kemi Aktiebolag
Kemeco Aktiebolag

FFC Kemi Aktiebolag
Skargard AB
A Cook AB
Capinord AB
GDP Gégo de Prince-Myrthil Lab AB
Orchide Essence of Nature AB
Ingrid K AB
WAM Eko AB
Chudvård AB
Myhavtorn of Sweden AB
Innovitro AB
Moyana Corigan AB
Svenska Saneringsaktiebolaget
Reniderm Scandinavia Aktiebolag
Binab Bio-Innovation AB
Nya Bionema Aktiebolag
Höglandets Trädgårdsjord AB
Pyro Event Magnus Cieslak AB
Envitech Aktiebolag
Plasmatrix Materials AB
Strandman Composites AB

**Pharmaceutical products, reagents,
etc.**

>250 employees

AstraZeneca AB
GE Healthcare Bio-Sciences AB
Fresenius Kabi AB
Octapharma AB
McNeil AB
Apotek Produktion & Laboratorier AB
Phadia AB
Q-Med Aktiebolag
Swedish Orphan Biovitrum AB (PUBL)
Cambrex Karlskoga Aktiebolag
Recipharm Stockholm AB
Pfizer Health AB

51-250 employees

Recipharm Karlskoga AB
Pfizer AB
Cepheid AB
Kemwell AB
Polypeptide Laboratories (Sweden) AB

AMO Uppsala AB
Vitrolife Sweden Aktiebolag
Qpharma AB
Crucell Sweden AB
Unimedic Aktiebolag
Abigo Medical Aktiebolag
Oasmia Pharmaceutical AB
Cobra Biologics AB
Orexo AB
Euro-Diagnostica AB
Recipharm Högånäs AB
Repligen Sweden AB
Bioglan AB
Scandinavian Gene Synthesis Aktiebolag
Recipharm Strängnäs AB

11-50 employees

Allergon Aktiebolag
Fujirebio Diagnostics AB
Vitamex Production AB
Cobra Biopharma Matfors AB
Astareal AB
Bactiguard AB
Bohus Biotech Aktiebolag
Biora AB
Olerup SSP Aktiebolag
Natumin Pharma AB
Magle Aktiebolag
Aktiebolaget Cernelle
Chemotechnique MB Diagnostics
Aktiebolag
Rolf Kullgren AB
Nidacon International AB
Devyser AB
Agrisera Aktiebolag
IDL Biotech AB
Medirox Aktiebolag
MKL Diagnostics AB

1-10 employees

JE-Medic i Gävle AB
Carls-Bergh Pharma Aktiebolag
Viscogel AB
Octean AB

Octean AB
Biothema Aktiebolag
Syntagon AB
Dental Therapeutics Aktiebolag
Miwana Aktiebolag
Biokraft Pharma Aktiebolag
Appeartex AB
Glycorex Ubp AB
Speximo AB
Metasafe AB
Wasa Medicals AB
Percell Biolytica Aktiebolag
Mimer Medical AB
Sensidose AB
Reagensia Aktiebolag
Encecor Aktiebolag
Zula Diagnostics AB
2Care4 AB
Imco Corporation LTD Aktiebolag
Lidds AB
Metina AB
Novozymes Biopharma Sweden AB
BR. Bioreagens AB
Biocool AB
Novandi Chemistry AB

Vinnova's publications

May 2016

See vinnova.se for more information

Vinnova Analysis

VA 2016:

- 01 VINNVÄXT - Ett innovativt program i takt med tiden
- 02 Årsbok 2015 - Svenskt deltagande i europeiska program för forskning & innovation
- 03 Effektanalys av Vinnväxt-programmet - *Analys av effekter och nytta*
- 04 Chemical Industry Companies in Sweden - *Update including data for competence analysis*

VA 2015:

- 01 Årsbok 2014 - Svenskt deltagande i europeiska program för forskning & innovation
- 02 Samverkansuppgiften i ett historiskt och institutionellt perspektiv
- 03 Långsiktig utveckling av svenska lärosätens samverkan med det omgivande samhället - *Effekter av forsknings- och innovationsfinansiärens insatser*
- 04 Företag i Tåg- och järnvägsbranschen i Sverige - 2007-2013
- 05 FoU-program för Små och Medelstora Företag - *Metodologiskt ramverk för effektanalyser*
- 06 Small and beautiful - *The ICT success of Finland & Sweden*
- 07 National Research and Innovation Councils as an Instrument of Innovation Governance - *Characteristics and challenges*
- 08 Kartläggning och behovsinventering av test- & demonstrationsinfrastruktur

VA 2014:

- 01 Resultat från 18 VINN Excellence Center redovisade 2012 - *Sammanställning av enkätresultaten. (For English version see VA 2014:02)*
- 02 Results from 18 VINN Excellence Centres reported in 2012 - *Compilation of the survey results. (For Swedish version see VA 2014:01)*
- 03 Global trends with local effects - *The Swedish Life Science Industry 1998-2012*
- 04 Årsbok 2013 - Svenskt deltagande i europeiska program för forskning och innovation.
- 05 Innovations and new technology - *what is the role of research? Implications for public policy. (For Swedish version see VA 2013:13)*

- 06 Hälsoekonomisk effektanalys - *av forskning inom programmet Innovationer för framtidens hälsa.*
- 07 Sino-Swedish Eco-Innovation Collaboration - *Towards a new pathway for shared green growth opportunity.*
- 08 Företag inom svensk massa- och pappersindustri - 2007-2012
- 09 Universitets och högskolors samverkansmönster och dess effekter

VA 2013:

- 01 Chemical Industry Companies in Sweden
- 02 Metallindustrin i Sverige 2007 - 2011
- 03 Eco-innovative Measures in large Swedish Companies - *An inventory based on company reports*
- 04 Gamla möjligheter - *Tillväxten på den globala marknaden för hälso- och sjukvård till äldre*
- 05 Rörliga och kopplade - *Mobila produktionssystem integreras*
- 06 Företag inom miljötekniksektorn 2007-2011
- 07 Företag inom informations- och kommunikationsteknik i Sverige 2007 - 2011
- 08 Snabbare Cash - *Effektiv kontanthantering är en tillväxtmarknad*
- 09 Den svenska maritima näringen - 2007 - 2011
- 10 Long Term Industrial Impacts of the Swedish Competence Centres
- 11 Summary - Long Term Industrial Impacts of the Swedish Competence Centres. *Brief version of VA 2013:10*
- 12 Företag inom svensk gruv- och mineralindustri 2007-2011
- 13 Innovationer och ny teknik - *Vilken roll spelar forskningen. (For English version see VA 2014:05)*
- 14 Företag i energibranschen i Sverige - 2007-2011
- 15 Sveriges deltagande i sjunde ramprogrammet för forskning och teknisk utveckling (FP7) - *Lägesrapport 2007-2012*
- 16 FP7 and Horizon 2020

Vinnova Information

VI 2016:

- 01 Projektkatalog Utmaningsdriven innovation Steg 1-2015 - *Initieringsprojekt*
- 02 Projektkatalog Utmaningsdriven innovation Steg 2-2015 - *Samverkansprojekt*
- 03 Projektkatalog Utmaningsdriven innovation Steg 3-2015 - *Följdinvesteringsprojekt*
- 04 Årsredovisning 2015
- 05 FFI Årsrapport 2015 - *Samverkan för stark svensk fordonsindustri och miljöanpassade samt säkra transporter*
- 06 Innovation för ett attraktivare Sverige - *Sammanfattning*

VI 2015:

- 01 Insatser för innovationer inom Hälsa
- 02 FFI Årsrapport 2014 - *Samverkan för stark svensk fordonsindustri och miljöanpassade samt säkra transporter*
- 03 Social innovation - *Exempel*
- 04 Social innovation
- 05 Årsredovisning 2014
- 06 Sweden needs FFI (for Swedish version see VI 2015:10)
- 07 Innovation för ett attraktivare Sverige - *Underlag till regeringens politik för forskning, innovation och högre utbildning 2017-2020 - Huvudrapport*
- 08 Förutsättningar för innovationspolitik i Sverige - *Underlag till regeringens politik för forskning, innovation och högre utbildning 2017-2027 - Analysrapport*
- 09 Utmaningsdriven innovation - *Samhällsutmaningar som tillväxtpotentialer (for English version see VI 2015:11)*
- 10 Sverige behöver FFI (for English version see VI 2015:06)
- 11 Challenge-Driven Innovation - *Societal challenges as opportunities for growth (for Swedish version see VI 2015:09)*

VI 2014:

- 01 Tjänsteinnovationer 2007
- 02 Innovationer som gör skillnad - *en tidning om innovationer inom offentliga verksamheter*
- 03 Årsredovisning 2013
- 04 VINNVÄXT - *A programme renewing and mowing Sweden ahead*
- 05 Replaced by VI 2015:01
- 06 Din kontakt i EU:s forsknings- och innovationsprogram

- 07 VINNOVA - Sveriges innovationsmyndighet. (For English version see VI 2014:10)
- 08 Visualisering - inom akademi, näringsliv och offentlig sektor
- 09 Projektkatalog Visualisering - inom akademi, näringsliv och offentlig sektor
- 10 VINNOVA - Sweden's Innovation Agency (For Swedish version see VI 2014:07)
- VI 2013:**
- 01 Branschforskningsprogrammet för skogs- & träindustrin - Projektkatalog 2013
- 02 Destination Innovation- Inspiration, fakta och tips från Ungas Innovationskraft
- 03 Inspirationskatalog - Trygghetsbostäder för äldre
- 04 Replaced by VI 2015:11
- 05 Replaced by VI 2013:14
- 06 Årsredovisning 2012
- 07 Trygghetsbostäder för äldre - en kartläggning
- 08 Äldre entreprenörer med sociala innovationer för äldre - en pilotstudie kring en inkubatorverksamhet för äldre
- 09 Fixartjänster i Sveriges kommuner - Kartläggning och samhällsekonomisk analys. (For brief version see VINNOVA Information VI 2013:10)
- 10 Sammanfattning Fixartjänster i Sveriges kommuner - Kartläggning. (Brief version of VINNOVA Information VI 2013:09)
- 11 Replaced by VI 2014:10
- 12 Replaced by VI 2013:19
- 13 När företag och universitet forskar tillsammans - Långsiktiga industriella effekter av svenska kompetenscentrum
- 14 No longer available
- 15Handledning - för insatser riktade mot tjänsteverksamheter och tjänsteinnovation
- 16 Replaced by VI 2013:22
- 17 Innovationer på beställning - tidning om att efterfråga innovationer i offentlig sektor
- 18 Replaced by VI 2014:06
- 19 Arbetar du inom offentlig sektor och brinner för innovationsfrågor? - VINNOVA är Sveriges innovationsmyndighet och arbetar för att offentlig sektor ska vara drivkraft för utveckling och användning av innovationer
- 20 Programöversikt 2014 - Stöd till forskning och innovation
- 21 OECDs utvärdering av Sveriges innovationspolitik - En sammanställning av OECDs analys och rekommendationer.
- 22 Att efterfråga innovation - Tankesätt och processer

Vinnova Report

VR 2016:

- 01 Third Evaluation of VINN Excellence Centres - AFC, BiMaC Innovation, BIOMATCELL, CESC, CHASE, ECO2, Faste, FUNMAT, GHz, HELIX, Hero-m, iPack, Mobile Life, ProNova, SAMOT, SuMo & WINGQUIST
- 02 Third Evaluation of Berzelii Centres - Exselent, UPSC & Uppsala Berzelii
- 03 NOVA - Verktyg och metoder för normkreativ innovation
- 04 Forskning och utveckling för ökad jämställdhet - Följeforskning om Vinnovas regeringsuppdrag avseende behovsmotiverad forskning för ökad jämställdhet 2013-2015
- 05 This is about Change - Ten years as an on-going evaluator of the Triple Steelix initiative (For Swedish version see VR 2015:05)

VR 2015:

- 01 Bumpy flying at high altitude? - International evaluation of Smart Textiles, The Biorefinery of the Future and Peak Innovation
- 02 From green forest to green commodity chemicals - Evaluating the potential for large-scale production in Sweden for three value chains
- 03 Innovationstävlingar i Sverige - insikter och lärdomar
- 04 Future Smart Industry - perspektiv på industriomvandling
- 05 Det handlar om förändring - Tio år som följeforskare i Triple Steelix (For English version see VR 2016:05)
- 06 Evaluation of the Programme Multidisciplinary BIO - The strategic Japanese-Swedish cooperation programme 2005 - 2014
- 07 Nätverksstyrning av transportinnovation
- 08 Ersättningssystem för innovation i vård och omsorg - En studie av åtta projekt som utvecklar nya ersättningsmodeller

VR 2014:

- 01 Vägar till välfärdsinnovation - Hur ersättningsmodeller och impact bonds kan stimulera nytänkande och innovation i offentlig verksamhet
- 02 Jämställdhet på köpet? - Marknadsfeminism, innovation och normkritik
- 03 Googlemodellen - Företagsledning för kontinuerlig innovation i en föränderlig värld
- 04 Öppna data 2014 - Nulägesanalys
- 05 Institute Excellence Centres - IEC - En utvärdering av programmet
- 06 The many Faces of Implementation
- 07 Slututvärdering Innovationslössar inom hälso- och sjukvården

VR 2013:

- 01 Från eldsjälssdrivna innovationer till innovativa organisationer - Hur utvecklar vi innovationskraften i offentlig verksamhet?
- 02 Second International Evaluation of the Berzelii Centra Programme
- 03 Uppfinningars betydelse för Sverige - Hur kan den svenska innovationskraften utvecklas och tas tillvara bättre?
- 04 Innovationslössar inom hälso- och sjukvården - Halvtidsutvärdering
- 05 Utvärdering av branschforskningsprogrammen för läkemedel, bioteknik och medicinteknik
- 06 Vad ska man ha ett land till? - Matchning av bosättning, arbete och produktion för tillväxt
- 07 Diffusion of Organisational Innovations - Learning from selected programmes
- 08 Second Evaluation of VINN Excellence Centres - BiMaC Innovation, BIOMATCELL, CESC, Chase, ECO2, Faste, FunMat, GigaHertz, HELIX, Hero-m, iPACK, Mobile Life, ProNova, SAMOT, SuMo & Wingquist
- 09 Förkommersiell upphandling - En handbok för att genomföra FoU-upphandlingar
- 10 Innovativa kommuner - Sammanfattning av lärdomar från åtta kommuner och relevant forskning
- 11 Design av offentliga tjänster - En förstudie av designbaserade ansatser
- 12 Erfarenheter av EU:s samarbetsprogram - JTI-IKT (ARTEMIS och ENIAC)



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