National and regional cluster profiles

Companies in biotechnology, pharmaceuticals and medical technology in Sweden

2004

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This edition has is designed as a basis for dialogue in conjunction with an oral presentation.

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About VINNOVA

VINNOVA's mission is to *promote sustainable growth*
by developing *effective innovation systems*
and funding *problem-oriented research*.

Through its activities in this field, VINNOVA aims to make a significant contribution to Sweden´s development into a leading centre of economic growth.

The VINNOVA Analysis series includes publications of studies, analyses, official reports and evaluations that have been produced or commissioned by VINNOVA's Strategy Development Division.

Research and innovation for sustainable growth.

About ADDENDI

Addendi AB is a consultancy company which carries out analyses, strategies, market plans, training and inspiration seminars for clusters and innovation systems. www.ADDENDI.se

National and regional cluster profiles

Companies in biotechnology, pharmaceuticals and medical technology in Sweden

Tage Dolk and Anna Sandström

Commissioned by

VINNOVA
City of Stockholm/Stockholm BioRegion
Uppsala BIO
Region Västra Götaland/
Business Region Gothenburg
Region Skåne/MediconValley
Biotech Umeå
BioMedley Östergötland
The Swedish National Labour Market Board
NUTEK
ISA

Initiator

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Preface

Background

VINNOVA has been commissioned by Sweden's Ministry of Enterprise, Energy and Communications to develop, in partnership with affected companies, financiers and other players, a national innovation and research strategy for the biotech field. This strategy will focus on areas with the conditions for high growth and international competitive strength. The assignment is due to report no later than 15 May 2005.

The strategy work requires different types of background documentation, one of which is this report. The work was initiated by VINNOVA and conducted in partnership with players in the most important biotech regions and other official bodies.

The profiles in the report aim to clarify the structure of both the industry and of Swedish regional clusters of companies in biotechnology, pharmaceuticals and medical technology. These profiles may be used as a basis for strategic assessment both nationally and regionally.

In addition, the regions will gain common material as a basis for dialogue on similarities and differences, which may strengthen the national strategy.

The profiles are also intended for use as international comparisons on both national and regional levels.

More in-depth regional profile reports based on the classification may be carried out by regions as a basis for regional action programmes.

The cluster profiles may also be used to demonstrate the nature of company clusters to a wider audience.

The work

The work was initiated by and received basic financing from VINNOVA.

Before this work was commenced, the City of Stockholm initiated a corresponding study for the region comprising Stockholm, Uppsala, Södertälje and Strängnäs. That study aroused the interest of VINNOVA and other regions in producing corresponding documentation for the whole country.

The following regions and initiatives contributed background documentation and financing:

- *The City of Stockholm/Stockholm BioRegion/Uppsala Bio*
- *Region Västra Götaland/Business Region Gothenburg*
- *Region Skåne/Medicon Valley.*

The following regions and initiatives contributed background material:

- *Biotech Umeå*
- *Biomedley Linköping.*

VISANU (VINNOVA, ISA and NUTEK in partnership) and the Swedish National Labour Market Board, AMS, contributed to the financing. AMS also co-ordinated its national competence poll with this work.

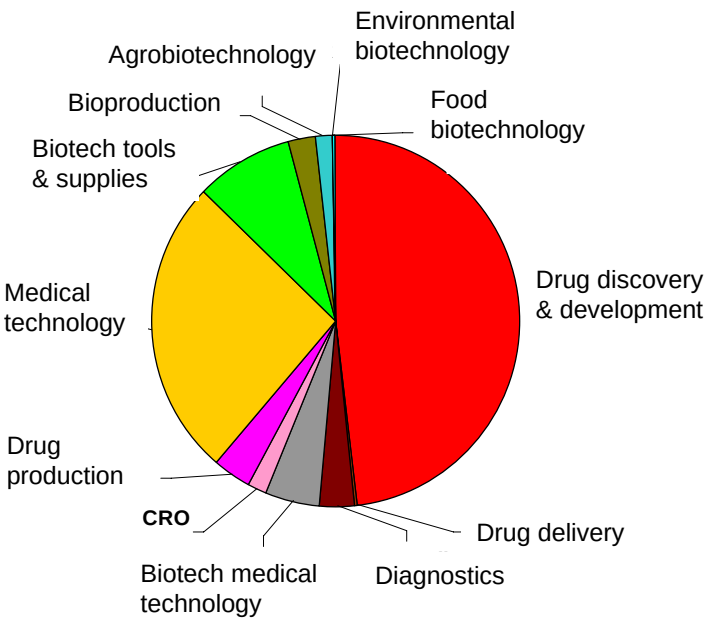
The work was conducted and co-ordinated by ADDENDI AB through Tage Dolk, Cluster Architect and Anna Sandström, M.D. and Life Science Analyst.
Svante Carlsson, Professor and venture capitalist and Jan-Evert Nilsson, Professor of Regional Development, contributed as resource persons.

The report is presented graphically and described with brief texts in order to make its analysis transparent and for new connections and measures to be identifiable later by those involved in strategy and development work. The report should be seen as working material which will be developed during the strategy work. The simplified reporting method may require oral presentations and discussion in order to avoid misunderstandings and misinterpretations. We therefore recommend that the material be used in conjunction with oral presentations.

Companies in biotechnology, pharmaceuticals and medical technology with national and/or international markets

800 companies with 40,700 employees

Subject fields



Drug discovery and development dominates, but medical technology also comprises a major proportion.
- What is the corporate structure within the subject fields?
- Are there regional concentrations?
- What are the shares for production, research and sales?

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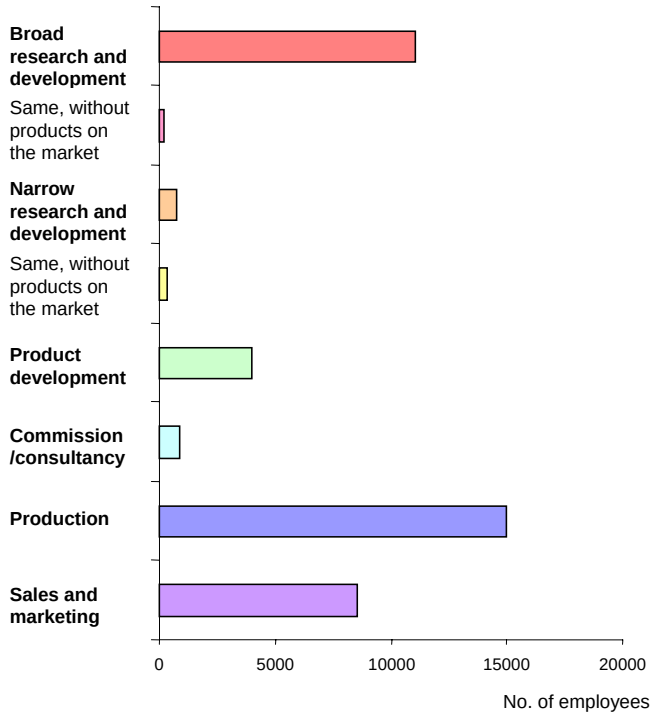
Activity categories



Over 12,000 people working in research-intensive activity, 15,000 in production and 8,500 in sales and marketing.
- What is the scope of companies on the international market?
- How large are the companies?
- What proportion of companies have products on the market?

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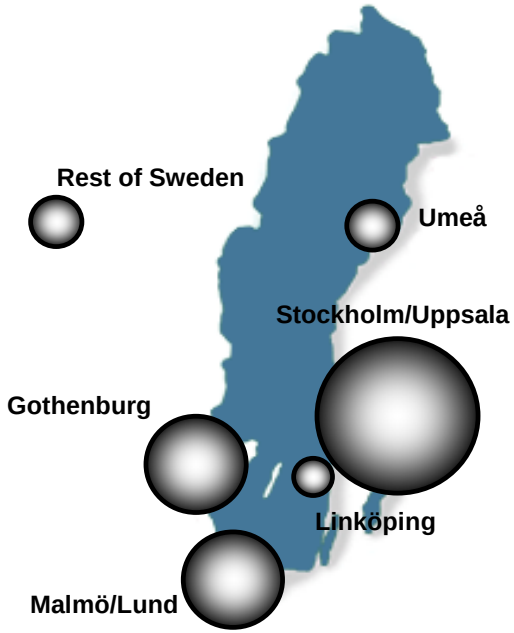
Regional distribution



The industry is concentrated in the metropolitan regions.
- Do the regions specialise in different subject fields?
- Do they concentrate on different categories of activity?
- What activities are there outside the metropolitan regions?
- What conditions are there for co-operation?

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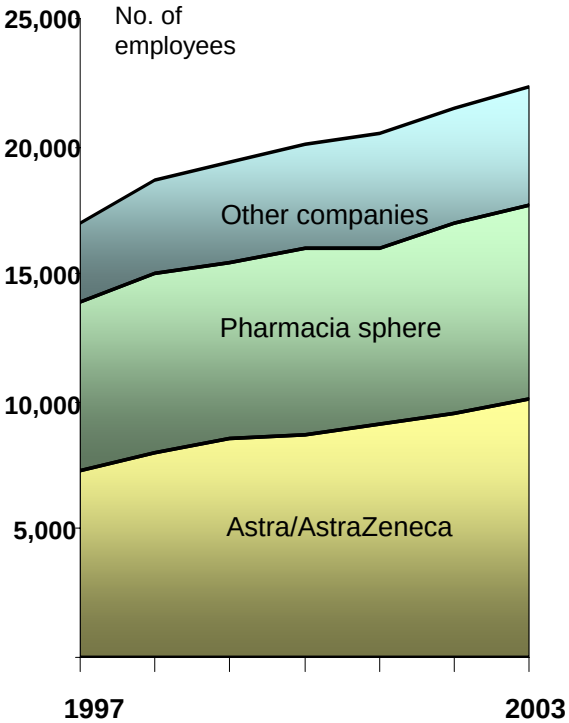
Changes 1997 – 2003, Biotechnology, Astra/AstraZeneca and the Pharmacia sphere

216 companies with 22,400 employees (2003)

Growth



The development between 1997 2003 is shown with particular reference to the number of employees for a part of the field included in this study. This applies to Astra/AstraZeneca, the Pharmacia sphere and other biotech companies.

- What is growth like in the various sections?
- What is the corporate structure like?

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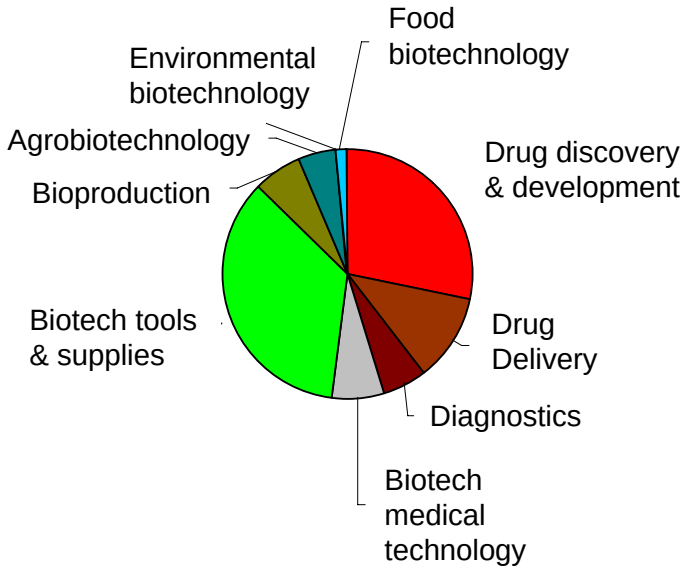
New companies



Biotech tools and supplies and drug discovery and development show the greatest growth both in the number of new companies and number of employees

- But how great is the growth really?
- In which regions is it taking place?
- What type of company has disappeared?

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All companies

- Which companies are in the study?
- Which subject fields are they active in?
- How many employees do they have?
- How can the results of the study be summarised in figures?
- What sources have been used in the study?
- Who are the contacts?

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List of companies

Companies in biotechnology, pharmaceuticals and medical technology

Companies in this sector have differing core expertise within fields such as drug discovery and development, drug delivery, diagnostics, medical technology, bioproduction, biotech tools and supplies, food biotechnology, agrobiotechnology and environmental biotechnology. The fields within which they work are characterised by increasingly sophisticated products and services as science progresses and involve ever more expertise.

The automotive, food and telecom industries are relatively well-defined, but the industries charted in this study have no natural collective name. “Life Science companies” is occasionally used as a designation and includes the greater proportion of companies.

This study reports on approximately 800 companies with 40,700 employees; it gives a snapshot of these companies in Sweden in 2004, grouped by subject field, type of activity, principal market and region. The development of a subset of companies since 1997 is also shown.

The study reports on companies but does not account for such things as the care sector, official bodies, universities or other research institutions which are important players in the innovation systems of which companies form a part.

Companies are often active in international markets with very strong brands. It is often difficult to determine what type of activity companies have in different countries and regions. This study gives a picture of what activities companies are running in Sweden and in different Swedish regions.

Companies in new industries such as biotechnology find it difficult to get suitable classification designations within things like SNI codes, as there is often no classification for new fields. This study gives a snapshot of each individual company’s activity regardless of official classification.

Life Science companies comprise an important branch of industry, of economic and political significance to today’s society. It is important to be able to clearly show the extent and structure of this industry.

Some different perspectives

The graphics in this study contain information which may be interpreted in different ways on the basis of different perspectives.

The national perspective

The fundamental conditions for companies' activities are largely controlled by national decisions within policy and research. The diagrams may therefore be looked at from a national perspective; to provide a basis for discussion surrounding fundamental conditions for this type of company and how these conditions can be influenced.

This is the main purpose of this study.

The regional player perspective

The diagrams may also be viewed from a regional player perspective; understanding how regional and local players around companies can act, preferably in tandem with them, to support the development of regional company clusters or innovation systems. A fundamental understanding of companies' differing motives and relationships can create the conditions for successful cluster initiatives.

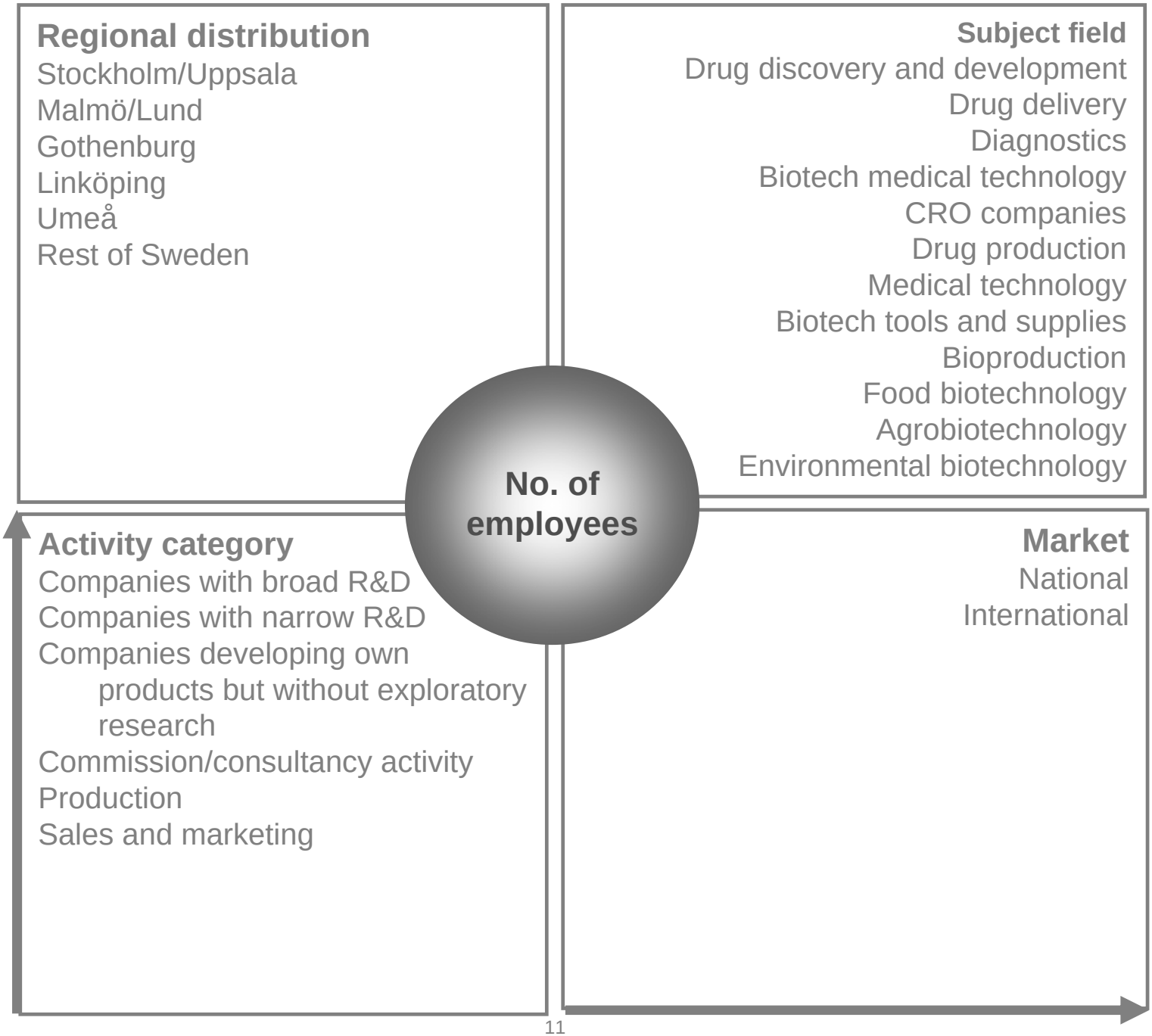
More in-depth regional knowledge is required in order to illustrate this perspective better.

The corporate perspective

The diagrams may also be viewed from a corporate perspective; how an individual company can relate to other companies.

Individual companies can increase their insights into companies in their immediate surroundings, with the aim of possible collaboration.

Variables


Regional distribution
Stockholm/Uppsala
Malmö/Lund
Gothenburg
Linköping
Umeå
Rest of Sweden
Subject field
Drug discovery and development
Drug delivery
Diagnostics
Biotech medical technology
CRO companies
Drug production
Medical technology
Biotech tools and supplies
Bioproduction
Food biotechnology
Agrobiotechnology
Environmental biotechnology
No. of employees
Activity category
Companies with broad R&D
Companies with narrow R&D
Companies developing own products but without exploratory research
Commission/consultancy activity
Production
Sales and marketing
Market
National
International

Subject fields

Drug discovery and development

- research and development of new drugs and therapies.

Drug delivery

- developing solutions on how to administer drugs to patients so that the active substance is best absorbed by the body.

Diagnostics

- development of diagnostics, often antibody-based tests.

Biotech medical technology

- providing health services with that part of medical technology which has a biotech basis, including equipment and instruments for in vitro fertilisation, cell cultivation, substitute plasma, blood management or nutrient solutions, plus the use of certain biomaterial e.g. polymers which the body gradually breaks down.

CRO companies

- “Contract Research Organisations” within the medical/pharmaceutical field; companies dealing with products and services for clinical trial activity.

Drug production

- companies specialising in drug production and which do not have their own research operations. Biotech production of drugs is not included here and is shown instead under Bioproduction.

Medical technology

- equipment and instruments for medical treatment and diagnostics. Companies developing such things as anaesthesia equipment, pacemakers, dialysis equipment, respirators, peripherals for radiological examinations, dental equipment and wound treatment products. This also includes oral cavity titanium implants plus bone-anchored prostheses and hearing aids.

Biotech tools and supplies

- products and services for production, research and development within biotech applications. This includes equipment for bioseparation or biomolecular analyses and bioinformatics.

Bioproduction

- biotech production of drugs, biomolecules or microorganisms.

Agrobiotechnology

- plant or forest tree breeding utilising biotech methods in the cultivation work and which may use gene technology as a method for obtaining specific properties (genetic modification). Also included is plant protection based on naturally occurring microorganisms or biomolecules plus processing of land-based raw materials with the aid of biotechnology.

Environmental biotechnology

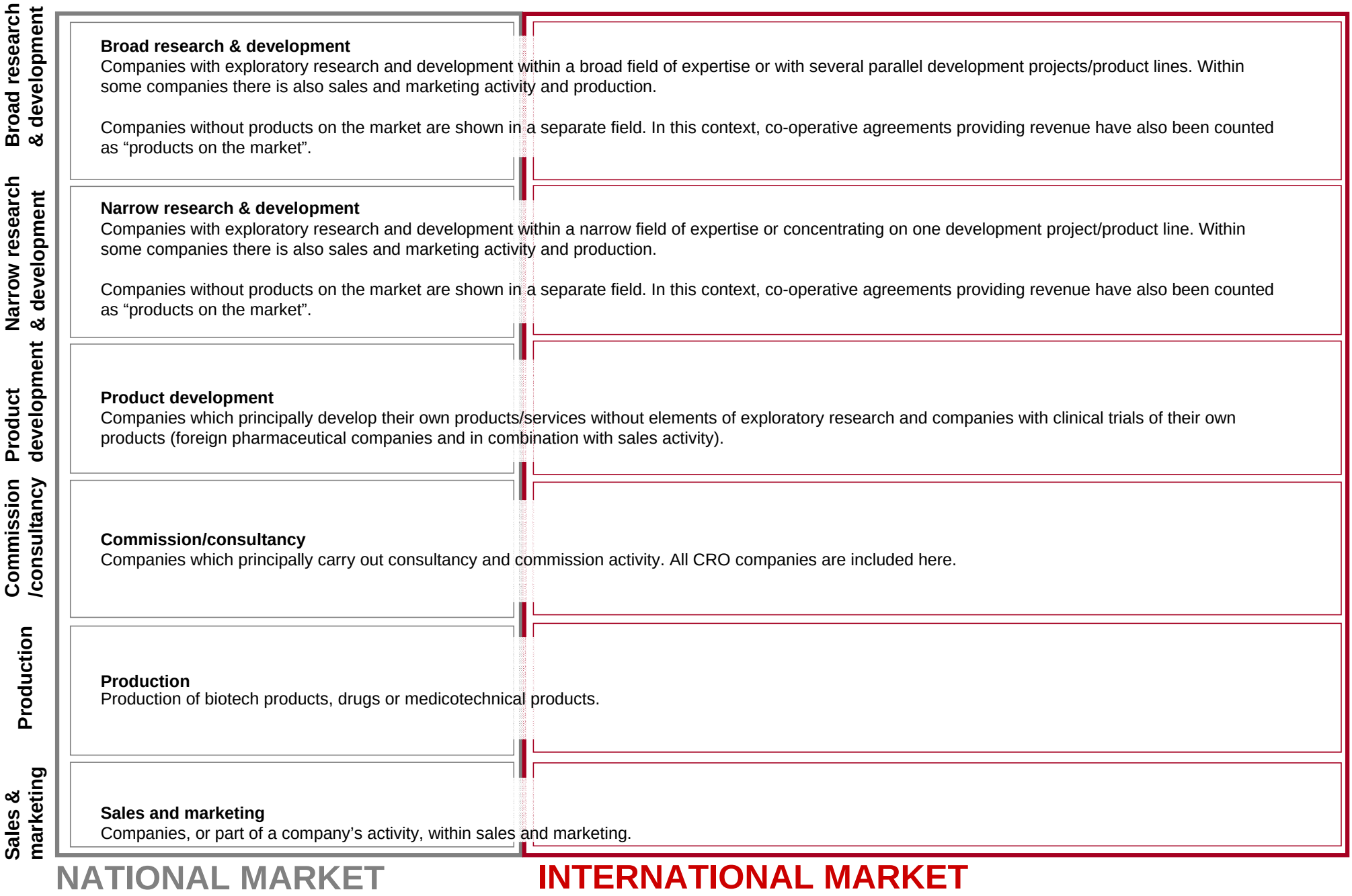
- biotech solutions to environmental issues such as water purification, land decontamination (bioremediation) and waste management.

Food biotechnology

- biotechnically-produced components or ingredients for the development of foods with positive health benefits; probiotics for example.

Ball colour denotes subject field.

Activity categories



Number of employees, market and regions

Number of employees

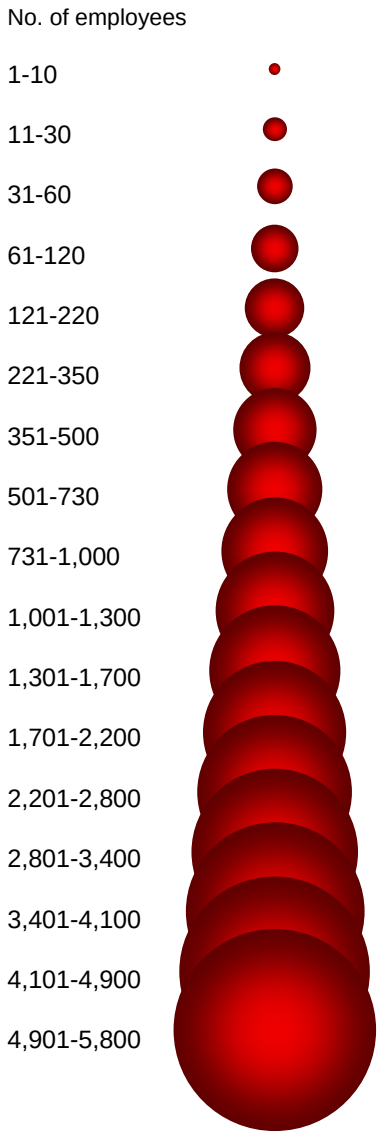
What is shown as “number of employees” in the report is the mean value of the number of full-time annual working units during the year 2003, i.e. the number reported by companies in their annual report to the Swedish Companies Registration Office. The actual number of people employed in companies may be 20-30% higher due to part-time posts, leave of absence etc.

The size of companies, measured by number of employees, is given as a ball where the size of the company or operation is proportional to the volume of the ball. The scale is a cube root scale.

Companies with more than 500 employees have been divided up into different activity categories (not different subject fields) following contact with the companies.

For a few companies operating in different subject fields, only one section of the company has been included which belongs to the subject fields chosen for the study.

Companies with operations in different regions are shown by balls, where the volume is proportional to the number of employees in each region.



Markets

National market

“National market” means companies or operations based principally on revenues from a client base in Sweden, or operations running clinical trials based on a patient base in Sweden. The great majority of companies operate in the international market, or have it as an objective to do so. Those operating nationally are largely foreign companies’ sales and marketing and clinical trials operations in Sweden plus a few CRO companies.

International market

“International market” means companies or operations based principally on revenues from the client base in the Nordic region, Europe or the rest of the world, or operations running project management of clinical trials based on a patient base in more countries than Sweden.

Regions

Stockholm/Uppsala

Comprising the County of Stockholm, Uppsala County and Södermanland County. Active initiatives are “Stockholm BioRegion”, ”UppsalaBio” and ”BiotechValley”.

Malmö/Lund

Comprising Skåne County. The active initiative is “Medicon Valley”, which also includes Copenhagen (Copenhagen not shown in this study).

Gothenburg

Comprising Västra Götalands County and Halland County. Active initiatives are “Biomedical Development in Western Sweden” and ”MedCoast”, which also includes Oslo (Oslo not shown in this study).

Linköping

Comprising Östergötland County. The initiative in operation is “BioMedley”.

Umeå

Comprising Västerbotten County. The initiative in operation is “Biotech Umeå”.

Rest of Sweden

Includes those companies which have been identified and which lie outside the regions described above.

Comments

Companies included

Companies which have their core activity within the previously described selection of subject fields with at least one employee in 2003.

Companies not included

Subcontractors to companies within the selection of subject fields which do not have their core activity within these fields of expertise are not included. This may apply to such enterprises as design companies, companies within manufacturing (if the operation is not entirely concentrated on included subject fields), Mechanical, optics and electronics companies, PR agencies, venture capital companies and patent and business advisers. The scope of these activities is very difficult to estimate.

Companies within fields such as disability aids (e.g. rollators and wheelchairs), prostheses or hearing aids which are not bone-anchored and companies conducting laboratory analyses plus orthopaedic laboratories and dental laboratories. These include approx. 5,000-15,000 employees. Companies producing fittings and furniture for health services such as lighting, examination couches and treatment tables are not included either. The scope of this activity is also difficult to estimate.

Division of companies into regions and different activity categories

For a company with operations in several regions, activities in all these regions are shown. Only in the diagram of companies with solely international markets has the regional division not been made.

Companies with more than 500 employees are divided into different activity categories, e.g. showing the number of employees within production and sales/marketing for these in separate balls. In the diagram of companies with solely international markets, any sales and marketing has been moved up to the company's topmost ball.

Assessment

Details of subject fields, activity categories and markets are not available in general statistics, but require subjective assessment based on information from different sources. Since the study is intended for strategic considerations, an assessment of individual companies is not conclusive for all of them. Groups of companies should therefore be considered rather than individual companies.

Companies with fewer than 500 employees and several activity categories within the company have been placed in the category which is highest on the vertical axis. This means if the company has both product development and production, they have been placed under "Product development" on the vertical axis.

Ball diagram

The ball diagram used in this study shows five variables simultaneously:

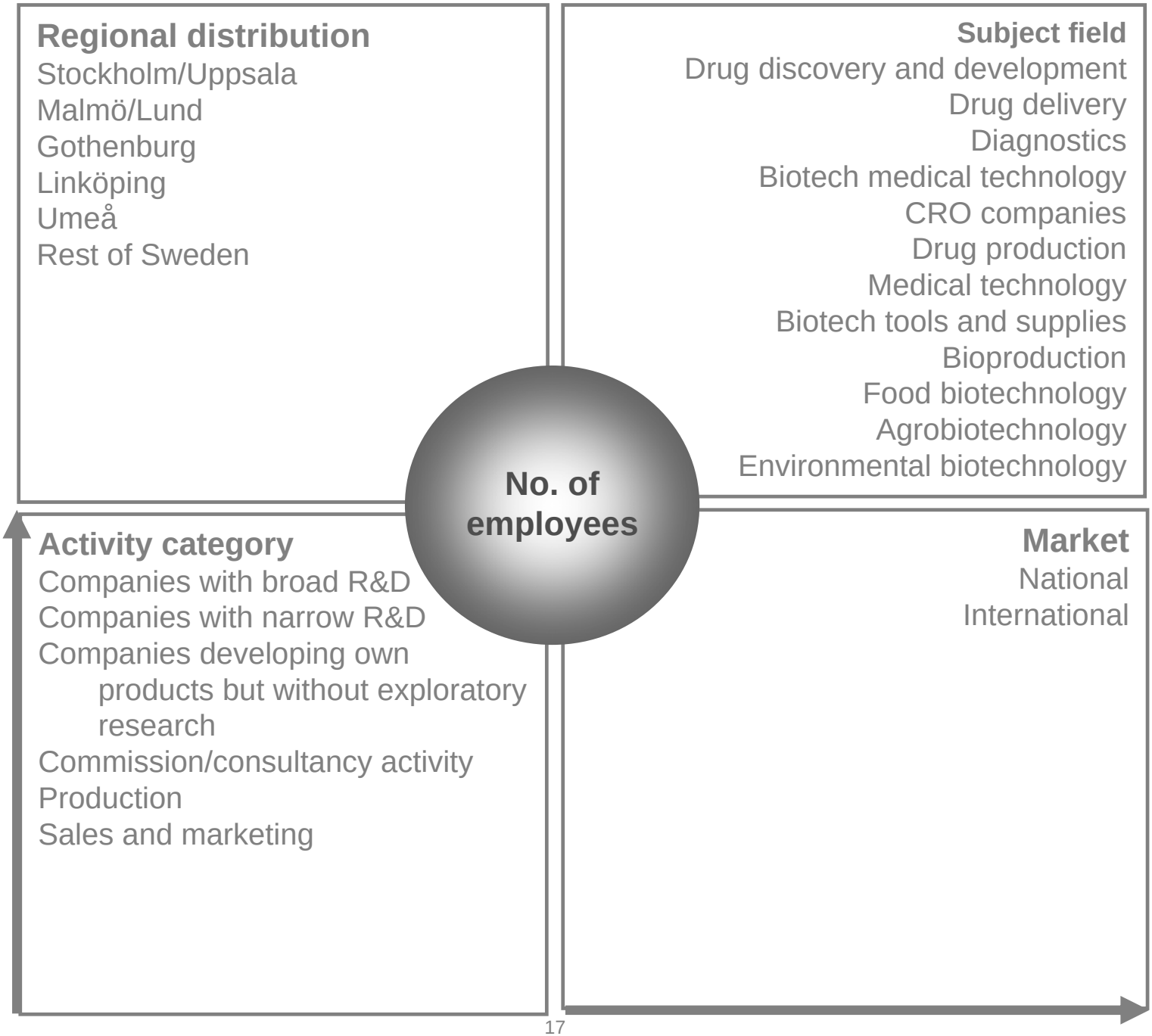
- Market (left/right side field)
- Geographical location (horizontal axis)
- Activity category (vertical axis)
- Subject field (colour)
- Company size, number of employees (ball size)

Readers may thus draw their own conclusions based on differing combinations of these variables.

Updates

A wish has been expressed by the parties involved to contribute to update of the database. However, the current project involves no specific undertaking from the parties in this regard.

All companies



All companies

Scope

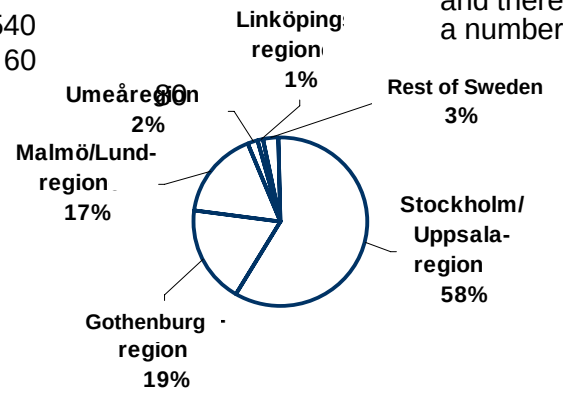
The total number of companies active in international and/or national markets within biotechnology, pharmaceuticals and medical technology in Sweden is approx. 800 with a total of almost 40,700 employees. Half these companies are active in international markets and comprise 81% of the employees. Those operating nationally are largely the sales and marketing and clinical trial operations of foreign companies in Sweden, plus a few CRO companies.

At the end of the report is a table summarising the results plus a list of all companies included.

Subject fields

Companies being studied are distributed into different subject fields reckoned by number of employees as follows:

Drug discovery and development	19,600
Drug delivery	200
Diagnostics	1,230
Biotech medical technology	1,850
CRO companies	720
Drug production	1,200
Medical technology	10,700
Biotech tools and supplies	3,500
Bioproduction	1,050
Agrobiotechnology	540
Environmental biotechnology	60
Food biotechnology	80



Regional overview

The regions have differing subject profiles:

Stockholm concentrates on drug discovery and development and has a strong presence of international pharmaceutical companies which often localise their sales and marketing activities in clinical trial operations there. Uppsala has several of the country's larger biotech tools and supplies companies, largely due to Pharmacia's previous activity in that region. Conversely, most new companies in this subject field have started up in Stockholm more recently, often as spin-offs from the Karolinska Institute and KTH. Strängnäs has some large bioproduction plants and is shown in subsequent diagrams as part of the Stockholm region.

The Gothenburg area has AstraZeneca's largest research unit in Sweden, plus several larger medical technology companies. These include several companies involved in the development of oral cavity titanium implants, limb prostheses and bone-anchored hearing aids. The Gothenburg region also has a large number of sales companies.

Skåne has many people employed in medical technology. There are also companies here in bioproduction, drug discovery and development and drug production, and agrobiotechnology companies have a long tradition in the region. The small number of companies in food biotechnology, agrobiotechnology and environmental biotechnology are chiefly in Skåne.

Östergötland mainly has companies in medical technology, some originating with Saab.

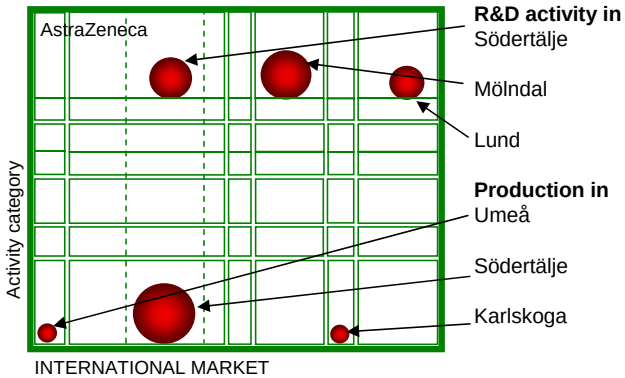
In Västerbotten, the larger companies are mainly involved in production, but there is also a lesser number of small research-intensive companies.

Few companies in the stated subject fields are found outside the above regions and there are almost no research-intensive companies. However, there are a number with product development and production.

All companies

The largest companies

Some of the larger companies run operations in several Swedish regions. AstraZeneca has its research and development operations in Södertälje, Lund and Mölndal. The company has its largest production unit in Sweden in Södertälje and also runs production in Umeå and Karlskoga (now sold off). AstraZeneca has over 10,000 employees in Sweden and makes up 25% of the studied industry's employment and 50% of the number of employees in drug discovery and development/production.



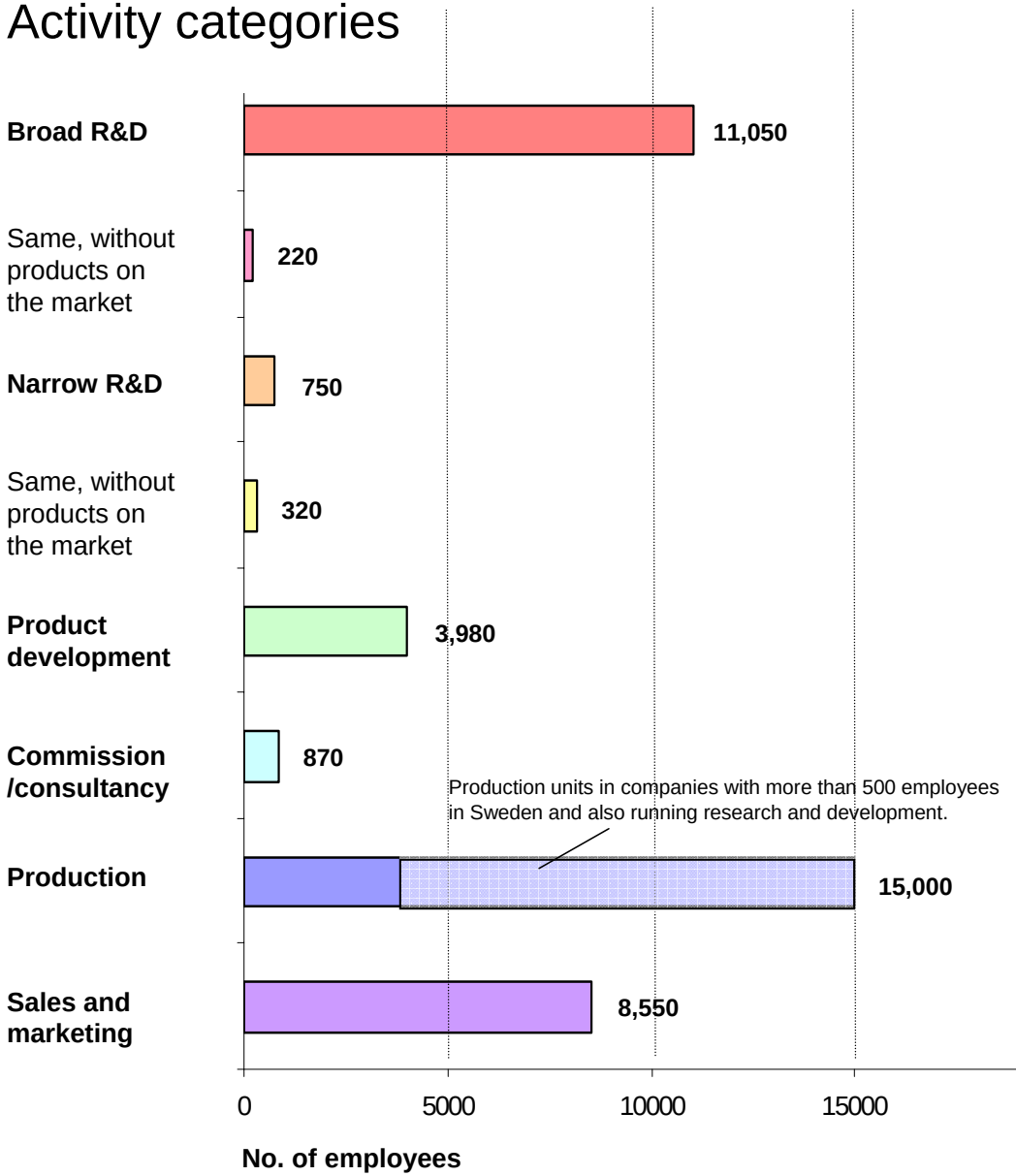
Pfizer, with a total of approx. 3,500 employees in Sweden, has production units in Strängnäs, Helsingborg and Uppsala. Sales and marketing on the Nordic market and clinical trial activity in the Nordic patient base are run in Stockholm.

The following is a list of companies with more than 500 employees in Sweden which are divided into different activity categories in the study:

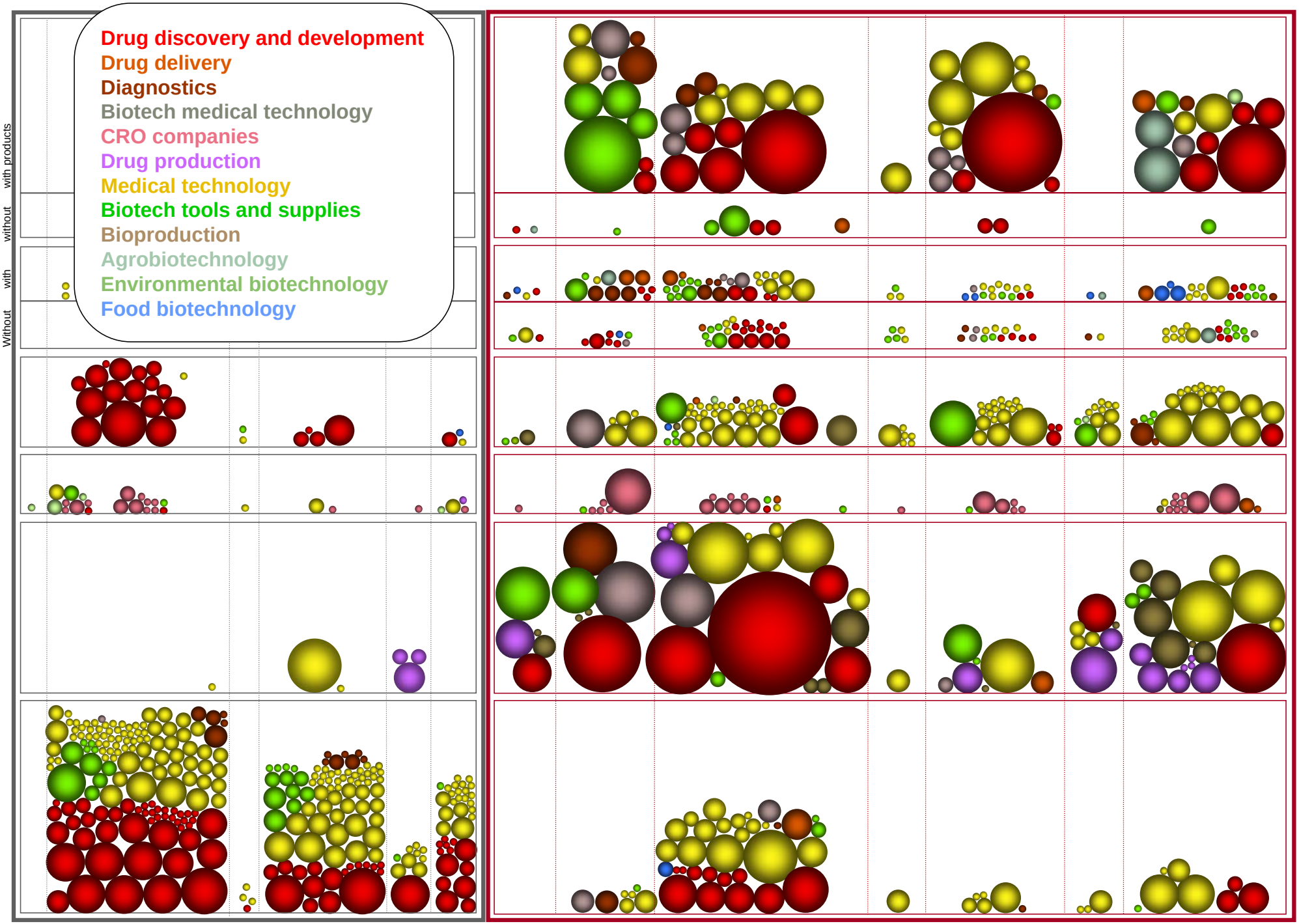
AstraZeneca	10,076	Pfizer	3,458
GE Healthcare	1,525	Gambro	905
Siemens-Elema	852	Fresenius Kabi	796
Getinge	724	AstraTech	627
Pharmacia Diagnostics	601	Biovitrum	558
Octapharma	555		

Certain foreign companies run both clinical trials and sales and marketing in Sweden through the same company. These companies have also been divided up, even though they have fewer than 500 employees. They are divided into the activity categories of product development and sales and marketing respectively.

Activity categories

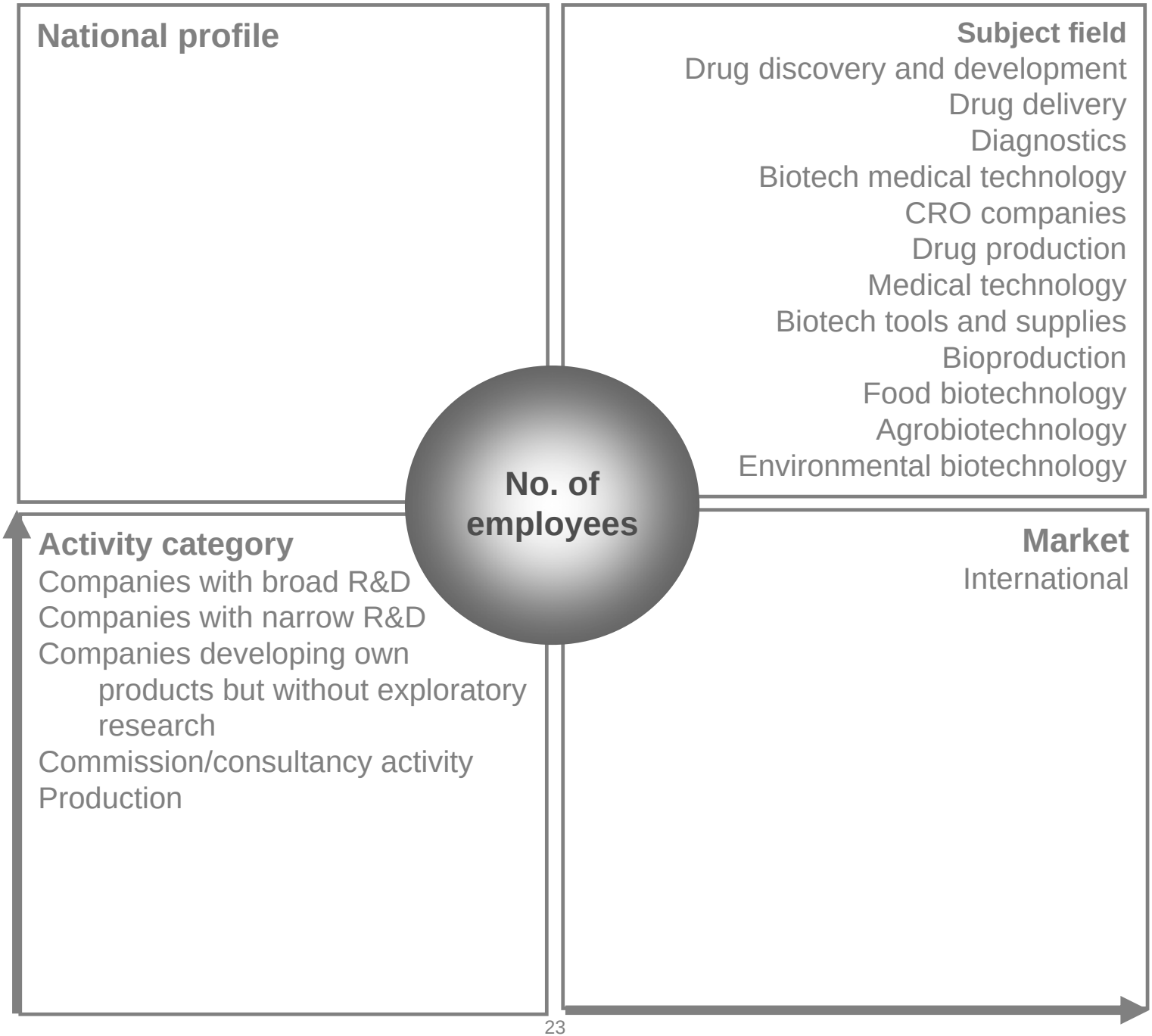


CLUSTER PROFILE All companies



Companies with an international market

(excluding companies with sales/marketing only)



Companies with an international market

(excluding companies with sales/marketing only)

General

Companies exporting products and services are of particularly major significance to Sweden's economy. Within the subject fields included it is also the case that the absolute majority of employees are in companies operating on the international market or whose goal it is to achieve this. These companies are shown in groups by subject field. The diagram shows the scope and company's size distribution in terms of number of employees.

Some companies have been divided into several different activity categories in this study. For these, management function, finance, personnel, marketing department etc. are shown as a proportion of the company's activity placed highest on the vertical axis.

Scope

406 companies with a total of 31,300 employees.

The drug discovery and development and drug producing companies dominate, with 15,100 employees. Within this group are many mature companies as well as many relatively recent start-ups.

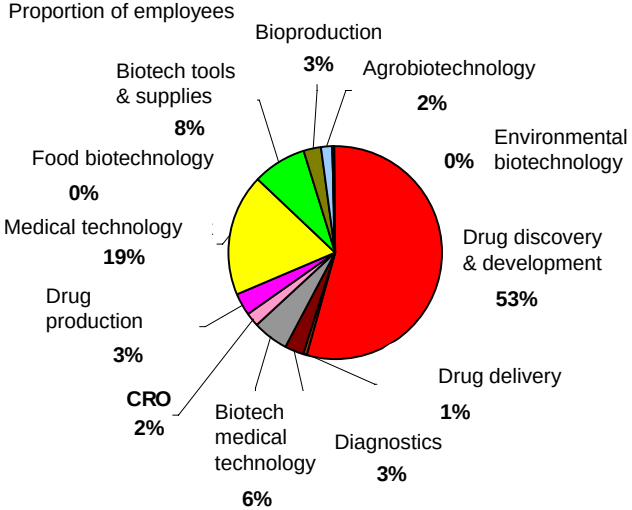
The Medicaid technical companies are greatest in number; 148. These employ 7,010 people. These companies have many different products used for various purposes such as surgery, orthopaedics, dialysis, wound treatment and dental treatment.

Companies within biotech tools and supplies employ 2,900 people in 64 companies. There are several mature companies within this subject area, but also a relatively high number (46) of small companies with fewer than 10 employees.

To date, Sweden has few companies developing biotech products and services within foodstuffs, agricultural industries and the environmental field.

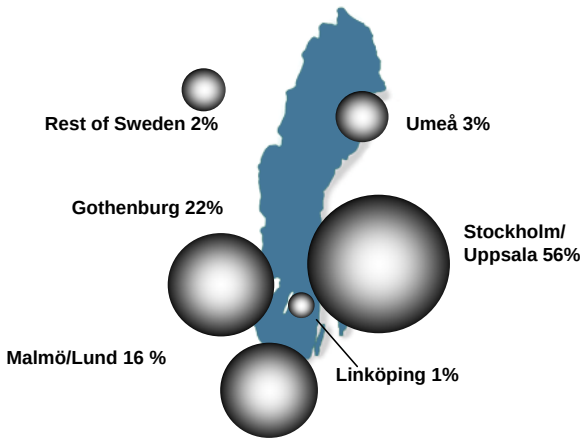
Subject fields

Proportion of employees



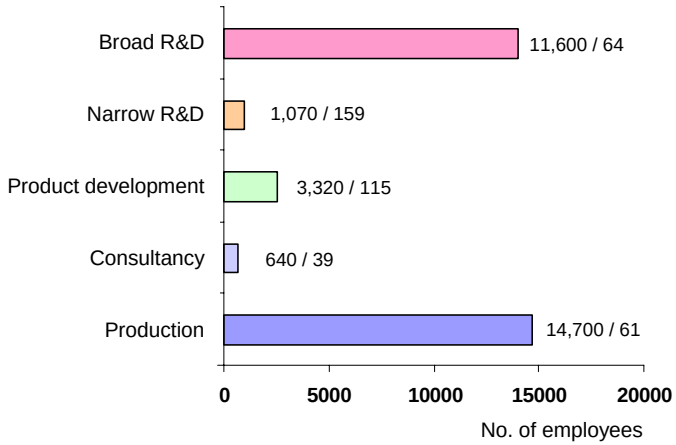
Regional distribution

Proportion of employees

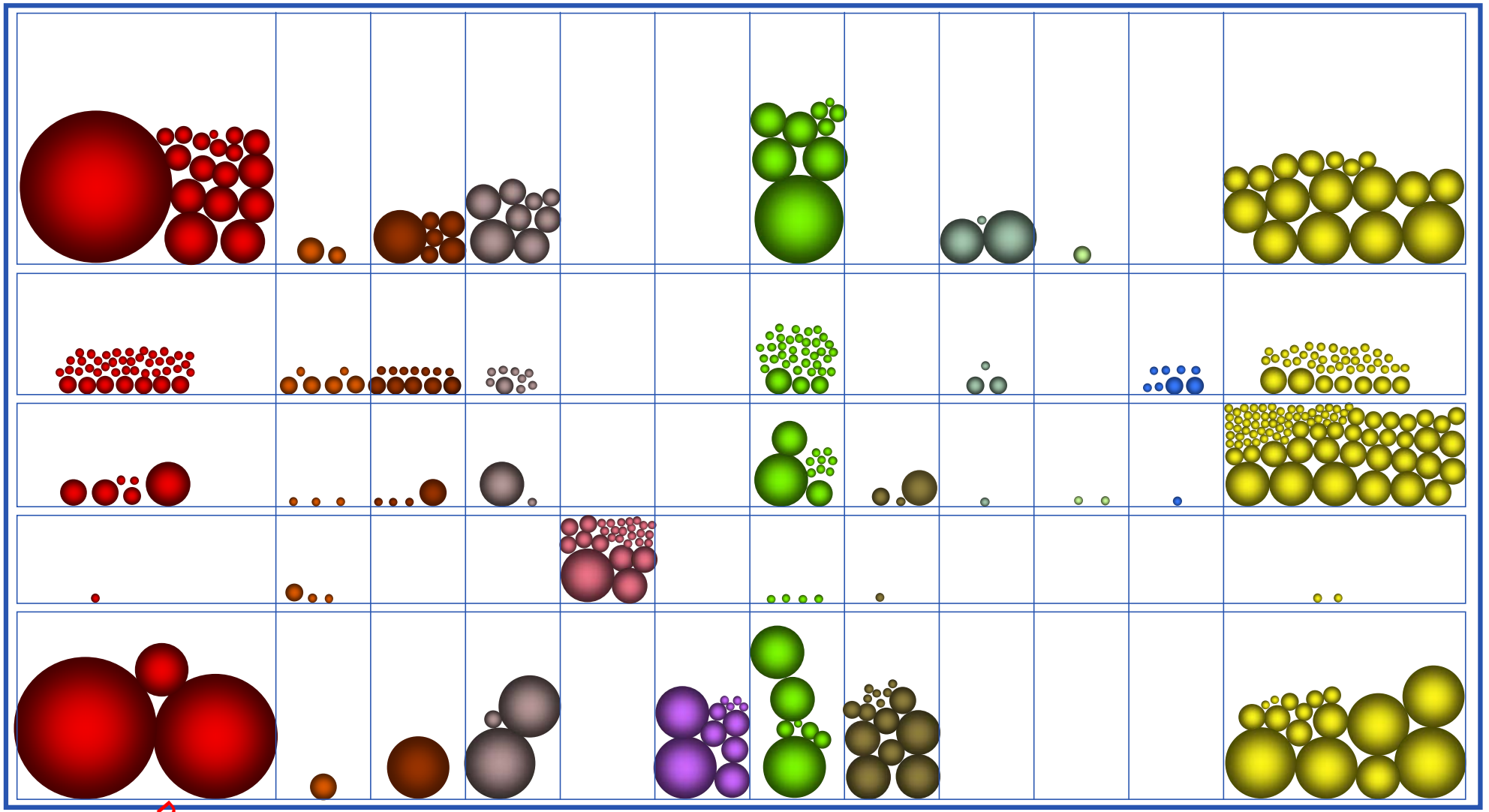


Activity categories

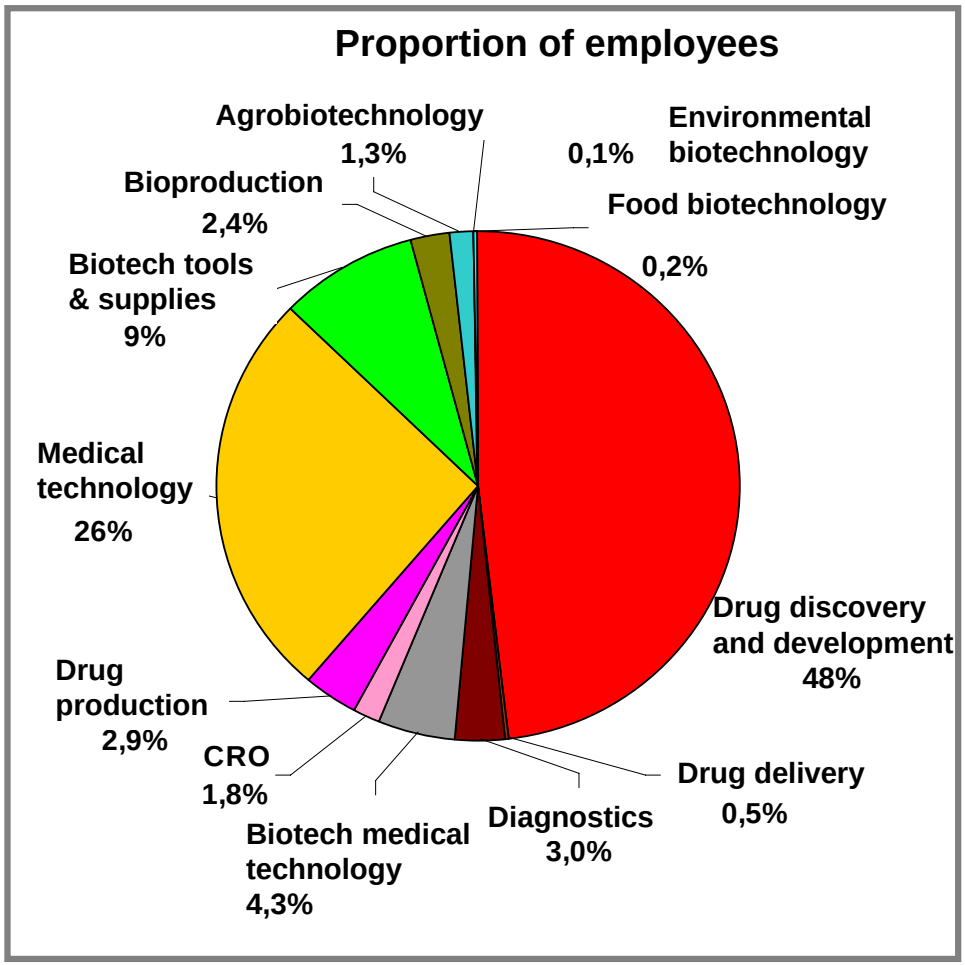
No. of employees / No. of companies – activities



CLUSTER PROFILE, companies in Sweden with an international market



Subject fields



Drug discovery and development dominates, but medical technology also accounts for a major proportion.

- What is the corporate structure in the various subject fields like?
- Are there regional concentrations?
- What is the share for production, research and sales?

Drug discovery and development and CRO companies

Activity

The companies' activity includes research and development of new drugs and therapies. In certain cases, clinical trial activity, production, sales and marketing are also included within the individual company. A company has been counted as having a product on the market when a co-operation agreement providing revenue to that company exists with another company.

Foreign drug companies' sales and marketing plus clinical trial activity in Sweden is also shown.

CRO companies are consultants to companies developing drugs or medicotechnical equipment. They work with project management of clinical trial operations, documentation and regulatory issues surrounding the process of getting a drug or medicotechnical equipment tested and approved.

Expertise

Companies in drug discovery and development may have differing core expertise. For example, they may be focused on mechanisms controlling individual diseases, individual target molecules (molecules whose structure and function a drug molecule can affect) involved in several diseases, or on platforms to identify target molecules or candidate drugs within a number of disease fields. In order to develop their expertise, it is important for companies to have a network to the life science research front. They must also be aware of the demands of the market and have a good knowledge of competition internationally within their niche fields. If they are running production, this requires expertise within the specific production processes and quality and safety requirements stipulated for the production of drugs.

For companies in drug sales and marketing, it is important to be familiar with the best channels for reaching out with product information to the doctors prescribing drugs for the intended indications for the company's products. In certain cases, information campaigns are aimed directly at patients.

Companies within clinical trial activity need to be familiar with international regulations and regulatory bodies in Sweden as well as having well-developed contacts in clinical research, Swedish hospitals and certain authorities.

Scope and regional distribution

In total there are 19,600 employees in 165 companies within drug discovery and development. This includes companies such as AstraZeneca, Pfizer, Biovitrum, KaroBio and Active Biotech, but also smaller companies such as Cellartis, Avaris, Arexis and A Carlsson Research. Approx. 5,200 of those employed are in foreign pharmaceutical groups which are running clinical trials and sales/marketing in Sweden.

The majority of research-intensive companies in this field are in Stockholm/Uppsala, but there are also many companies around the academic centres in the other metropolitan regions. There have been a few bankruptcies in recent years, Melacure Therapeutics and AstaCarotene for instance.

The sales and marketing organisations of the international pharmaceutical companies in Sweden are found chiefly in Stockholm, some in the Gothenburg region but few elsewhere. There again, these units run their own activity across the entire country even though organisationally they may belong to a company in Stockholm. The project management of clinical trials which these companies run in Sweden is most often co-located with sales and marketing, but even this activity can later be conducted in other parts of the country.

The CRO companies have approx. 720 employees in some 40 companies. The largest company in Sweden within this field is in Uppsala and is part of Quintiles Inc., USA. CRO companies are to be found almost exclusively in the metropolitan regions, i.e. Stockholm/Uppsala, Gothenburg and Malmö/Lund.

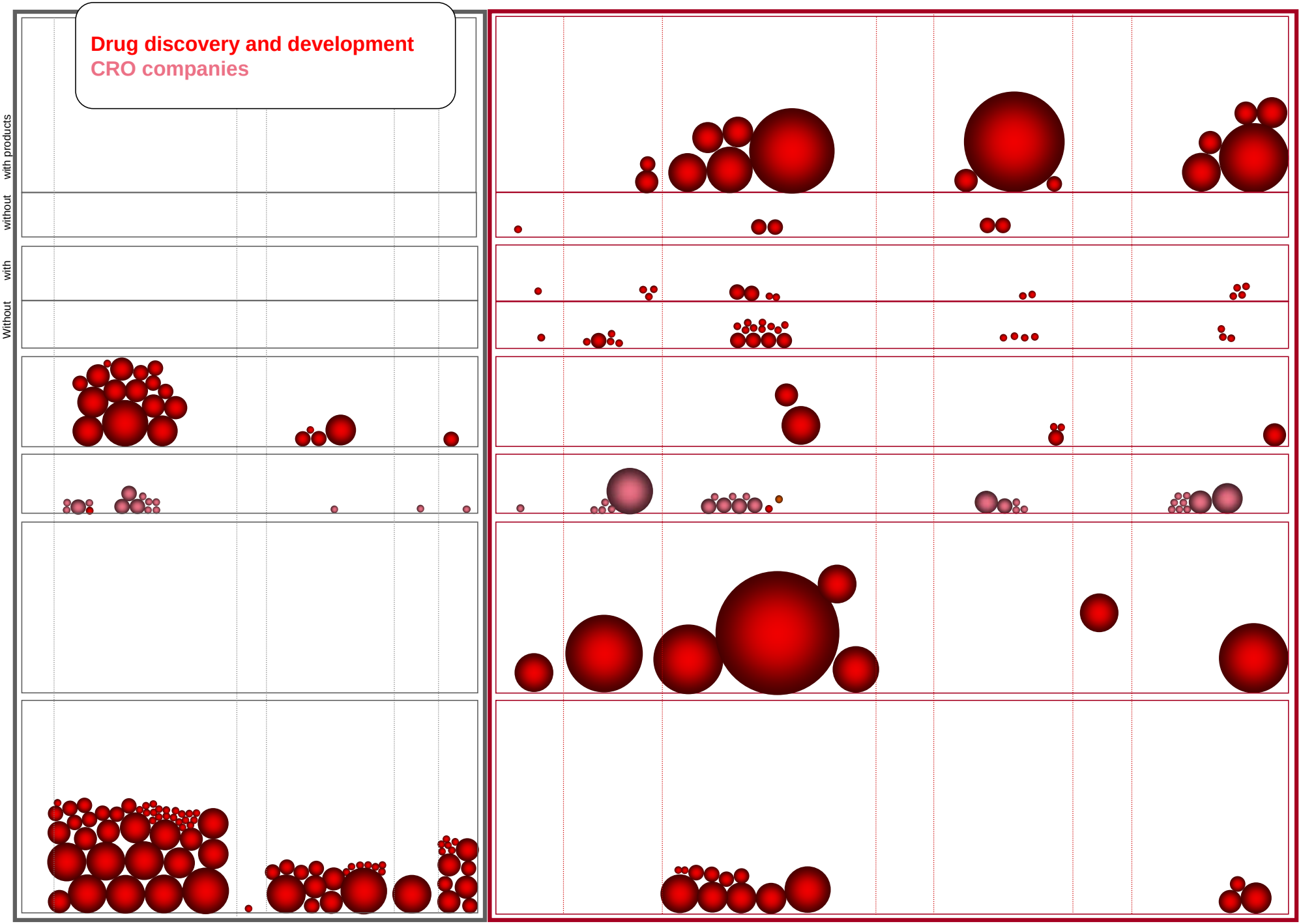
Comments

Many of the small and medium companies developing new drugs need venture capital in order to finance their activity. Several of the companies have revenues from co-operative agreements with large pharmaceutical companies.

As a rule, it takes more than 10 years before an identified active substance reaches the market in the form of a new drug. International pharmaceutical companies do not often enter into an agreement with a biotech company regarding development of specific drug before a candidate drug has reached phase 2 or sometimes phase 3 of clinical trials.

The conditions for attracting clinical trial activity to Sweden are good, due to such things as prominent clinical research, stable patient populations, well-functioning regulatory authorities and good register data. This activity requires ongoing investment in medical research. Deficiencies in the system include IT systems and case record management not being harmonised across different care providers within a county council or across different county councils in Sweden.

CLUSTER PROFILE Drug discovery and development and CRO companies



Drug delivery

Activity

Companies within drug delivery develop solutions on how to administer drugs to patients so that the active substance is best absorbed by the body.

Scope and regional distribution

Within drug delivery, 13 companies have been identified with approx. 200 employees. Orexo AB, Lipocore AB, Camurus AB and Skyepharma AB are the largest.

Expertise

Companies within drug delivery may have their core expertise in galenic pharmacy and fields such as lipid technology, polymer technology, drug inhalation etc.

Comments

The development of solutions to how a drug should be prepared so that the active substance is best absorbed by the body takes place in parallel to identification of the active substance and clinical trial of such a candidate drug.

Known active substances may gain new ways of being used following development of a different method of administration to the patient. Sometimes, opportunities are discovered for using a substance for new treatments of diseases beyond the original indication. When the active substance is used for a new indication, it is often in a different preparation or with a new way of administering the substance to the patient than was the case when used to treat the original indication. Since some of the clinical trials required for a new active substance may already have been carried out in such cases, the process of getting the drug approved may be shortened.

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Drug production
(excluding biotech)

Activity

Companies within drug production manufacture their own products or are specialised in contract manufacture of drugs. Conversely, the only companies included are those focusing on the production of drugs and without their own research into drug discovery and development. Biotech drug production is not included here and appears under the subject field of Bioproduction.

Scope and regional distribution

The largest units within drug production are the former Astra and Pharmacia production plants which are now within AstraZeneca and Pfizer Health and which was shown in the previous slide. If the AstraZeneca and Pfizer Health plants are excluded, then the activity covers 15 companies with 1,200 employees as illustrated in the next slide. The largest employers amongst these are Apoteket, with just over 500 employees at production plants in four areas (Umeå, Malmö, Gothenburg and Stockholm) and Cambrex Karlskoga, with around 300 employees.

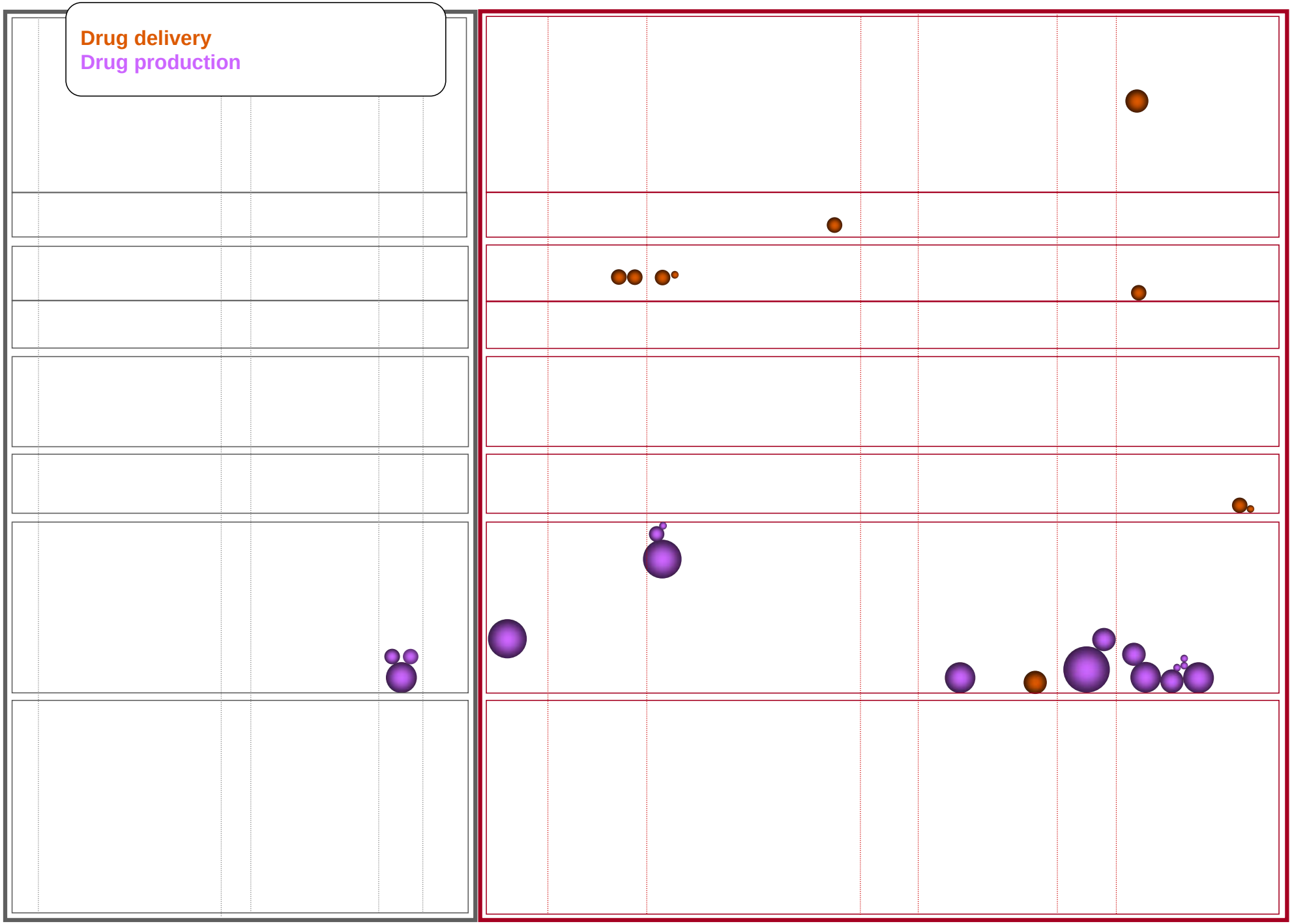
Expertise

For companies within drug production, the important things are development in process and production technology as well as requirements and regulations that exist internationally to be assured of good product quality, safety and durability.

Comments

There are close connections between drug production, drug delivery and drug discovery and development. The process of scaling up production from laboratory level and finding the best solutions to how a drug should be administered is very closely allied with the research and development stages and is integrated with and feeds back into them.

CLUSTER PROFILE, Drug delivery and drug production



Biotech medical technology and diagnostics

Activity

The companies provide health services with biotech medical technology, i.e. with the biotechnically-based part of medical technology. This involves such things as cell management equipment for in vitro fertilisation and cell cultivation, substitute plasma and nutrient solutions.

Diagnostics companies develop diagnostic tests or equipment such as those based on antibodies or DNA tests.

Expertise

Core expertise for companies within biotech medical technology is an awareness of needs and developments in clinical practice in their niche area. They must be aware of demand and have a good knowledge of the competition internationally. They must have well-developed international market channels since the national market for most of these companies' products is small.

Scope and regional distribution

Within biotech medical technology, there are approx. 1,850 employees in approx. 20 companies, of which just under 1,000 are employed in Uppsala and just over 600 in Stockholm. Some examples of companies within the field are Vitrolife within in vitro fertilisation, Fresenius Kabi within nutrient solutions, Octapharma within substitute plasma and Q-Med AB within the use of hyaluronic acid for aesthetics and medical technology. Amongst the companies are also several within regenerative medicine developing products and therapies based on cultivation of autologous cells and/or biomaterial for use within such things as orthopaedics and plastic surgery.

Where it concerns diagnostics, there are approx. 40 companies with approx. 1,230 employees. The largest company is Pharmacia Diagnostics, which in Uppsala concentrates on immunodiagnostic analyses within allergies. The company has research and development as well as production in Sweden. Pharmacia Diagnostics was sold by Pfizer to two international venture capital companies, Triton and PPM Venture, under 2004. Other companies include Biodisk, CanAg Diagnostics, and Light-Up technologies.

Comments

Within biotech medical technology, both of the largest companies are foreign-owned (Fresenius Kabi and Octapharma) and both originated with Pharmacia. One company which has grown rapidly in recent years is Q-Med.

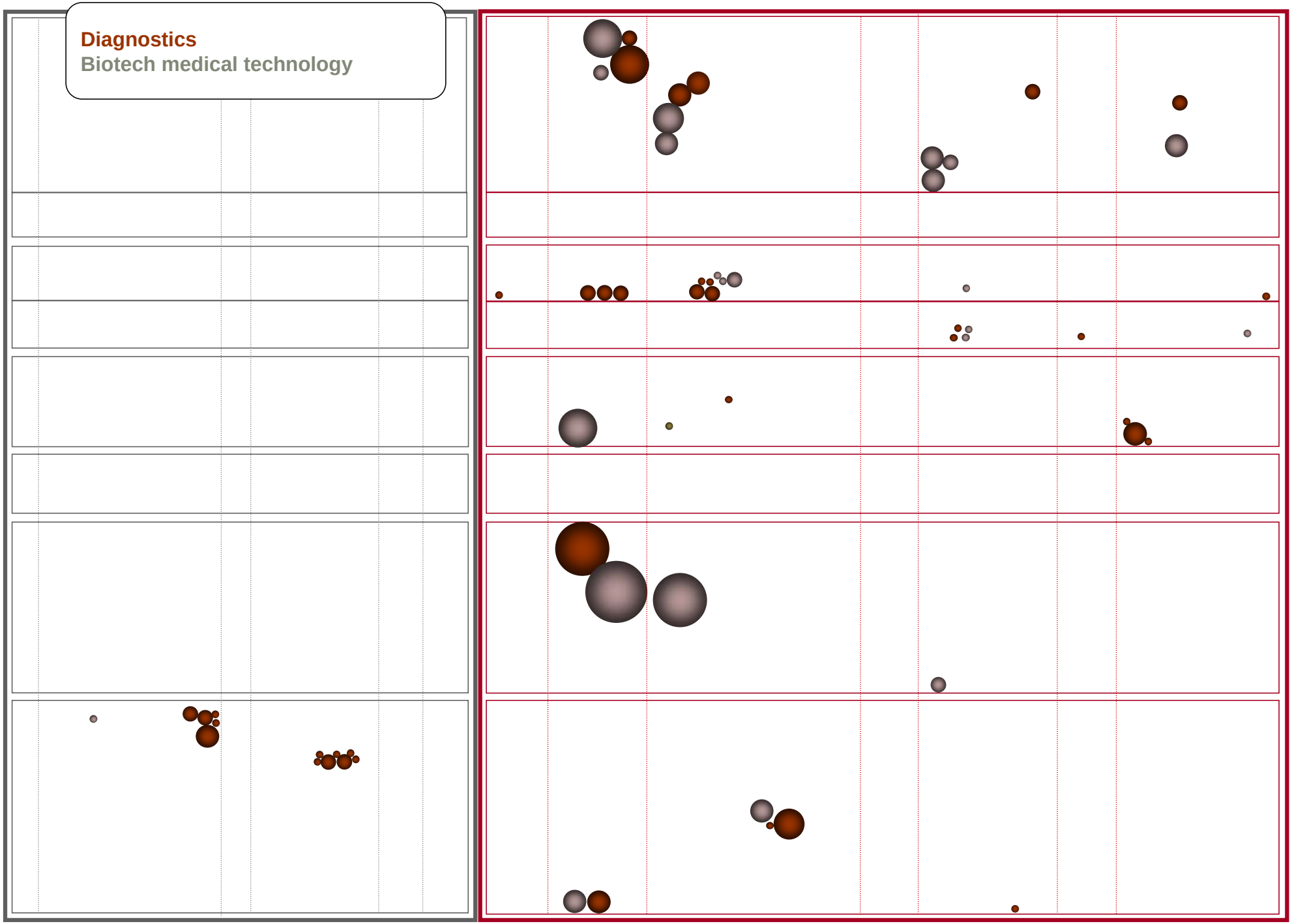
In recent years, several diagnostics companies in Sweden have gone bankrupt or been sold to foreign buyers and operations in Sweden sold off. These include Sangtec Medical, Chromogenix, Neoprobe and Sequenom (formerly Eurona).

The time from concept to product on the market is considerably shorter for diagnostics than for drugs. This is because the regulatory demands for approval are less extensive.

The market for diagnostics looks different in different countries. In some countries, it is common for certain diagnostic tests to be carried out at the patient's own surgery instead of at central clinical laboratories as in other countries. This affects corporate strategies in designing both the test and how sales and marketing are set up.

The international companies' sales of diagnostics in Sweden are largely shown within drug sales (previous slide), since drugs and diagnostics are sometimes developed and marketed by the same company.

CLUSTER PROFILE Biotech medical technology and diagnostics



Medical technology

Activity

Activity within medical technology includes research, development, production and sales of equipment and instruments for medical treatment and diagnostics. Companies developing such things as anaesthesia equipment, pacemakers, dialysis equipment, respirators, as well as peripherals required for radiological examinations and products for wound treatment or dental procedures. This also includes oral cavity titanium implants plus bone-anchored prostheses and hearing aids.

This category also includes subsidiaries of foreign companies involved in sales and marketing of their products on the Swedish market or a larger region as well as Swedish companies importing foreign medicotechnical products.

Expertise

The companies' core expertise is being aware of the latest developments and the need for treatment and diagnostics internationally within the company's niche area. This, so as to develop their own products or expand their product range as well as remaining aware of the competition internationally. A prerequisite is a good network in clinical practice in order to detect needs and for collaboration on new product development. They are dependent on good sales and marketing channels internationally, since the national market for the subject field is relatively small.

Scope and regional distribution

Within medical technology, there are approx. 360 companies with approx. 10,700 employees. This includes companies such as Gambro Lundia, Elekta, Siemens-Elema, St. Jude Medical, Nobel Biocare and Astra Tech.

Activity in terms of research, development and production is concentrated on the three metropolitan regions plus a certain amount of activity in Linköping. Sales and marketing are concentrated on the Gothenburg and Stockholm regions. Companies within the use of biomaterial and titanium implants for repairing or replacing damaged tissue are largely found in Gothenburg.

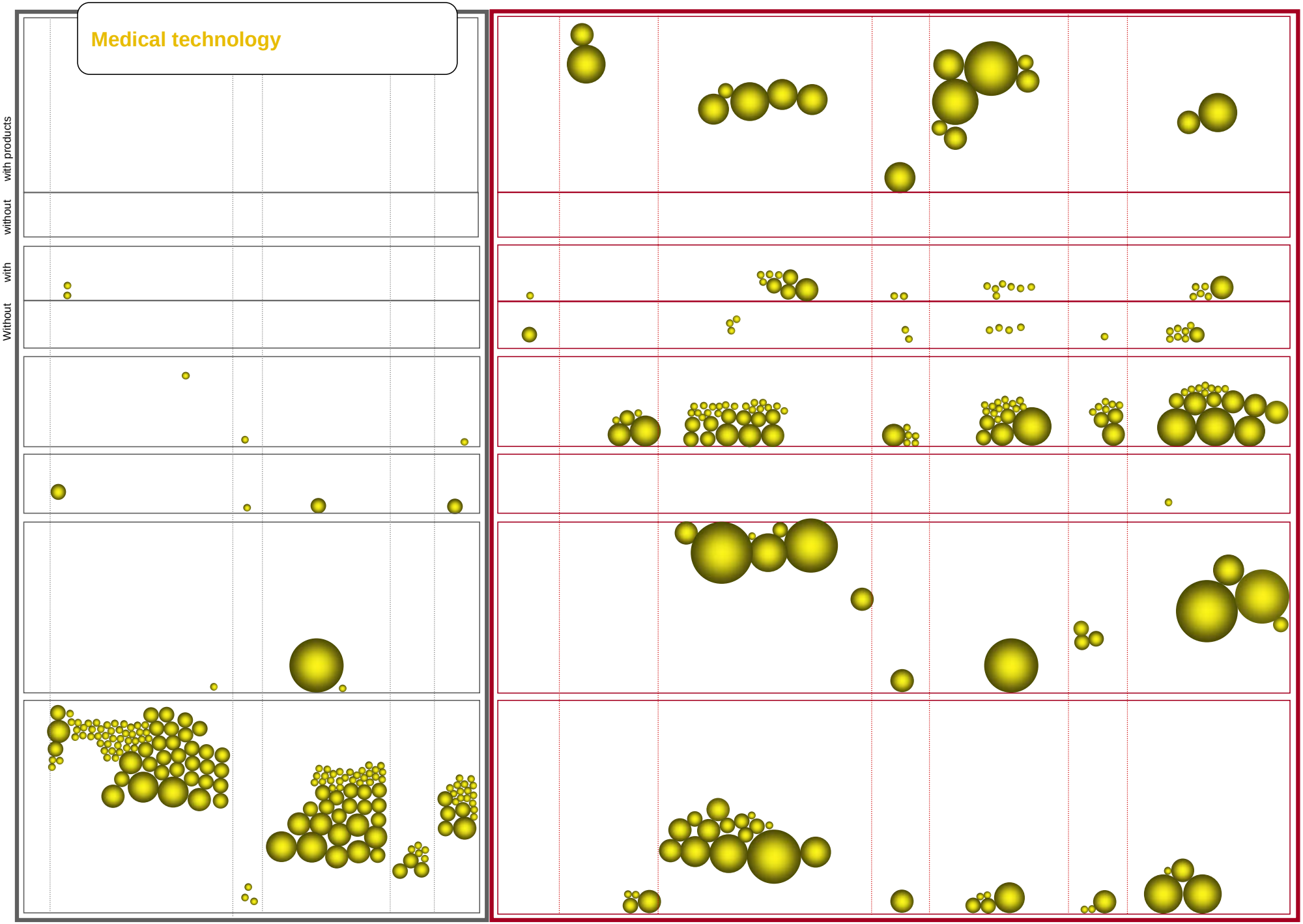
Comments

The mature medical technology companies were founded in Sweden and have operated in the country for a long time. In the past decade, some former Swedish operations within the field have undergone restructurings, buy-outs and, in a few cases, cutbacks and departure. Two examples of changes in recent years are the Siemens-Elemas operation in Sweden within anaesthesia and respiration with 410 employees in Stockholm, purchased by Getinge in 2003 and Instrumentarium AB (formerly Datex-Engström and which was also called Datex-Ohmeda) within such areas as anaesthesia, now owned by General Electric Company Inc.

Marketing by drug companies is chiefly aimed at prescribing doctors or directly at the patient. Companies within advanced medical apparatus often approach clinical directors, hospital management or county councils instead, since decisions on larger investments of the kind involved with the equipment these companies develop, are often taken at a higher level. The hierarchy and structure varies with different countries.

Development, production and sales of disability aids (rollators, wheelchairs etc.), prostheses, dental laboratories, orthopaedic technology laboratories plus furniture, lighting and equipment for health services have not been included in this report.

CLUSTER PROFILE Medical technology



Biotech tools and supplies

Activity

The companies develop products and services for production, processes, research and development within biotech applications. This includes equipment for bioseparation or biomolecular analyses and bioinformatics. Products and services are used chiefly within the fields of medical and biological research, drug discovery and development and production and for the development of diagnostic tests and diagnostic equipment.

With the increasing use of biotechnology in foods, plant cultivation, green materials, forestry products etc. growth opportunities are predicted for new markets in other sectors.

Expertise

Companies need to be aware of the latest life science research within their niche area in order to identify needs within industry and research.

Application of interdisciplinary systems thinking, combining technologies such as electronics, IDT, mechanics, optics and material technology with life science in order to find solutions to life science problems.

A few companies have been included here which are very closely connected to the biotech companies as subcontractors but whose core activity is not really within biotechnology. The largest example included is the section of Pharmadule Emtunga's operation which has the pharmaceutical industry and biotech companies as clients. Pharmadule Emtunga builds factories and laboratories in modules.

Scope and regional distribution

This field comprises some 100 companies with approx. 3,500 employees. The largest company is GE Healthcare, formerly Amersham Biosciences, with close to 1,400 employees in Sweden. Other major companies include Getinge's operation within disinfection equipment and Biacore, Biotage and Pharmadule Emtunga (sub-contractor, i.e. not a biotech company).

Most large companies are in Uppsala, whilst the small and often newer companies are chiefly found in Stockholm as well as in Skåne and the Gothenburg region.

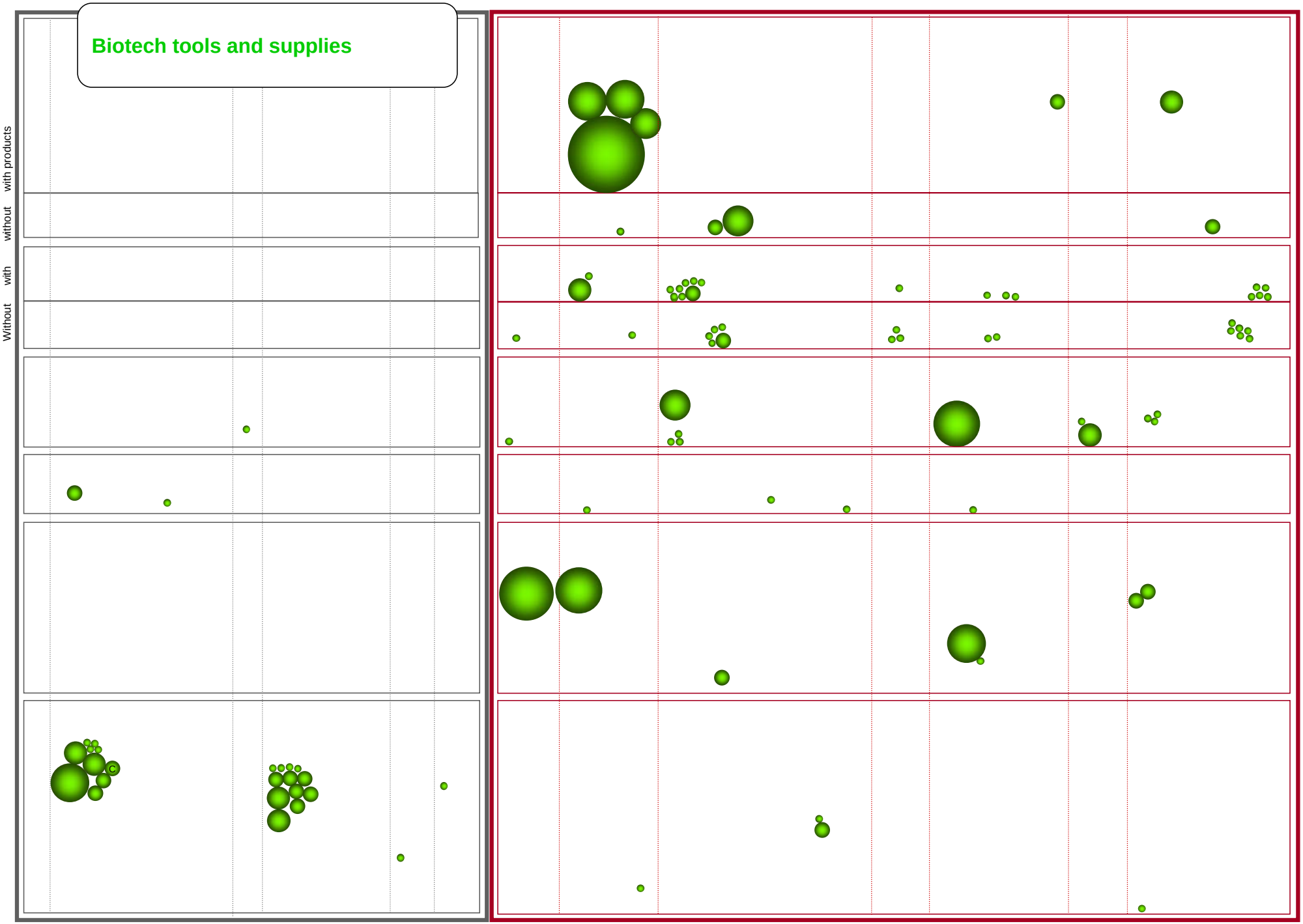
Comments

In many cases, the larger companies originated with the former Pharmacia whilst the new, smaller companies are often spin-offs from universities and colleges.

Companies which have started up during the period of so far showing low profitability and a number have still not yet got any products on the market.

In recent years, a number of companies have merged, e.g. Pyrosequencing and Personal Chemistry which jointly became Biotage and Affibody which purchased Visual Bioinformatics. The largest company, Amersham Biosciences, was purchased in 2004 by the American company General Electric Inc. and is now called GE Healthcare. Some companies, such as Gnothis and AlphaHelix have gone into bankruptcy/liquidation.

CLUSTER PROFILE Biotech tools and supplies



Bioproduction

Activity

The companies' activity includes biotech production of drugs, biomolecules or microorganisms. These are specialised production companies whose clients include the pharmaceutical industry, other biotech companies or research groups. The bioproduction units within Pfizer and Biovitrum have not been included here; their production units are included under the subject field of Drug discovery and development and are marked on the diagram under the activity category of "Production".

Expertise

The companies' core expertise is development of cost-effective production solutions, adapting their activity to internationally stipulated regulatory requirements on quality and safety and an ability to adapt to customer requirements. They must be aware of the progress being made within relevant research fields affecting efficiency and quality within bioproduction and must keep themselves updated regarding the knowledge and trends affecting client needs and demand. For example, there may be an increasing demand for production of biomolecules in animal cell cultures.

Scope and regional distribution

There are approx. 1,050 employees in 20 companies specialising in this type of production.

Most employees are in Strängnäs and Skåne. The larger companies concentrating on bioproduction are DSM Anti-Infectives Sweden, Ferring and Novozymes Biopharma (Biogaia's former production facility). Not included in the 1,050 employees are employees at bioproduction plants within the drug discovery and development companies, Pfizer and Biovitrum.

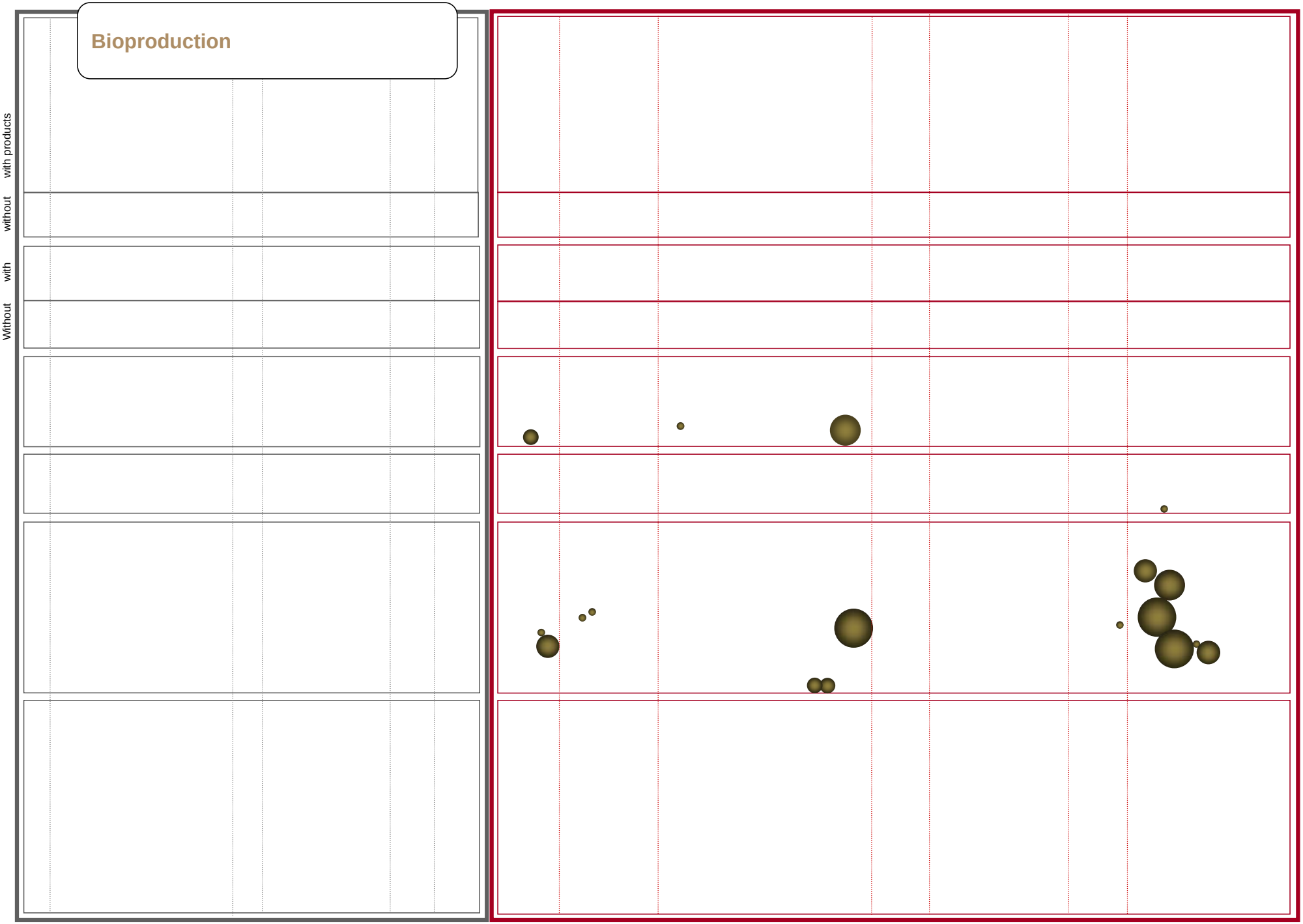
Comments

The number of biotechnically produced drugs is increasing internationally and thus the need for this type of production capacity. In Sweden to date, there seem to be few new drugs in clinical trials where the active substance is a large biomolecule.

Some of these companies are also angling for in-house development of applications for their own own products within drugs or food biotechnology.

Where it concerns bioproduction for pharmaceutical applications, there are close connections between production, drug delivery and drug discovery and development. The process of scaling up production from laboratory level and finding the best solutions to how a drug should be administered is very closely allied with the research and development stages and is integrated with and feeds back into them.

CLUSTER PROFILE Bioproduction



Agrobiotechnology (1), Environmental biotechnology (2) Food biotechnology (3)

Activity

The companies' activity comprises:

1. Plant or forest cultivation using biotech methods in the cultivation work and in some cases use of gene technology as the method of obtaining specific properties (genetic modification). Also included is biological plant protection based on naturally occurring microorganisms or biomolecules, plus cultivation of land-based raw materials with the aid of biotechnology.

2. Biotech solutions to environmental issues such as water purification, land decontamination (bioremediation) and waste management.

3. Health-promoting components or ingredients in foods. They are often suppliers to medium-sized and large food-producing companies such as. Skane Dairy and Arla.

Expertise

1. In terms of genetically modified crops, alongside expertise in their subject field, companies must also know how best to manage the major impact on this activity by public and decision makers' attitudes to it.
Companies within biological plant protection are based on university research and need to maintain their cutting-edge expertise within their narrow field. They must also have strong expertise regarding regulatory requirements and national and international marketing.

2. Companies within this field have very diverse focuses, producing products or services within such things as LAD decontamination and developing techniques for purifying outfall water or measuring the level of microorganisms in the indoor environment. It is therefore difficult to highlight a common core expertise.

3. Above all, it is a matter of maintaining cutting-edge expertise within their niche which may be within microbiology, nutrition, process technology etc. They also need knowledge of public attitudes and demand plus the potential market and need from prospective partners in the food industry.

Scope and regional distribution

1. Agrobiotechnology
   Seven companies with approx. 540 employees. The two largest companies are in Skåne (Syngenta Seeds and Svalöf Weibull). Svalöf Weibull and German company BASF have jointly started the company Plant Science Sweden in Skåne which amongst other things is developing genetically modified potatoes for the production of industrial starch. A few small university spin-offs exist in Umeå (SweTree Technologies) and Uppsala (Bioagri).

2. Environmental biotechnology
   Five companies with approx. 60 employees with the largest companies being AnoxKaldnes and Pegasus Lab. All companies have fewer than 20 employees and are distributed across Sweden.

3. Food biotechnology
   Eleven companies with approx. 80 employees, the largest of which are Biogaia and Probi. All companies in this field are small and many of the employees are in Skåne.

Comments

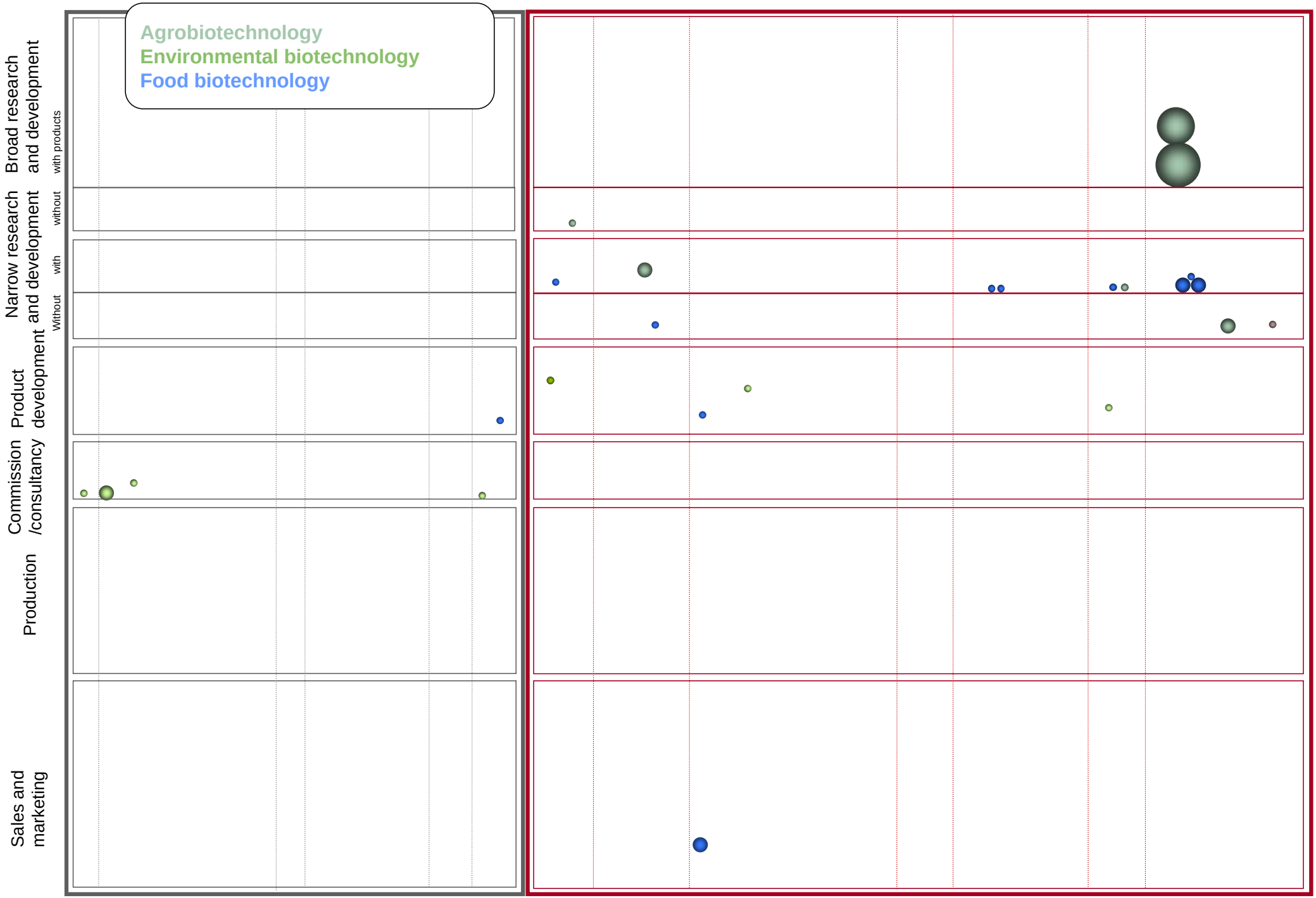
The growth potential of these operations is often pointed out, but to date their extent in Sweden is minor.

It is important for the food industry to meet consumers' needs and requirements. Many consumers have a wait-and-see attitude to new food products based on biotech methods. The advantages of these types of products must be clearly apparent if consumers are to be prepared to pay the increased development costs entailed by this category of new products in the form of research and development investment.

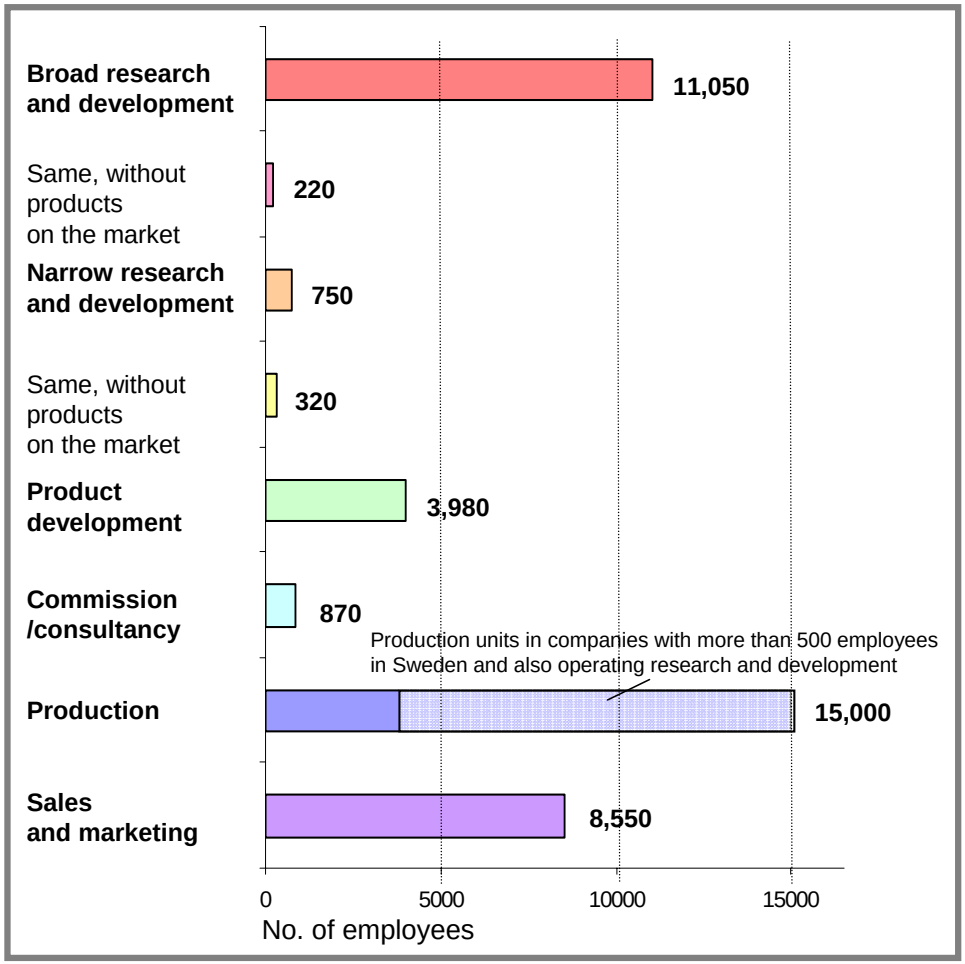
The field of agrobiotechnology is affected by attitudes to the use of gene technology in plant cultivation. Only now are the first signs of a change in attitude by the public and decision-makers beginning to be seen in Europe.

These companies do not feel such great cohesion with the rest of the companies in this study. They have different customers and their product development, market and collaboration with universities and colleges and other industries looks different.

CLUSTER PROFILE Agrobiotechnology, environmental biotechnology and food biotechnology



Activity/market



Over 12,000 people working in research-intensive activity, 15,000 in production and just over 8,500 in sales and marketing.

- What is the scope of companies on the international market?
- How large are companies in terms of number of employees?
- What proportion of companies have products on the market?

Companies with broad research and development

General

These companies are the research-intensive growth engines within the fields of biotechnology, pharmaceuticals and medical technology in Sweden. Their successes inspire others to invest in research and business in Sweden in these fields. They operate on an international market with a small domestic market.

Activity

Companies operating within a broad expertise field where the activity in many cases comprises all functions (research, product development, production, sales and marketing activity), which are integrated. They have a broad scientific base with several development areas/projects/product lines being developed in parallel. The pale areas show production plants for companies with more than 500 employees.

Companies are also counted as having a product on the market when there is co-operative agreement with another company providing revenue.

Scope

Some 70 companies with 11,300 employees in Sweden. If these companies' own production units in Sweden are included, the number of employees becomes 20,100. AstraZeneca dominates the group with its main focus on pharmaceuticals. Other companies within pharmaceuticals include Biovitrum, Active Biotech and KaroBio. GE Healthcare (formerly Amersham Biosciences) is also a major employer within biotech tools and supplies and there are a number of large companies within medical technologies such as Gambro Lundia, Siemens-Elema, Astra Tech and Nobel Biocare. The companies are present almost exclusively in the three metropolitan regions.

Characteristics

Companies with a great many international contacts, often global, and with a comprehensive network of other companies and academic research environment nationally and internationally, plus their own advanced and broad research and development. They have a strong focus on profitability and a long-term view but a number are foreign-owned and thus dependent on the decisions of the foreign parent company.

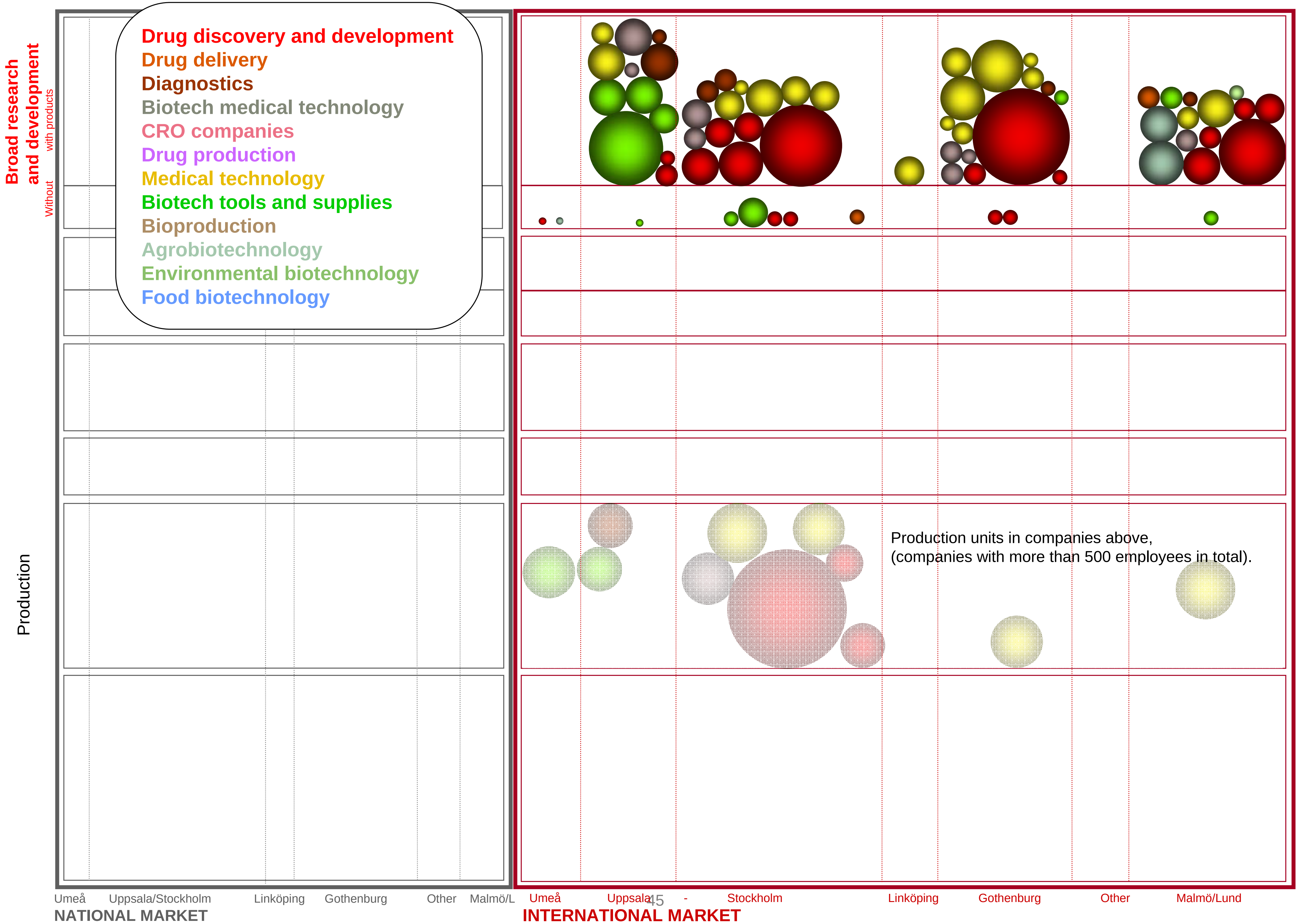
Mature companies with global markets, many of which are quoted on the stock market. These companies comprise the growth engine for the cluster but some of the small and medium-size companies have a need for new capital as they have not yet shown a profit.

Relationships

Since the companies operate in international markets and the national domestic market is small, they do not often compete domestically. To a certain extent, they may compete for personnel and possibly also venture capital.

The companies are able to agree on collective actions, within the framework of the relatively new industry organisation SwedenBIO for example, to influence decision-makers in fields where they have joint interests. This may relate to issues regarding the companies' supply of expertise when viewpoints are put forward on the need for a trained workforce within various fields, demand for increased research resources for universities for more or less specific fields and initiatives for facilitating international recruitment. Joint initiatives are also taken on finding international co-operation and investment, delivering information about the field and conveying requests for improved infrastructure or other viewpoints on the companies' conditions.

CLUSTER PROFILE companies with broad research and development



Companies with narrow research and development

General

These companies comprise an important part of Sweden's growth potential within the fields included.

In this group of companies, the dynamic is great and the group is continually being replenished, in recent years chiefly by university spin-offs.

Activity

Most often young companies with research and development in a narrow field of expertise, concentrated on one development project/product line. In some cases, all functions (research, product development, production, sales and marketing activity) are represented in the company.

Companies are counted as having a product on the market when there is co-operative agreement with another company providing revenue.

- *Products/services on the market and new ones in the pipeline*

Some 90 companies with approx. 750 employees. Half of these are only Stockholm/Uppsala region.

Some successful mature niche companies, but also relatively new start-up companies. Emphasis on the narrow product fields may be both a risk factor and a strength. This category represents an important part of the growth potential of the subject fields included. Despite having products on the market, many of the companies still have profitability problems and a need for venture capital.

- *Products/services in the pipeline, <u>but not yet on the market</u>*

Some 70 companies with approx. 320 employees.

Several new companies with growth potential but without products on the market are in the risk zone. Concentrating on a first product or service may be both a risk factor and a strength. The need for new venture capital may be great, as is the need for business-minded leadership and knowledge of and opportunity for reaching out to the international market.

Characteristics

Research-intensive companies with international contacts and advanced but narrow activity. University spin-offs most often have close contact with their original environment as well as networks with international research environments. They often require highly specialised expertise.

As a rule, very small companies with fewer employees and aspirations to grow or be purchased. Many require venture capital. Some companies may be "hobby companies" with no ambitions to expand.

Relationships

Since companies operate on international markets, they do not often compete on the home field other than for financing and possibly personnel.

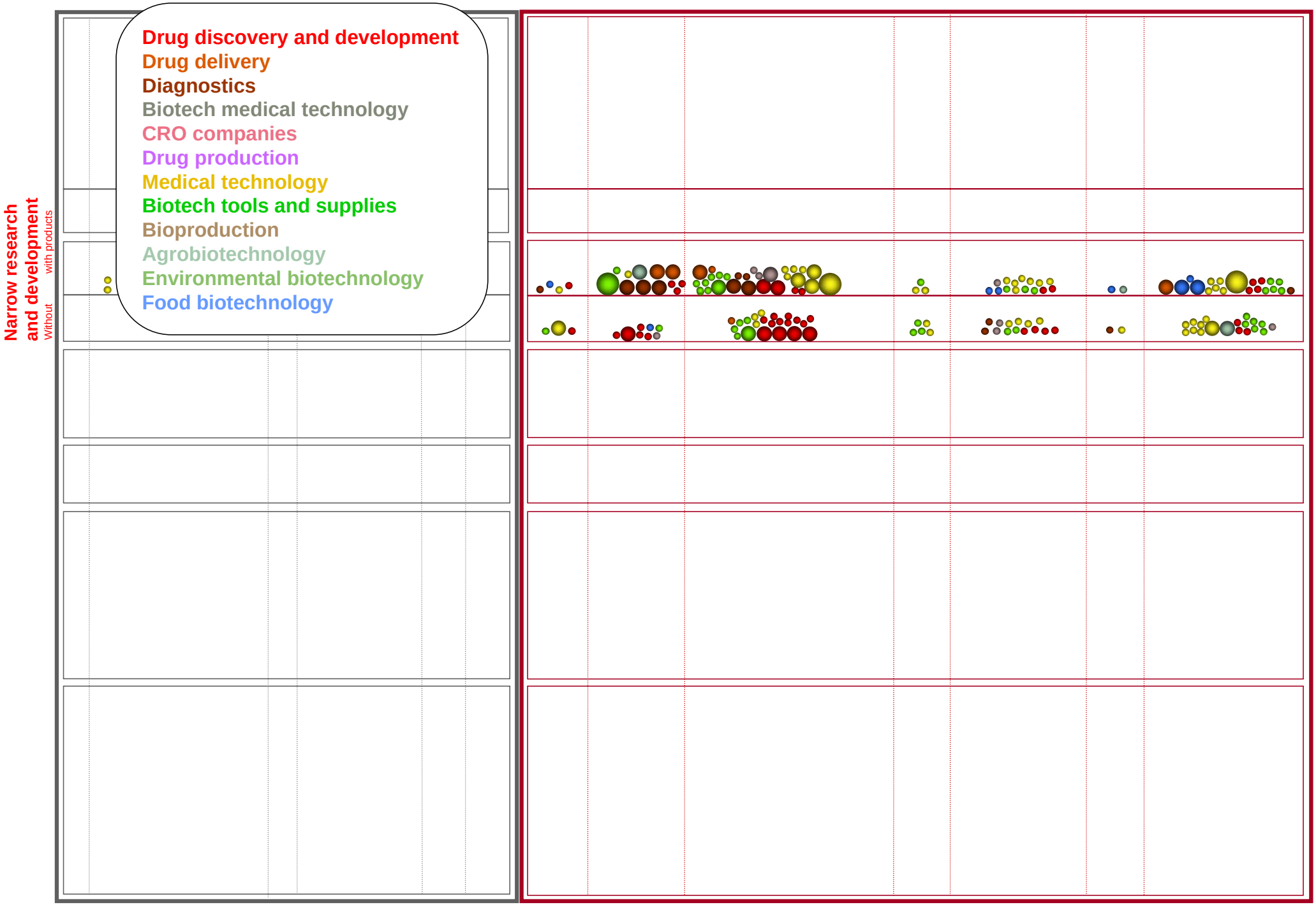
Most companies are small and therefore have limited resources for participating in long-term work with other players if they cannot see a direct benefit to the individual company.

Companies have to work out their long-term ownership since it can be a considerable number of years before they show a profit. Many companies spend a lot of time on finding financing for the operation and several are experiencing a lack of venture capital.

Since the domestic market for these companies' products is small even the minor, relatively new start-up companies must rapidly reach out onto the international market. Companies may be interested in collaborating with each other or the broader companies on international sales and marketing or on finding international partners.

Companies may be interested in going to incubator environments or so-called science parks so as to more easily find partnerships and benefit from the services and proximity to academic centres which these offer.

CLUSTER PROFILE Companies with narrow research and development



Product development

General

In this heterogeneous group of companies are both those with major growth potential and mature companies with lesser growth ambitions.

Activity

The majority of companies on the national market involve product development by international pharmaceutical companies through clinical trials of their own candidate drugs carried out in Sweden on Swedish patients. They have therefore been classified as a “national market”, whilst the products on the other hand will subsequently go onto an international market.

Conversely, companies with an international markets consist of many Swedish companies which have developed one or more of their own products. These have run research and development but now that the product is on the market, the main emphasis is often on increasing market shares and reaching out to new markets. Further development of established products takes place in parallel.

Scope

Approx. 140 companies with approx. 3,980 employees with the foreign companies’ clinical trial activity corresponding to just under 1,200 employees. Apart from the clinical trial activity, whose organisational base is particularly in Stockholm, the majority of companies seem to be within medical technology. Examples of companies with clinical trial operations in Sweden are Bayer, Boehringer Ingelheim, Eli Lilly and Bristol-Myers Squibb and examples of companies within medical technology are Elos Medical, Arcoma and Dentatus.

Characteristics

The international pharmaceutical companies’ clinical trial activity in Sweden is often co-located with the company’s sales and marketing activity in Sweden or in a larger region.

Within product development are a mixture of companies which have developed their product relatively recently and mature companies which are already established in the market. Common to both these groups is the emphasis on increasing market shares and/or reaching out onto new markets and ensuring that the product range can withstand the competition. Product development for these is incremental above all else.

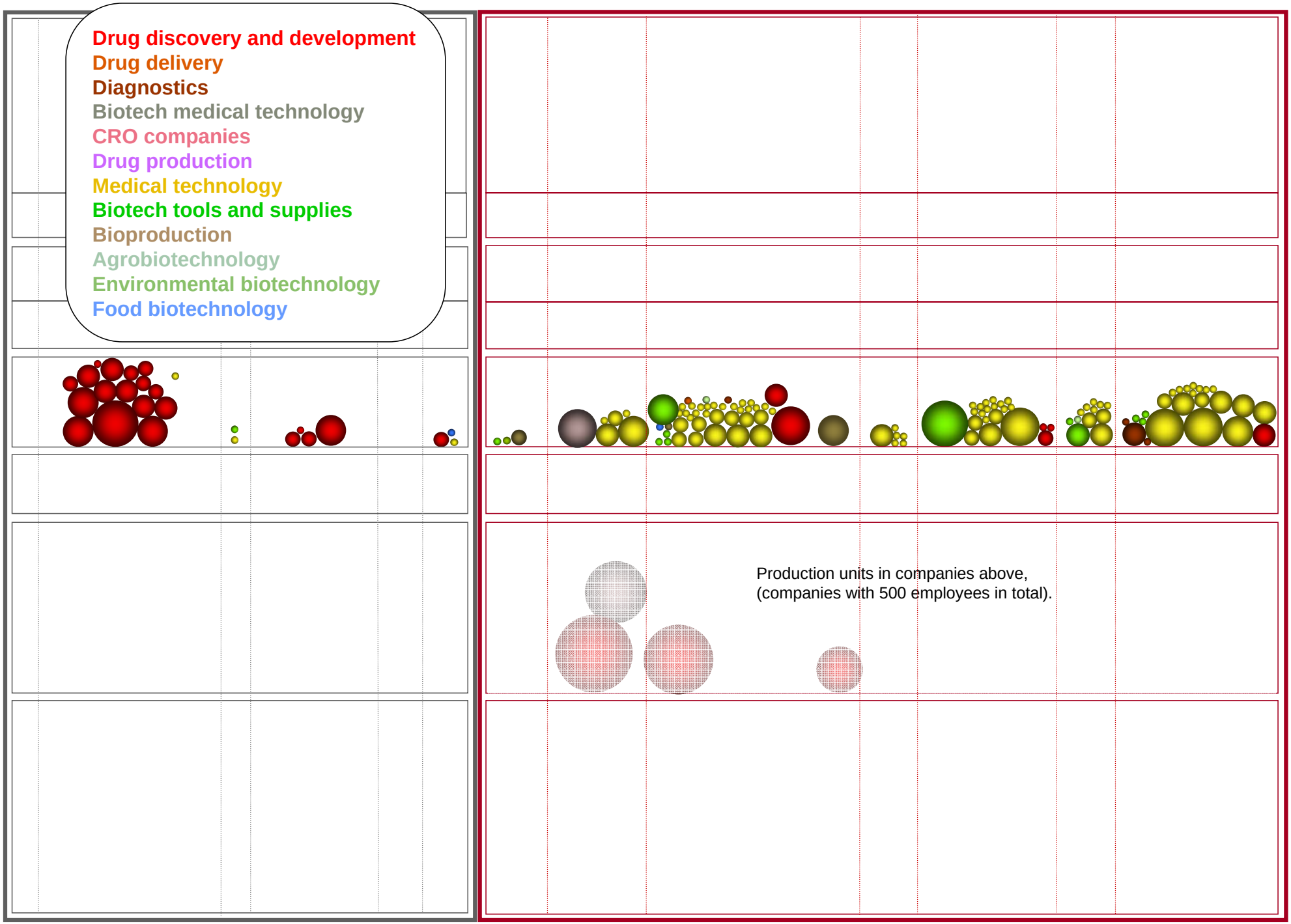
For some companies which have developed their own products, increasing market shares can lead to an expansion of production and consideration of where and how this will happen most cost-effectively.

Relationships

Above all, companies within clinical trial activity have a common interest in a good clinical trial activity infrastructure with excellent clinical research, good relationships with researchers, good register data/patient data and the right patient population. Companies sometimes compete with each other even though their drugs are often prescribed for different indications. In these cases, they compete for the best opportunities for conducting clinical trials, access to the best clinical researchers and the right patient group.

Within the company group which has developed their own products, there may be interest in collaboration on marketing and market channels.

CLUSTER PROFILE Produktutveckling



Consultancy and commissioned activity

General

These companies assist on a commission basis with specialists and resource augmentation at different stages of product development. This means that enterprises need not amass all the expertise within their own company.

Activity

Most of these companies are consultants to companies developing drugs or medicotechnical equipment within clinical trial operations or other medical research. They work within clinical trial operations and documentation and regulatory issues relating to the process of getting a drug or medicotechnical product tested and approved.

There are also a number of consultants in this category within such things as bioremediation and waste management as well as bioinformatics.

Scope

Some 70 companies with approx. 870 employees, of which CRO companies comprise more than 700. The largest CRO companies are Quintiles and Clinical Data Care.

Characteristics

Companies within clinical trial activity need to be familiar with regulations and regulatory bodies in Sweden and internationally as well as having well-developed networks within clinical research, Swedish hospitals and relevant authorities.

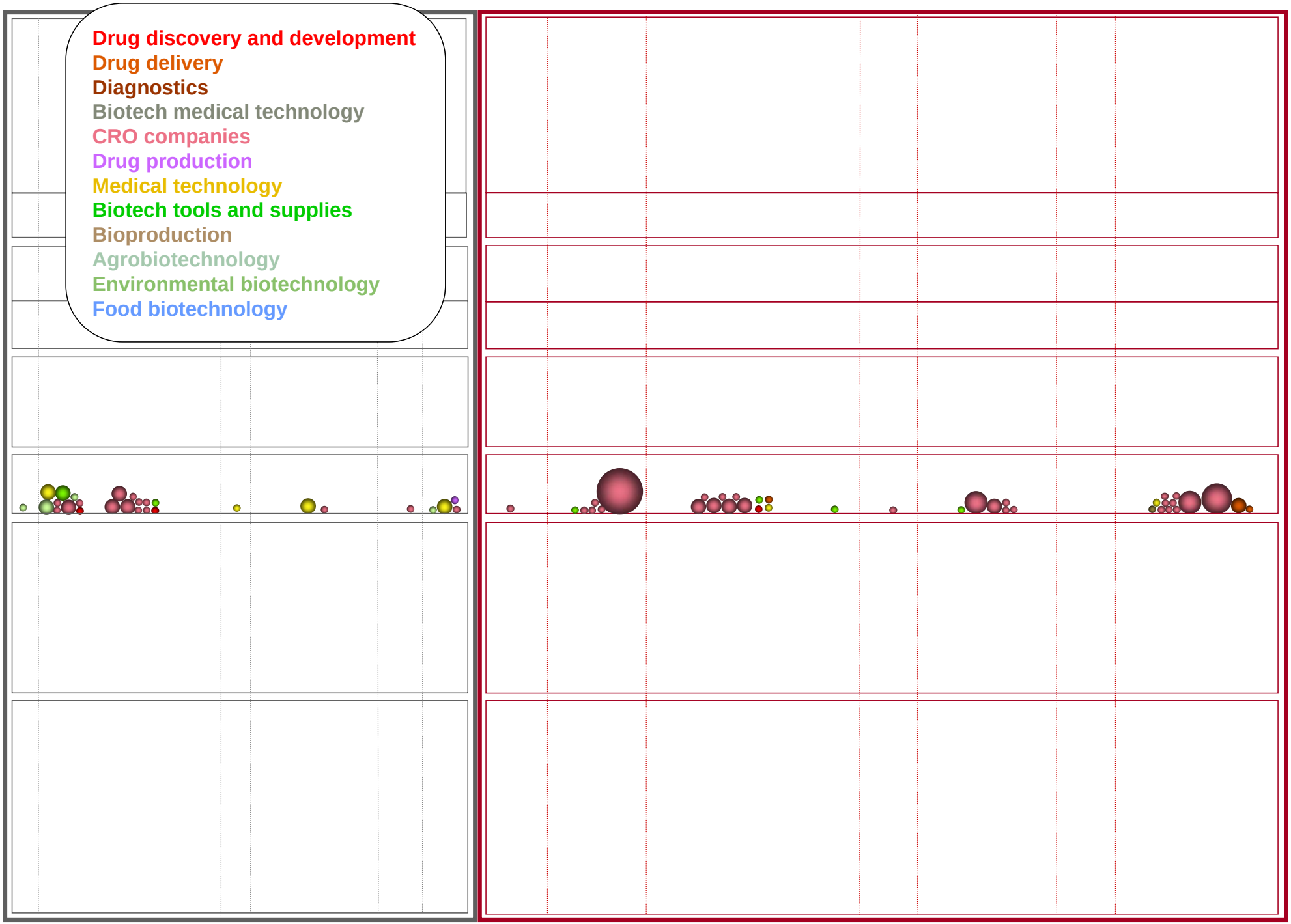
Customer-orientated activity where access to good register data/patient data, the right patient population, network with clinicians with scientific credibility are important.

For the small group of consultancy and service companies within other subject fields, it is important for them to have cutting-edge expertise within their respective fields and to be aware of customer demand.

Relationships

These companies sometimes compete with each other in a given subject field but may also be niched in different subsidiary fields which reduces competition between them.

CLUSTER PROFILE consultancy and commissioned activity



Production

General

These companies comprise Sweden’s production industry within biotechnology, pharmaceuticals and medical technology. One third of the employees within the included fields are to be found here. There is highly advanced production with strict regulatory requirements.

Activity

Approx. 70 companies with a total of 15,000 employees within bioproduction, drug production, manufacture of medical apparatus and equipment and manufacture of biotech tools and supplies. Some are companies focused on production without their own research and development, whilst others comprise production units within larger companies with more than 500 employees.

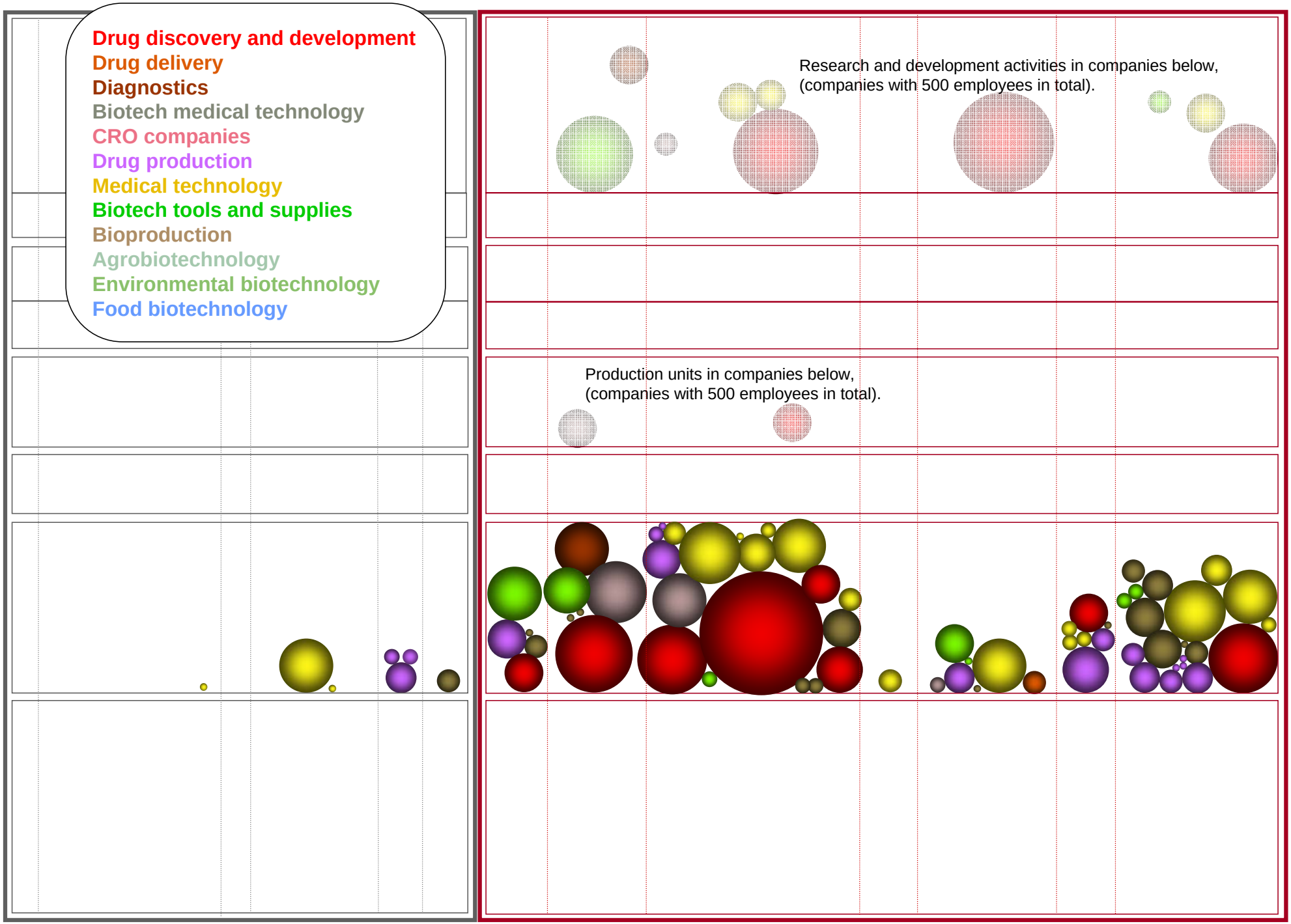
Since this study only divides companies with more than 500 employees into different activity categories, production units are concealed in many of the companies with fewer than 500 employees. These are indicated in the diagram on the next slide. The shaded companies are those with products on the market but which have fewer than 500 employees in Sweden in total. More than the stated approx. 15,000 in identified production units are therefore working in production.

If something like a manufacturing company has products within medical technology as one of several business areas, it is not included in the production unit in this study since it is difficult to determine what proportion of the company’s total activity is within medical technology. Companies which are subcontractors for components or materials for things like medicotechnical products or biotech tools and supplies have not been included.

Characteristics

Production and process technology for these product categories are under continuous development to streamline and quality-assure production. International requirements and regulations are also being developed. It is important that companies, Swedish research and Swedish training courses take this on board. Production companies are vital for broad employment. Any future competition with low-cost countries, for example will raise the bar for an efficient, high-quality operation.

CLUSTER PROFILE Production



Sales and marketing

- National market

Scope

Approx. 280 companies with approx. 5,800 employees (clinical trial activity co-located with sales and marketing has not been included here). These are often the Swedish sales organisations of an international pharmaceutical company, or company within medical technology or biotech tools and supplies. They are often subsidiaries within the foreign groups, but there are also Swedish companies selling Swedish products or importing and selling foreign ones on the Swedish market.

Characteristics

Companies within drug discovery and development have product specialists who meet prescribing doctors and sell drugs all over Sweden although in terms of organisation, they are concentrated on the metropolitan regions. They visit medical conferences and arrange information meetings and seminars for doctors within the individual company's product areas.

The customer profile and market differ to a great extent depending on the product when it concerns medical technology. Depending on the size of investment involved in the product, it may be sold to different customers in the hospital administration and county council structure.

The major pharmaceutical companies and companies in medical technology and biotechnology operate on an international market and must therefore have a sales and marketing organisation in all major markets. The scope of the operation is controlled by the size of the market.

Relationships

These companies are often competitors but may also have common interests, for example where it concerns arenas for reaching out to the individual customer group.

Comments

Cost-cutting may lead to mergers of several national offices into a single office looking after sales and marketing over a larger region.

Recently, the rules for this kind of activity in Sweden have been changed concerning contacts between companies and individual doctors or other decision-makers and potential customers in the care sector. For example, opportunities for reaching out via contributions to conference travel have been restricted.

- International market

Scope

Some 60 companies with approx. 2,700 employees in sales; as a rule the Nordic sales organisation of an international pharmaceutical company, or company within medical technology or biotech tools and supplies. They are often subsidiaries within the foreign groups, but there are also Swedish companies selling Swedish products or importing and selling foreign ones on the Swedish market.

Characteristics

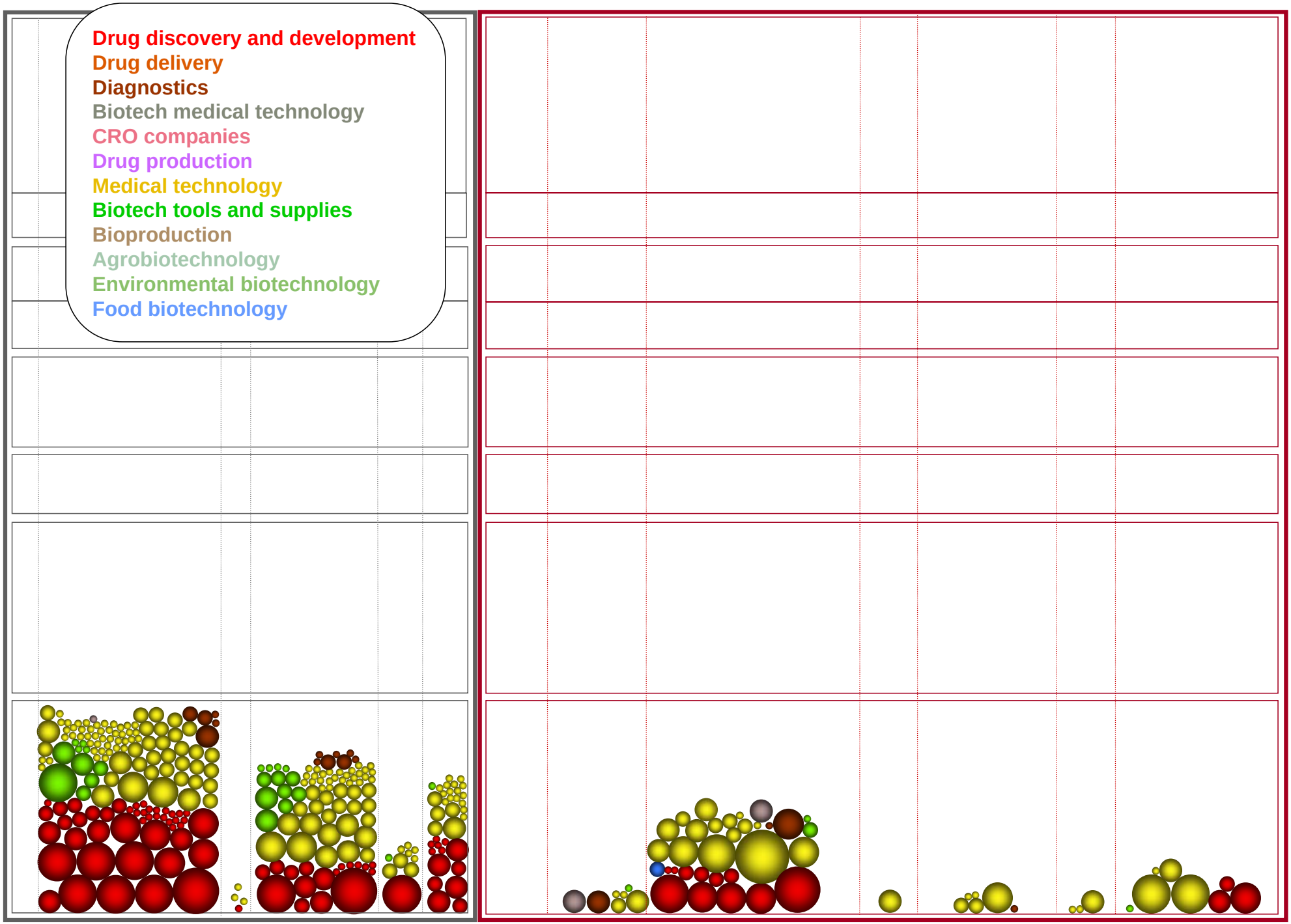
See companies with a national market. For these companies, it is a matter of having a corresponding organisation active within a larger geographical area such as the Nordic region.

Knowledge of national attributes and things like the structure of the care sector in different countries is required for an effective sales and marketing strategy.

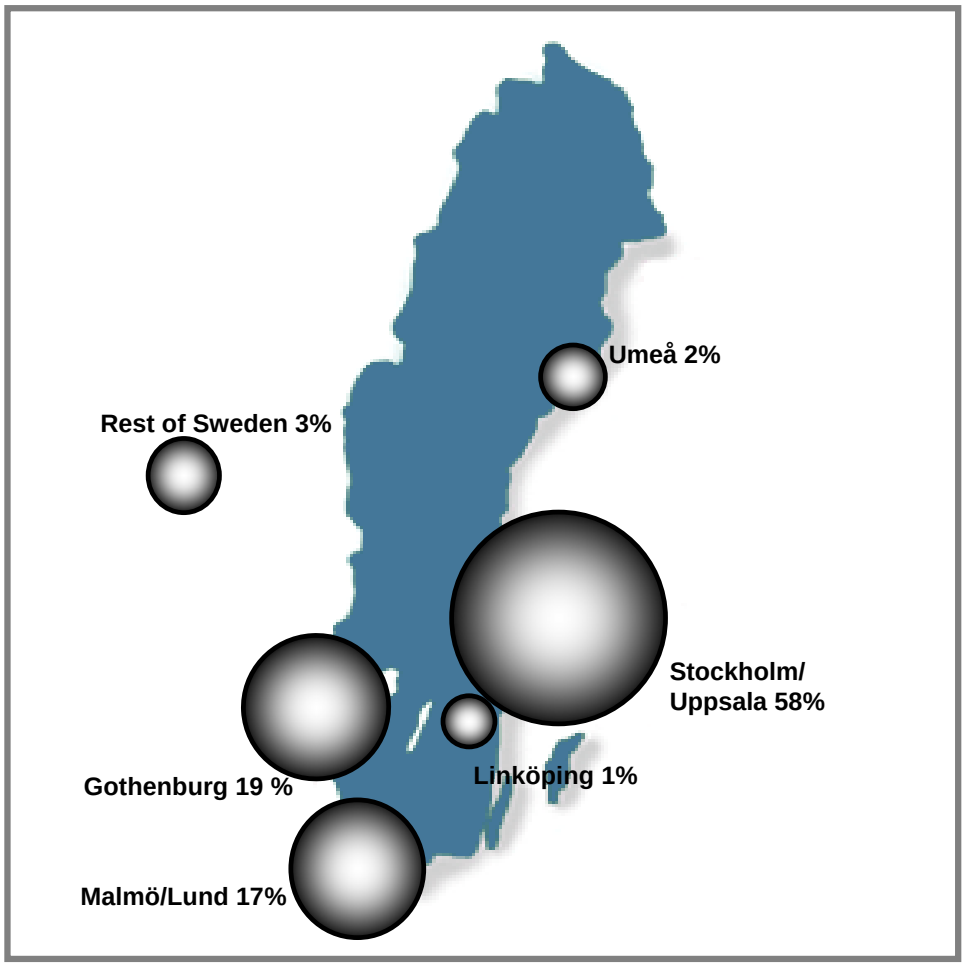
Relationships and comments

See National market.

CLUSTER PROFILE Sales and marketing



Regional profiles



The industry is concentrated on the metropolitan regions.

- Are the regions specialised within different subject fields?
- Are they focused on different activity categories?
- Which activities are found outside the metropolitan regions?
- What are the conditions for collaboration like?

Regional profiles

Stockholm/Uppsala region

There are 390 companies identified in Uppsala, Stockholm, Södertälje and Strängnäs with a total of 23,670 employees. This comprises 58% of the employment in Sweden.

Stockholm

The number of identified companies in the region, which also includes Södertälje, is just over 300 with a total of 18,500 employees.

In the Stockholm cluster, all lines are represented but companies which develop or sell drugs and medicotechnical equipment dominate.

Approx. 70 companies are research-intensive, with products or services for an international market. Many of the companies are small and several are developing products which are not yet on the market.

Stockholm is a national centre for international companies taking care of sales and marketing on the Swedish market. There is also a certain amount of representation for the Nordic/Baltic market.

This company cluster also has a large element of companies working with clinical trials. The greater part of these are subsidiaries of international groups.

The single largest employer is AstraZeneca which has both a major research facility in Södertälje and Sweden's largest drug production plant there. Other major employers include Pfizer Health, Octapharma, Biovitrum, Siemens-Elema and St. Jude Medical.

Uppsala

The number of identified companies is approx. 75 with a total of 5,200 employees.

Several of the companies originated in operations within the former Pharmacia.

The Uppsala cluster is dominated by companies developing biotech tools and supplies. There are also several companies within diagnostics.

There are also a number of minor companies developing drugs.

The largest employers are GE Healthcare, Pfizer Health, FreseniusKabi and Pharmacia Diagnostics.

Strängnäs

Some 10 identified companies with a total of approx. 600 employees, the majority of those working within bioproduction.

Gothenburg

The number of identified companies is approx. 170 with a total of 7,800 employees.

In the Gothenburg region, alongside AstraZeneca's research-intensive activity, there are also a number of major research-intensive companies within medical technology. There are also many small ones with research and/or development in medical technology itself. Companies within the use of biomaterial and titanium implants to repair or replace damaged tissue are largely found in Gothenburg.

In Gothenburg, there are a large number of companies selling drugs and medicotechnical products on the Swedish market; both subsidiaries in foreign groups and to a lesser extent Swedish import companies.

The largest employers are AstraZeneca, Astra Tech, Nobel Biocare, Getinge Sterilization and Mölnlycke Healthcare.

Malmö/Lund

The number of identified companies is approx. 160 with a total of 7,000 employees.

In Skåne, alongside AstraZeneca's research-intensive activity, there are a number of companies with research activity within several of the included subject fields. Skåne is largely on its own in Sweden regarding companies in agrobiotechnology.

The region has a relatively large element of companies with product development within medical technology and many production companies within drugs, bioproduction and medical technology.

The largest employers are AstraZeneca, Pfizer Health, Gambro Lundia, Becton Dickinson Infusion Therapy, Svalöf Weibull and Syngenta Seeds.

Umeå

The number of identified companies is approx. 20 with a total of 800 employees.

Umeå chiefly has companies within production, but also a lesser number of small research-intensive companies.

The largest employers are GE Healthcare, AstraZeneca and Apoteket's drug production unit.

Linköping

The number of identified companies is approx. 25 with a total of 320 employees and most companies are operating within medical technology. The largest employers are Sectra Imtec, Elekta and Partnertech's medical technology production unit.

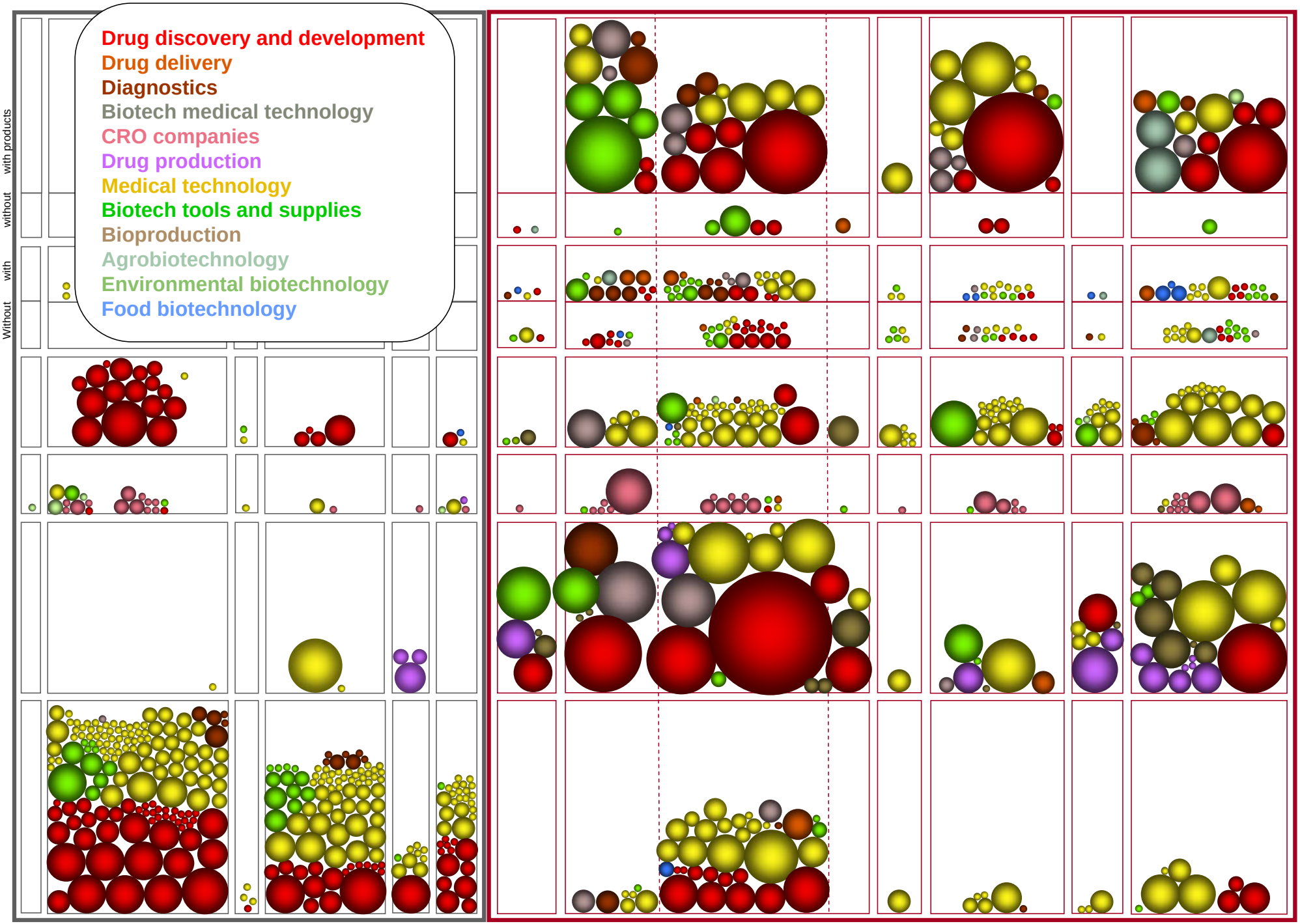
Rest of Sweden

The number of identified companies is approx. 40 with a total of 1,100 employees.

The industry is strongly concentrated on the metropolitan regions; outside these are primarily production and product development companies.

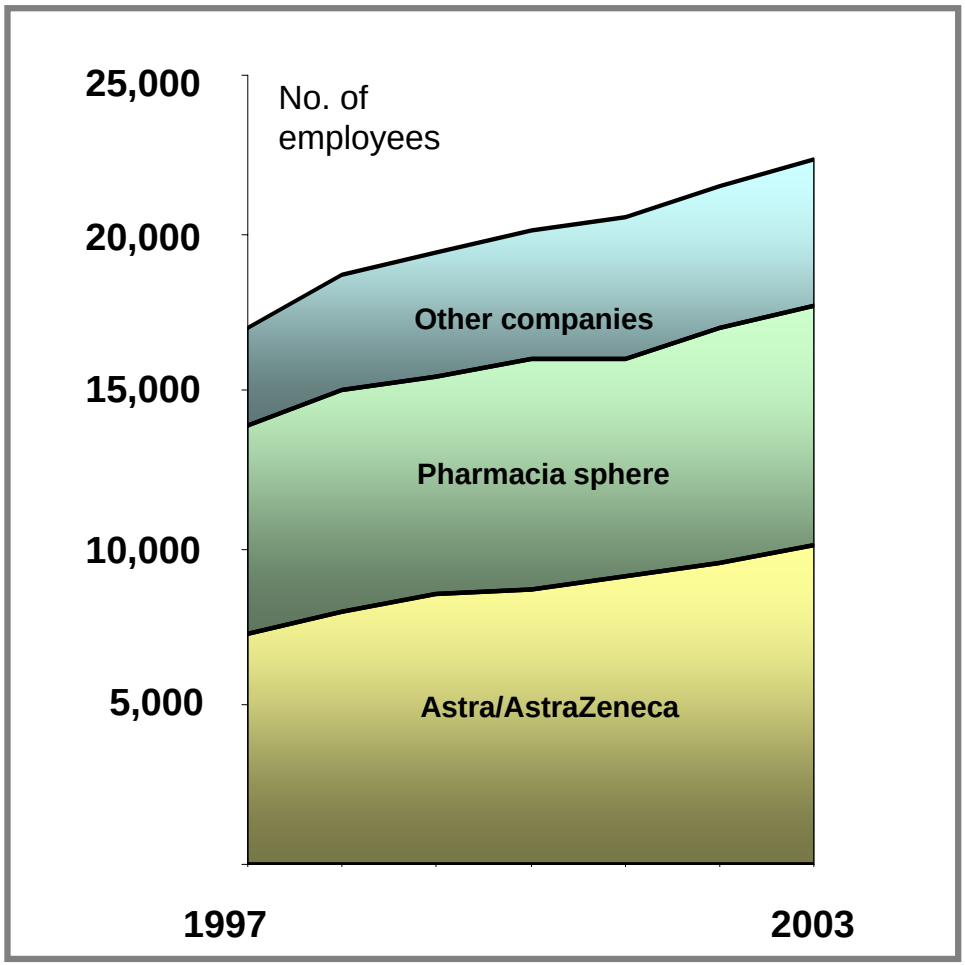
The largest employers are Cambrex Karlskoga, AstraZeneca in Karlskoga, CCS Clean Chemical Sweden in Dalarna and Unimedic in Västernorrland.

CLUSTER PROFILE Regional distribution



Changes 1997 – 2003

Biotechnology, Astra/AstraZeneca and the Pharmacia sphere



Changes in the number of employees a number of companies are shown for the following section of the industry: Astra/AstraZeneca, Pharmacia sphere and other biotech companies.

- What is the state of growth in the various sections ?
- What are the corporate structures like?

Biotechnology, Astra/AstraZeneca and the Pharmacia sphere 1997

Delimitation

The study “Swedish Biotechnology” identified and analysed companies within biotechnology 1997-2001*. It included only companies with production, research and/or development of products and services according to the definition: “companies producing, analysing or using biological systems on a micro, cellular or molecular level, or companies developing equipment or tools for these purposes”. For this reason, neither medical technology, CRO companies nor drug production were included but only companies with in-house research and development. The diagram to the right shows the companies which existed in 1997 and were included in the study including the companies then called Amersham Pharmacia Biotech, Pharmacia & Upjohn and Astra. All companies developing new drugs use biotech methods in their research and development and can therefore be seen as part of the biotech industry. Companies with only sales and marketing are not included. On the other hand, employees in sales and marketing with Pharmacia & Upjohn and Astra are summarised by the number of employees in research and development.

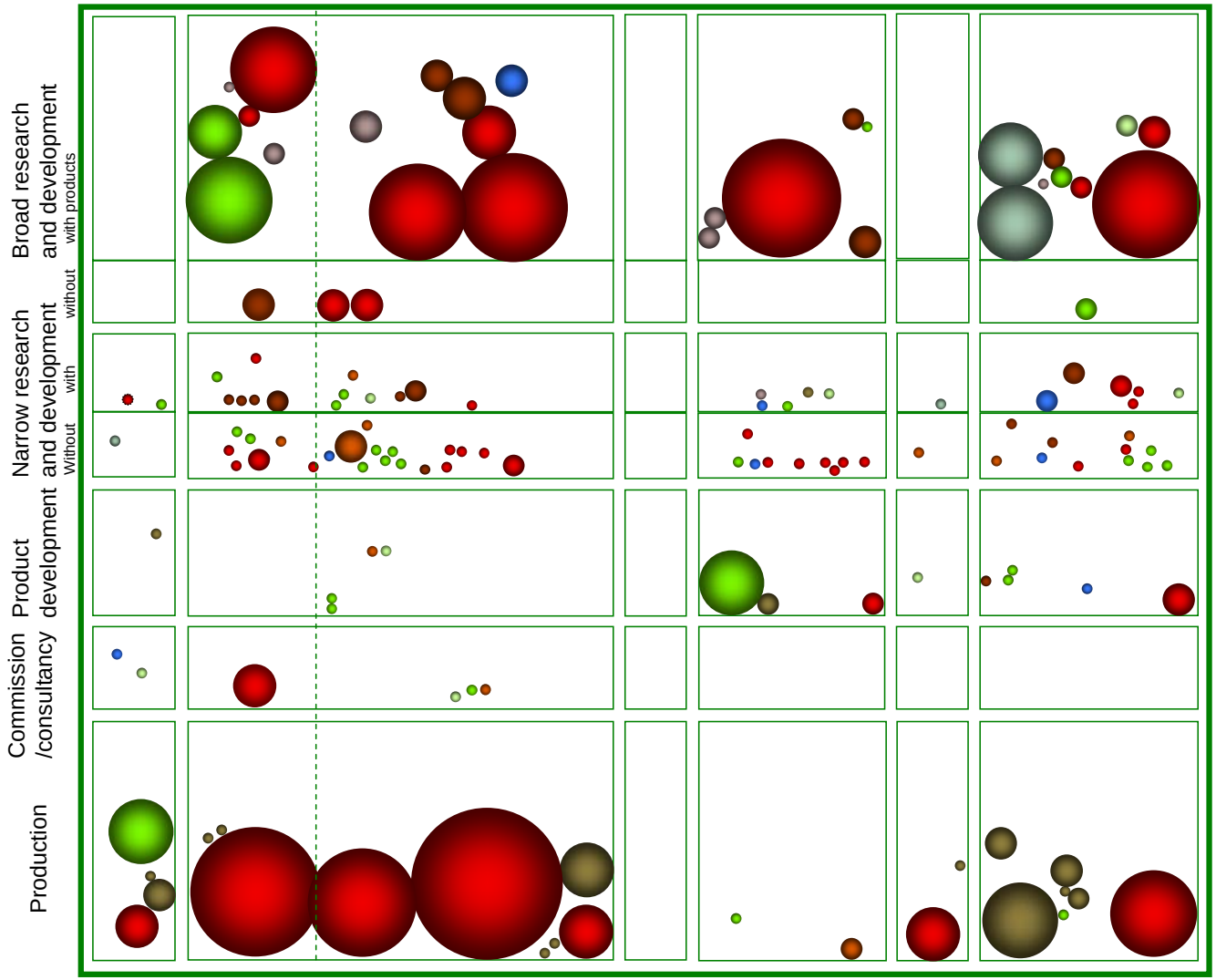
* VINNOVA Analysis VA 2003:2 VINNOVA

Structure and scope

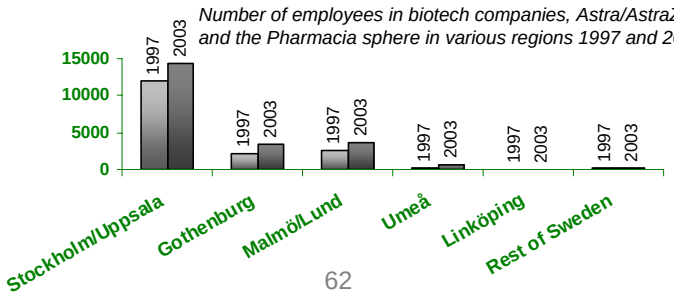
In 1997, the biotech industry comprised 139 companies with approx. 17,100 employees in Sweden and was dominated by the large pharmaceutical companies, Astra and Pharmacia & Upjohn. Within biotech tools and supplies, the largest companies were Amersham Pharmacia Biotech (now GE Healthcare), Getinge and Biacore. Otherwise, there were Svalöf Weibull and Syngenta Seeds within agrobiotechnology and Ferring and DSM Anti-Infectives Sweden within bioproduction. Other companies were relatively small.

Of the 70 companies with narrow research and development, 30 had products on the market and 40 had products under way.

- Astra had approx. 7,300 employees
- Pharmacia & Upjohn and Pharmacia Biotech jointly had approx. 6,500 employees.
- The other 136 companies at approx. 3,300 employees.



Number of employees in biotech companies, Astra/AstraZeneca and the Pharmacia sphere in various regions 1997 and 2003



Drug discovery and development
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Food biotechnology

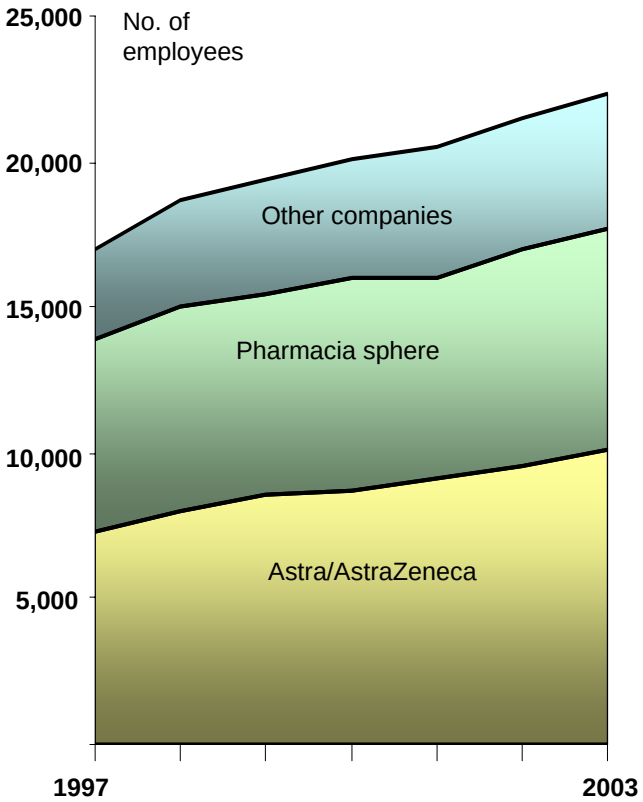
Biotechnology, Astra/AstraZeneca and the Pharmacia sphere, 2003

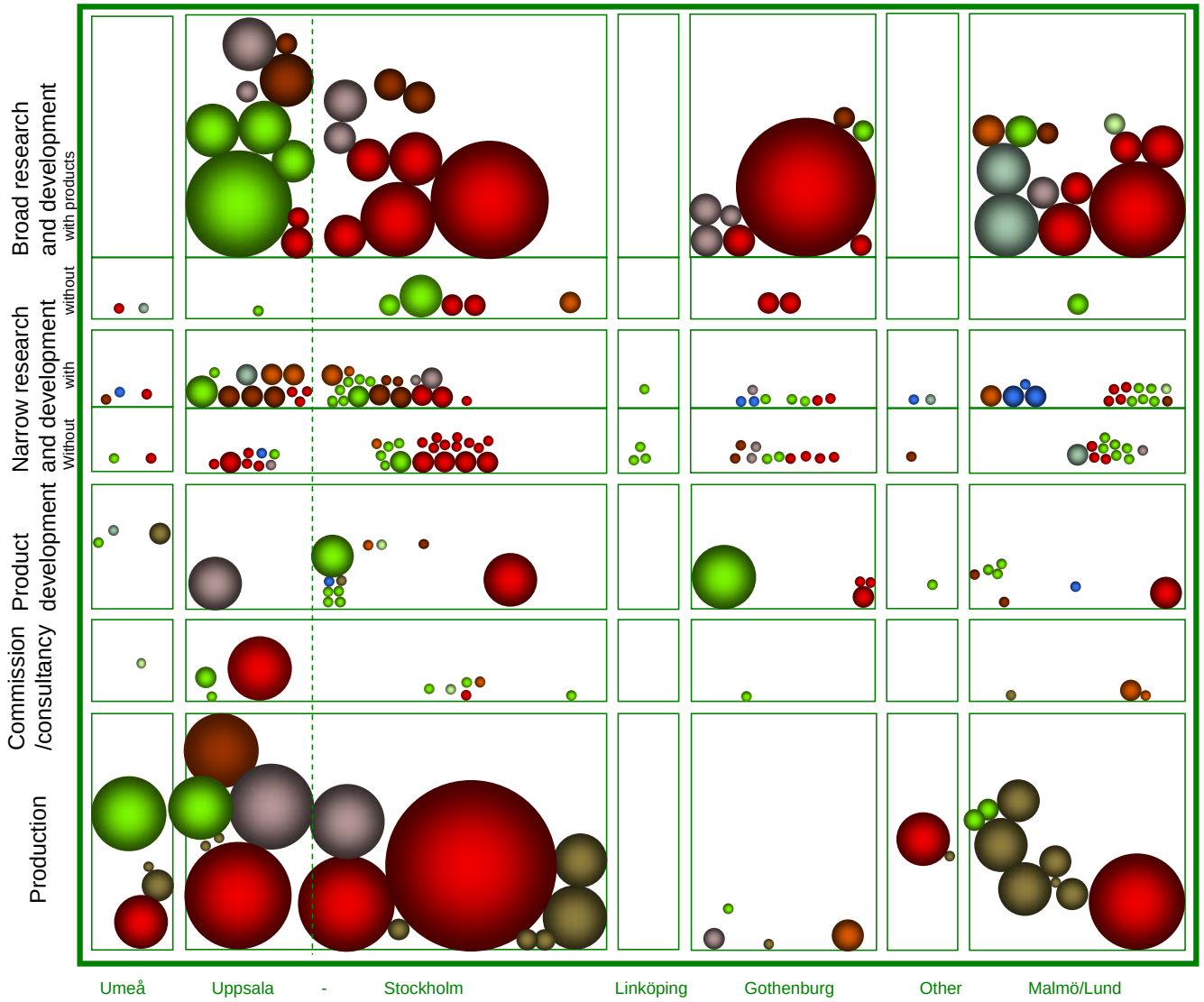
Structure and scope

In 2003, there were 216 biotech companies with a total of 22,400 employees. The growth in the number of employees was 31% between 1997 and 2003.
The number of employees increased quite a lot in the production sector, whilst the largest number of companies were added within biotech tools and supplies (33).

In 2003, AstraZeneca had just over 10,000 employees and operations in several locations in Sweden. The Pharmacia sphere had just under 8,000 employees in nine companies. The other 206 companies had 4,400 employees in 2003.

The number of companies with narrow research and development had increased to 120 companies, 65 of them with products on the market and 55 with products in development.





Comments

The largest changes during the period 1997 – 2003 were:

- AstraZeneca's expansion, slide 65
- Pharmacia/Pfizer's sales of certain operations, slide 66
- 26 small companies which closed, slide 68
- 98 companies which were added, slide 69

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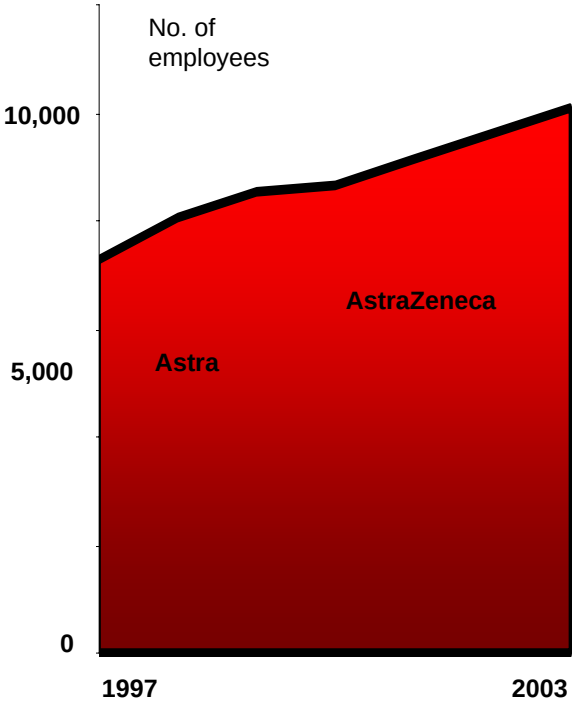
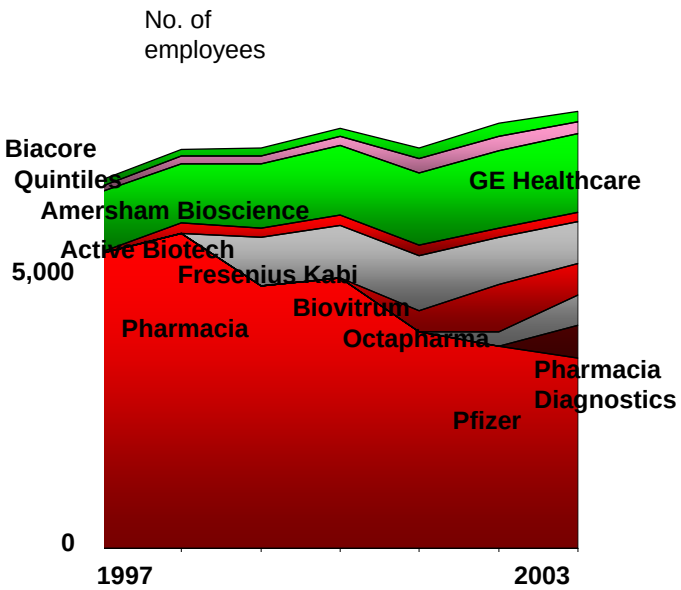
Biotechnology, Astra/AstraZeneca and the Pharmacia sphere Changes 1997 – 2003

Astra/AstraZeneca



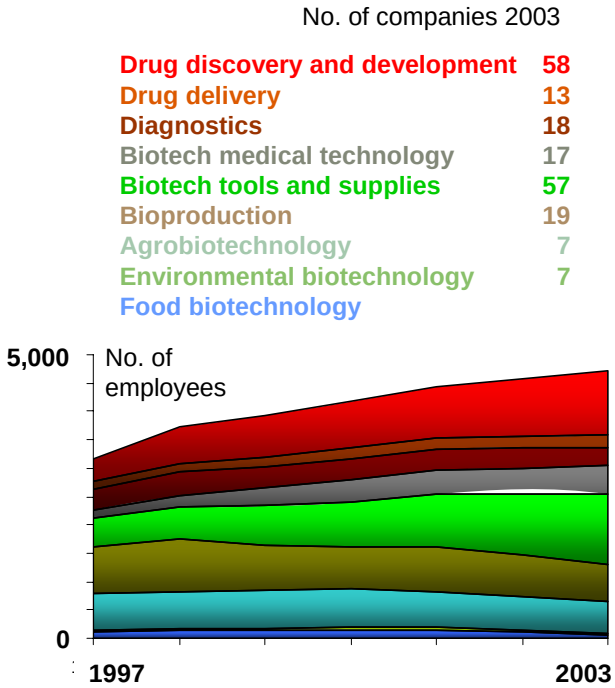
Astra/AstraZeneca has increased the number of employees by approx. 38%.

Pharmacia sphere



After 1995, the former Pharmacia's operation was sold to various owners and now consists of nine companies.
During the period 1997-2003, the companies jointly increased the number of employees by approx. 19%.

Other companies



Other companies increased the number of employees by approx. 43%. The number of companies increased from 132 in 1997 to 206 In 2003.
The graph shows these together in different subject alignments.

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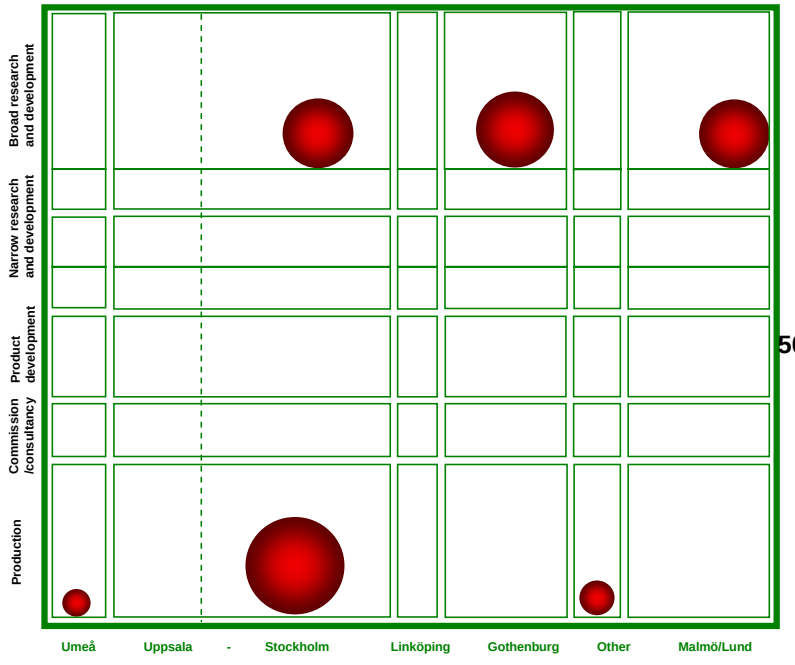
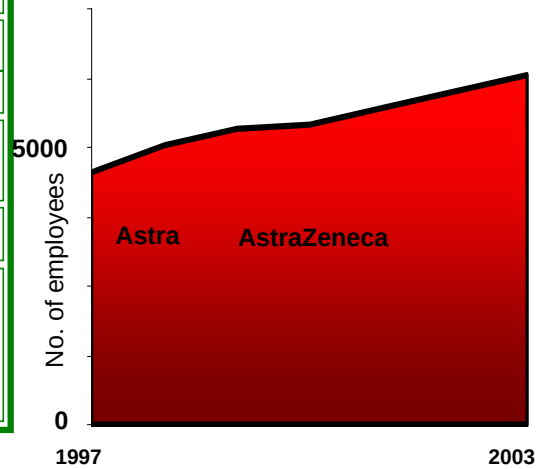
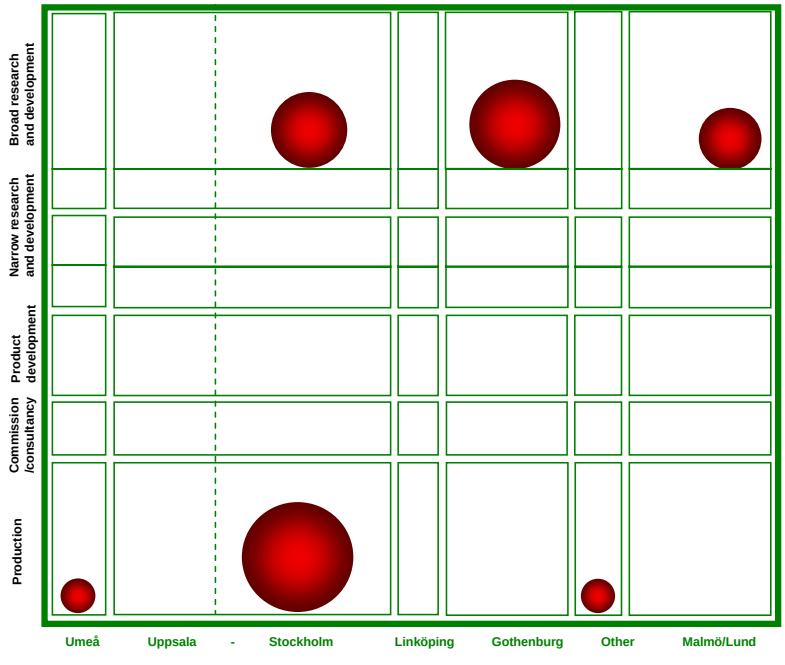
1997 Astra/AstraZeneca 2003







Astra/AstraZeneca

1913: Astra founded

1931: Astra begins own research and development

1934: Company starts to export products

1955: Astra shares quoted on stock on Stock Exchange

1997 Astra 7,300 employees in Sweden.

1999: Astra and British company Zeneca merge to form the new company AstraZeneca. Since the merger in 1999, the company has concentrated operations on its core activity, prescription drugs. In 1999, the special chemistry operation was disposed of and in 2000, the agrochemicals operation which was formerly a part of Zeneca, was separated through the formation of Syngenta.

2001: AstraZeneca sells its factory for pharmaceutical manufacturer of penicillin in Strängnäs to Recip. This is a minor part of Recip's operation and is not shown in the images and diagrams above, but the unit is included in other parts of the study.

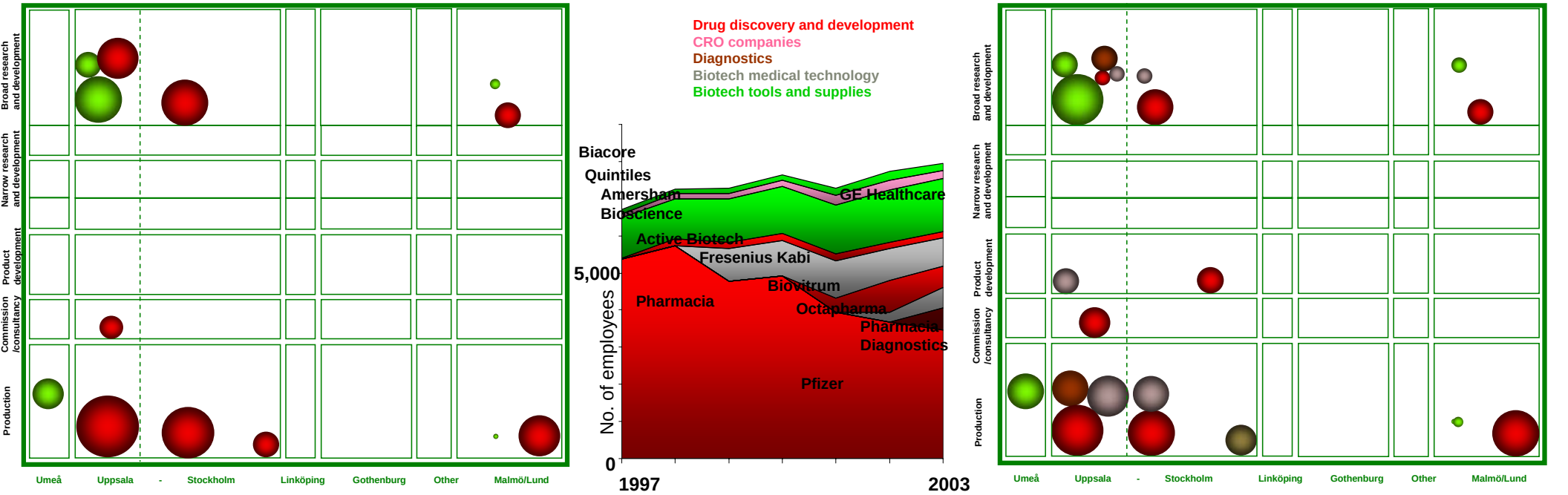
2004 The company is one of the world's leading pharmaceutical companies with products in six fields: oncology, cardiovascular, gastrointestinal, infection, neuroscience and respiratory and inflammation. In Sweden, research is being conducted into respiratory, gastrointestinal and neuroscience in Södertälje, Mölndal and Lund.

The largest production unit in Sweden is in Södertälje, but there is also production in Umeå and Karlskoga (the Karlskoga department has now been sold off). The Swedish group also includes AstraTech, which develops medical implants and single-use products for healthcare (not included in the figures, images and diagrams here but included in medical technology in other parts of the study). The group has its head office in London, but AstraZeneca's headquarters for research and development is in Sweden.

AstraZeneca has approx. 60,000 staff of which just under 10,000 are in Sweden. AstraZeneca increased the number of employees in Sweden by approx. 38% during the years 1997 – 2003. Sales take place through marketing companies in 45 countries

In 2003, the group had 12 development projects in phase II and 28 in phase III. The total global research budget amounted to USD 3.5 billion.

1997 The Pharmacia sphere 2003



1911: Pharmacia formed.
1995: Pharmacia merges with Upjohn to form *Pharmacia & Upjohn.* The company has approx. 7,000 employees in Sweden.
1996: Pharmacia Biosensor is sold and survives as *Biacore.*
1997: Pharmacia Biotech are merged with British company *Amersham* under the name *Amersham Pharmacia Biotech* which in 2001 is named *Amersham Biosciences.*

1997 Pharmacia has 5,250 employees.

1998: Pharmacia closes its research unit in Lund and major sections are purchased by *Active Biotech.*

The same year, German company Fresenius takes over production of nutrient solutions which is now operated run under the name *Fresenius Kabi.*

1999: Pharmacia & Upjohn merge with Monsanto. The new group calls itself Pharmacia.

2001: Most of the remaining research within Pharmacia in Sweden is sold off and the new company *Biovitrum* is formed. Biovitrum subsequently sells the substitute plasma operation to Swiss company *Octapharma*. The same year, the clinical trials operation is purchased by American company *Quintiles.*

2002: *Pfizer* purchases Pharmacia.

2003: Pfizer cells *Pharmacia Diagnostics* to two venture capital companies.

2004: *Amersham Biosciences* is sold to American company General Electric Inc. and named *GE Healthcare*.

Pfizer signs an agreement with *Advanced Medical Optics* to take over the ophthalmic surgery operation.

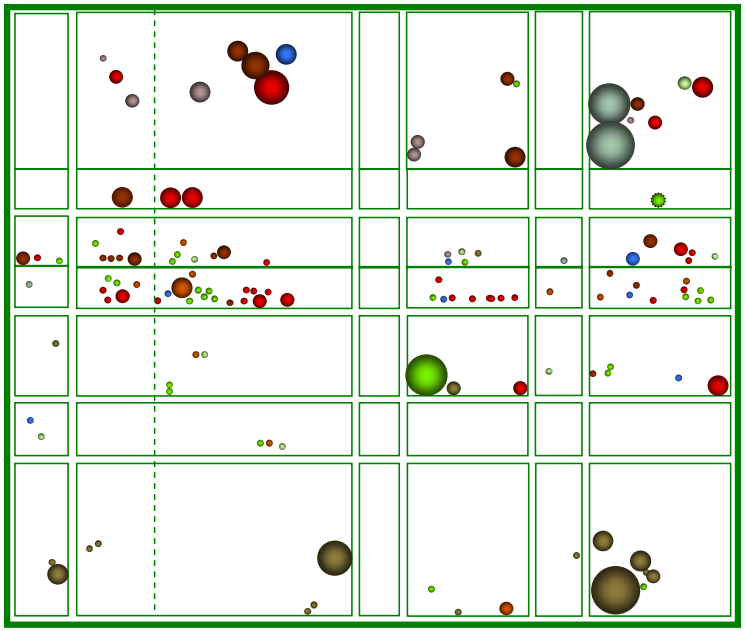
2003 The companies which arose through the sale of Pharmacia's operation have 7,960 employees in the following companies: Biacore, Fresenius Kabi, Biovitrum, Octapharma, Quintiles, GE *Healthcare, Pfizer, Pharmacia Diagnostics AB and Active Biotech.* This means a 19% increase in the number of employees in the sphere over 1997. Individuals who have worked in the Pharmacia sphere have also started up new companies and even individual projects have been hived off, leading to the start-up of new companies. The scope of this is not shown in this study.

There are just over 3,000 employees in Pfizer's operation in Sweden. It consists of three production plants (Strängnäs, Helsingborg and Uppsala) as well as sales and marketing and clinical trial operations. There is no research remaining, only some development of aids for dosage and taking off drugs. There is collaboration on research with Karolinska Institutet amongst others.

A decision-in-principle has now been taken that Pfizer is planning to move its Uppsala operation to Stockholm. The Uppsala production unit will remain independent and possibly be sold in future. In Strängnäs, investment will be made in increased production capacity and Helsingborg will become a global centre for manufacture of the Nicorette product family.

Since 1995, the former Pharmacia operation has been sold to various owners and now consists of nine companies. In the period 1997-2003 these companies have jointly increased the number of employees by approx. 19%.
During 2004, some of the companies in the Pharmacia sphere have reduced their number of employees or announced such intentions.

1997 Other companies 2003



Drug discovery and development
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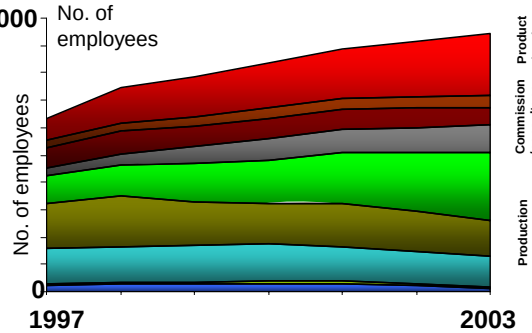
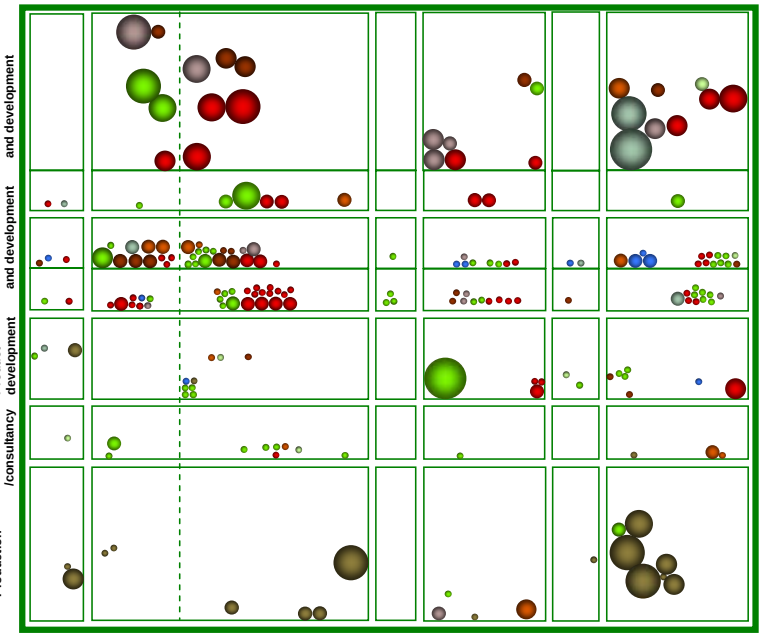




1997 There were 132 biotech companies with approx. 3,050 employees outside Astra/AstraZeneca and the Pharmacia sphere.

For the former Pharmacia, there are several examples of former employees "starting out by themselves" or a project being hived off. The description of the Pharmacia sphere only includes companies which arose when the parent company sold entire units of the company; other spin-offs are shown here. Amongst others this applies to Gyros, which was hived off from Amersham Pharmacia Biotech in 2000 and had 85 employees in 2003. Correspondingly, spin-offs from Astra have not been as common, but one example is the biotech company Medivir within drug discovery and development. The company was founded at the end of the 80s by former Astra employees who took an Astra project with them. In 1997, the company had 30 employees and in 2003 just under 60 employees in Sweden plus a subsidiary in Great Britain.

From 1997-2000, many start-up companies received venture capital. During the period studied, these were able to employ relatively many people.

There are also examples of companies during this period which managed to start up only to subsequently disappear through bankruptcy, buy-out or departure to another country. The above diagram includes the number of employees in the total population of biotech companies outside of Astra/AstraZeneca and the Pharmacia sphere for each year during 1997-2003.

2003 there were 206 companies with approx. 4,400 employees outside of Astra/AstraZeneca and the Pharmacia sphere. These companies have increased their number of employees by approx. 43%.

Drug discovery and development and biotech tools and supplies have displayed even growth in the number of employees, as has biotech medical technology albeit on a lower level.

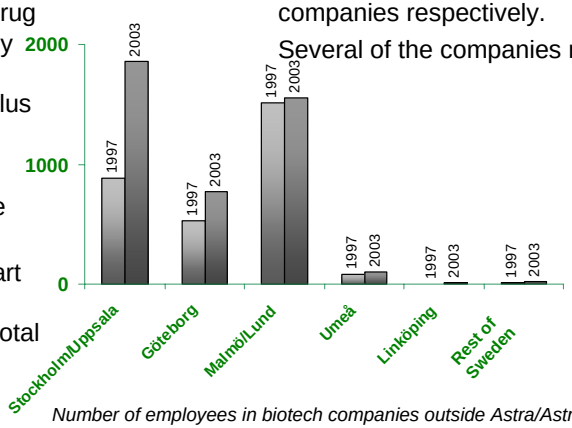
Above all, it is within the fields of biotech tools and supplies and drug discovery and development that the number of companies has increased strongly; 33 and 29 companies respectively.

Several of the companies marketed their products or services during this period.

In 2003, a large proportion of the research-intensive companies had a narrow field of activity, i.e. concentrating on one product line/project.

Stockholm/Uppsala greatly increased the number of employees during 1997-2003.

During 2004, several of the companies reduced their number of employees or announced such intentions. On the other hand, Q-med increase the number of employees by just over 100 during 2003 and 2004.



Number of employees in biotech companies outside Astra/AstraZeneca and the Pharmacia sphere in various regions, 1997 and 2003

Companies which disappeared, 1997-2003

Scope

This diagram shows that companies which existed outside the previously shown Pharmacia sphere and Astra in 1997 but which did not exist in 2003. There are 26 companies with 242 employees.

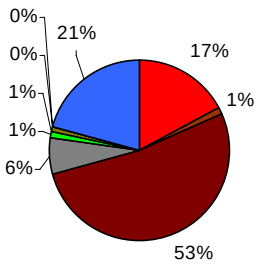
Companies which started up and disappeared during the period are not included in this diagram.

All companies were research-intensive and two thirds of the companies had no products on the market.

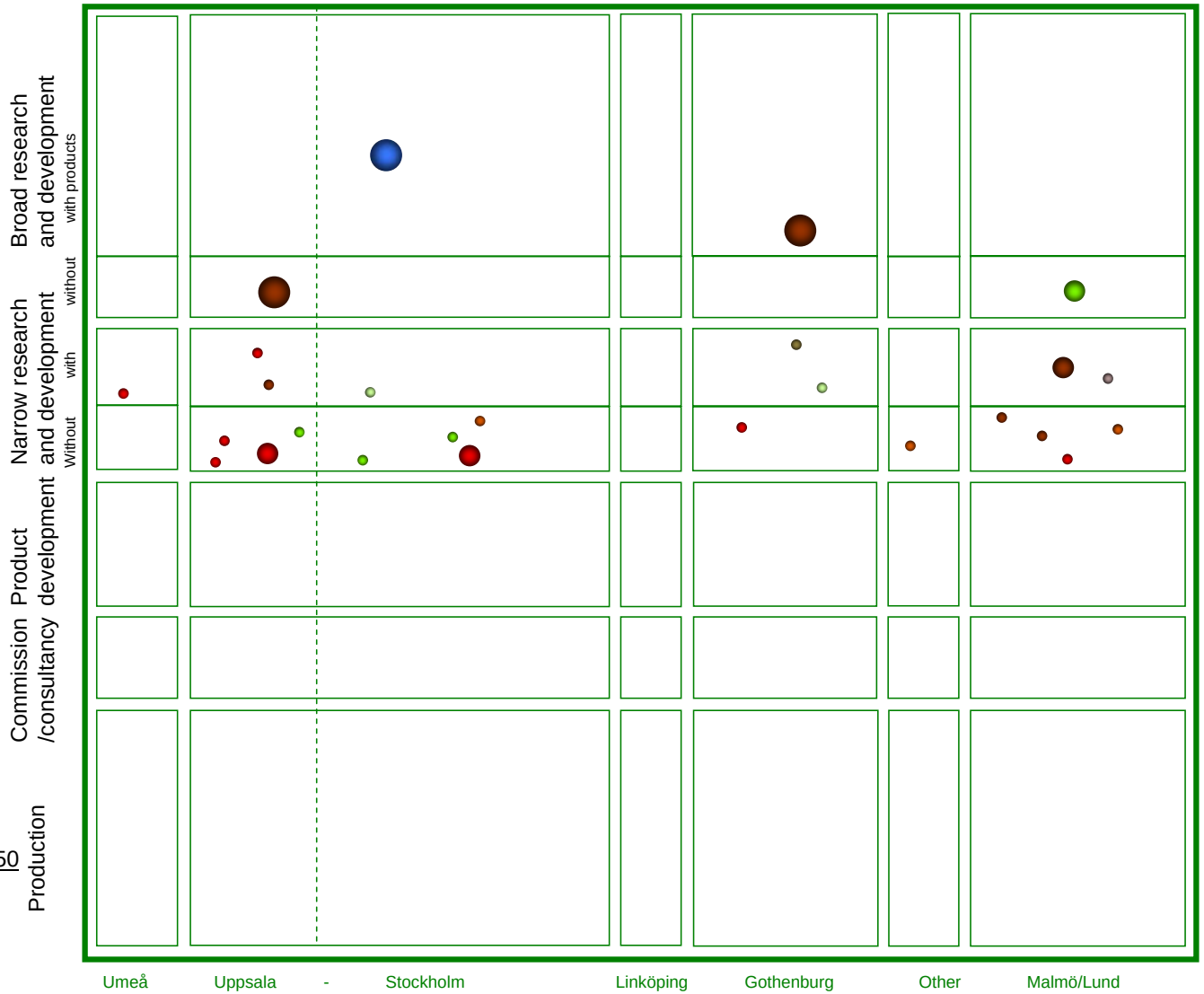
Companies within drug discovery and development are highest in number. The highest number of employees in these companies was within diagnostics.

Facts

	No. of companies	No. of employees		
Drug discovery and development	8	41		
Drug delivery	3	3		
Diagnostics	6	125		
Biotech medical technology	1	15		
Biotech tools and supplies	3	3		
Bioproduction	1	2		
Agrobiotechnology	0	0		
Environmental biotechnology	2	3		
Food biotechnology			2	50
TOTAL	26	242		



Proportion of employees within different subject fields



Drug discovery and development
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Environmental biotechnology
Food biotechnology

Comments and questions

What is the reason for these companies disappearing?
Were they successful companies or failed investments?
Capital loss, non-viable business concept, defective leadership or management, buy-out by a Swedish or foreign company, departure to another country….?
Can anything be learned from these disappeared companies?
What was the role of public players?

Companies added 1997- 2003

Scope

This diagram shows the companies which appeared in Sweden during the period 1997 – 2003, other than those previously shown from Astra/AstraZeneca and the Pharmacia sphere. However, a number of the companies may have been started by people who were active in these companies or based on projects which were hived off from Astra/AstraZeneca or the Pharmacia sphere.

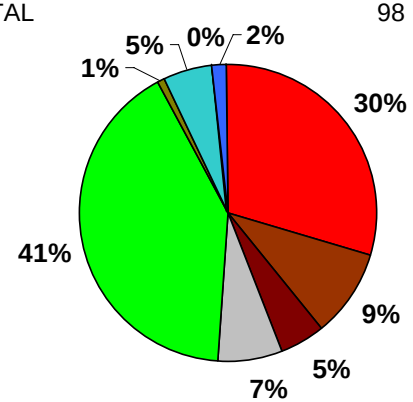
Most of the companies are research-based. Half of them still have no product on the market.

Biotech tools and supplies and drug discovery and development dominate both in terms of number of new companies and employment.

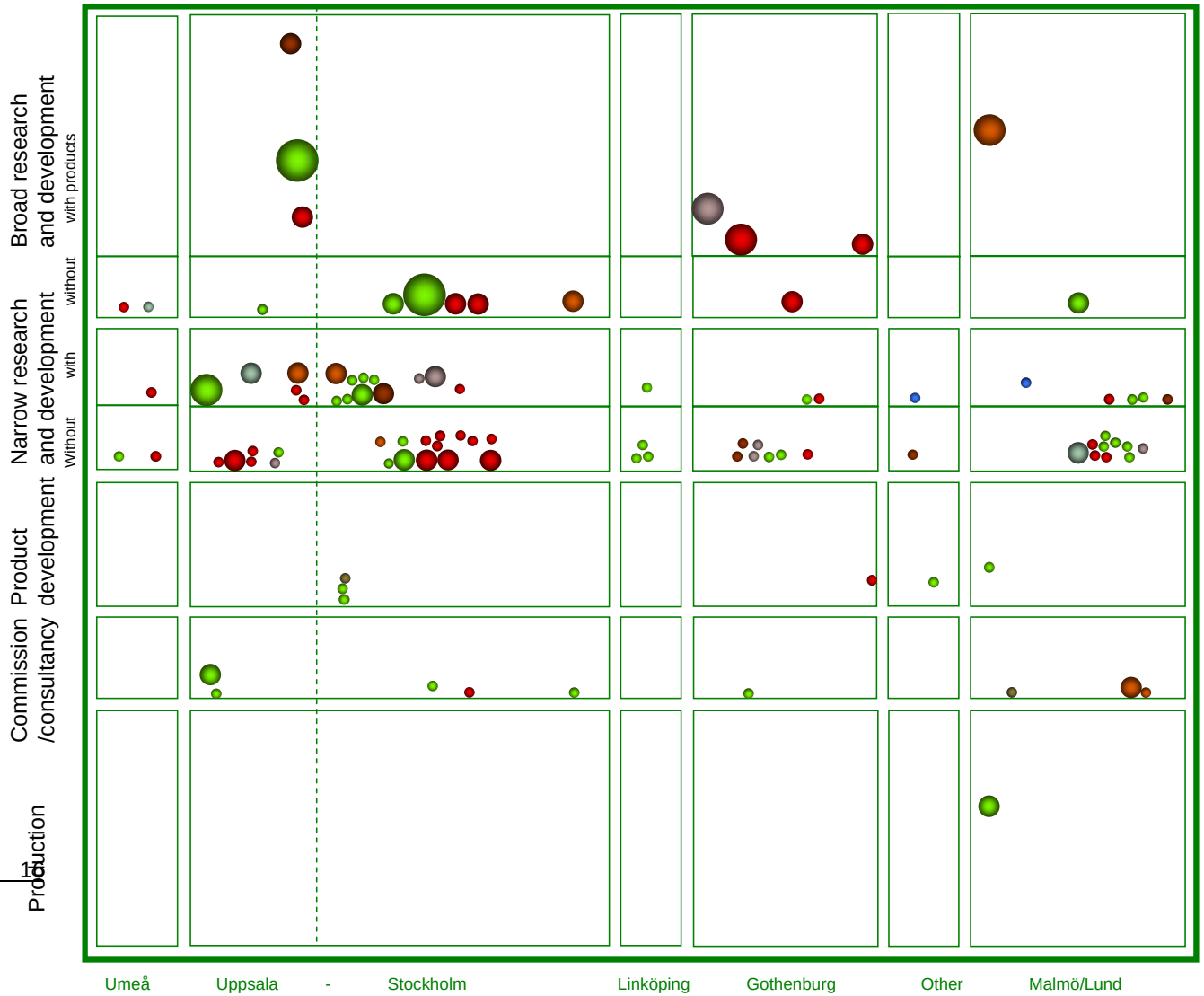
Most new companies appeared in Stockholm/Uppsala.

Facts

	No. of companies	No. of employees
Drug discovery and development	31	287
Drug delivery	6	90
Diagnostics	6	45
Biotech medical technology	8	68
Biotech tools and supplies	39	399
Bioproduction	2	6
Agrobiotechnology	3	52
Environmental biotechnology	0	0
Food biotechnology	3	16
TOTAL	98	963



Proportion of employees within different subject fields



Drug discovery and development
Drug delivery
Diagnostics
Biotech medical technology
biotech tools and supplies
Bioproduction
Agrobiotechnology
Environmental biotechnology
Food biotechnology

Comments and questions

What was the strongest driver for the appearance of these companies?
How many originated in university research in Sweden?
How many companies originated in AstraZeneca and the Pharmacia sphere?
Which are foreign-owned?
Which have growth ambitions?
How much venture capital have the companies received?
Have public players contributed to the appearance of these companies?

List of companies, tables and sources

Companies[1]

Drug discovery and development

Excluding sales and marketing companies

9,301-10,600 employees
AstraZeneca

2,801-3,400 employees
Pfizer

501-730 employees
Biovitrum AB

121-220 employees
Active Biotech
SBL Vaccin AB

61-120 employees
BioInvent International AB
Karo Bio AB
Medivir AB

31-60 employees
A Carlsson Research AB
Biora AB
Meda AB
WP Development AB

11-30 employees
Abigo Medical AB
Accuro Immunology AB
Anamar Medical AB
Arexis AB
Biolipox AB
Cell Artis AB
Diamyd
Glycorex
Got-a-gene AB
HemeBiotech A/S (Danish)
InDex Pharmaceutical AB
Kaprilink AB, formerly Pharmalink AB
Medicarb AB
Melacure Therapeutics AB [2]
Neuronova AB
Resistentia Pharmaceuticals AB

1-10 employees
Actar AB
Allosergon AB
Anamar Medical AB
Angiogenetics Sweden AB
Avaris AB
Bacilltech AB
Betagenon AB
Biophausia Support AB
Carlab Läkemedelsforskning AB
Cartela AB
Cortendo AB
Creative Peptides AB
E Holme Utveckling AB
Aspersion AB
Imed
Independent Pharmaceutica AB
Innate Pharmaceuticals AB
Innoventus AB
IscoNova AB
Landegren Gene Technology AB
Metcon Medicin AB
Mitra Medical Technology AB
Multipharma Sweden AB
Nectin AB
New Pharma Research Sweden AB
Oasmia Pharmaceutical AB
Oxy Pharma
Pronexus
Respiratorius AB
Svenska Miljöbolaget SVV AB
Synphora AB
Tremedic International AB
Tripep AB
Umangenomics AB
Vicore Pharma AB

[1] For a few companies on the list, employees are only included for that part of the company's activity which is within the included subject fields.

[2] Companies which disappeared during 2003 or 2004 through bankruptcy, merger, buy-out or departure to another country.

Drug discovery and development

Sales and marketing companies

501-730 employees
Tamro

221-350 employees
Merck Sharp & Dohme Sweden AB
Recip AB

121-220 employees
Abbott Scandiniavia AB
Baxter Medical AB
Bayer AB
Bristol-Myers Squibb
Eli Lilly Sweden AB
Glaxo Wellcome AB
Novartis Sverige AB
Novo Nordisk Scandinavia AB
Sanofi-Synthelabo AB
Schering-Plough AB
Wyeth Lederle Nordiska AB

61-120 employees
Amgen AB
Aventis Pharma AB
Boehringer Ingelheim AB
Glaxosmithkline AB
Janssen-Cilag AB
Leo Pharma AB
Organon AB
Orion Pharma AB
Roche AB
Schering Nordiska AB
Serono Nordic AB

31-60 employees
Alcon Sverige AB
H. Lundbeck AB
Nordic Drugs AB
Nycomed AB
Swedish Orphan
Ucb Pharma AB

11-30 employees
Allergan Norden AB
Almagest Pharma AB
Alpharma AB
Antula Healthcare AB
E. Merck AB
Ferring läkemedel AB
Ferrosan
Fujisawa Scandinavia AB
INO Therapeutics AB
Ipex Medical AB
Ivax Scandinavia AB
Mundipharma AB
Otsuka Pharma Scandinavia AB
Ratiopharm AB
Santenpharma AB
Selena Fournier AB
Solvay
Veter AB
Wilhelm Sonesson AB
Yamanouchi Pharma AB

1-10 employees
Actelion Pharmaceuticals Sverige AB
Arrow Scandinavia AB
Biogen Sweden AB
BiogenIdec Sweden AB
Biolac AB
BMM Pharma AB
BW Pharma AB
Ceva Vetpharma AB
Copyfarm AB
Dentirol AB
Desitin Pharma AB
Enapharm AB
EuroPharma Sverige AB
Hexal AB
Intervet AB
Mayne Pharma (Nordic) AB
Medartuum AB
Nord Vacc Läkemedel AB
Orifarm AB
Paranova Läkemedel AB
Perivita Sverige AB

Drug discovery and development (cont.)

Sales and marketing companies

Pierre Fabre Pharma Norden AB
Radio-Pharm AB
Renapharma AB
Scandinavian Pharmaceuticals-Generics AB
SINCLAIR PHARMA AB
Swed Active Health AB
TKT Europe AB
Vitaflo Scandinavia AB

Drug delivery

31-60 employees
Carmel Pharma AB
Skyepharma AB

11-30 employees
Camurus AB
Galenica AB
Lipocore AB
Microdrug Development AB
NeoPharma Production AB
Orexo AB

1-10 employees
Eurocine AB
Medinvent AB
Ponsus Pharma
SHL Medical AB
Zelmic Technologies AB

Diagnostics

Excluding sales and marketing companies

501-730 employees
Pharmacia Diagnostics AB

31-60 employees
Allergon AB
BioDisk AB
Sangtec Medical AB [2]
Sangtec Molecular Diagnostics AB

11-30 employees
Boule Diagnostics
Canag Diagnostics AB
Cavidi Tech AB
Euro-Diagnostica AB
Idexx Scandinavia AB
IDL Biotech AB
Light Up Technologies AB
Mercodia AB
Svanova Biotech AB
Wieslab AB

1-10 employees
Biopool AB
Biovator AB
Kalbiotech AB
LifeAssays AB
Noster System AB
Tendera AB

[2] Companies which disappeared during 2003 or 2004 through bankruptcy, merger, buy-out or departure to another country.

Diagnostics

Sales and marketing companies

61-120 employees
Roche Diagnostics Scandinavia AB

31-60 employees
Dade Behring AB
DiaSorin AB
DPC Scandinavia AB

11-30 employees
Alk Sverige AB
Medinor AB
Orion Diagnostica AB

1-10 employees
AH diagnostics
ANL-produkter Leif Norin AB
Biomérieux AB
Diagnostica & Analys Service, Friberger
Diagnostics I Falkenberg AB
Diffchamb Sverige AB
Haemochrom Diagnostica AB
Histolab Products AB

Biotech medical technology

Excluding sales and marketing companies

731-1,000 employees
Fresenius Kabi AB

501-730 employees
Octapharma AB

121-220 employees
Q-Med AB

61-120 employees
CMA Microdialysis AB

31-60 employees
Biomet Cementing Technologies AB
Vitrolife Sweden AB

11-30 employees
Artimplant AB
Bohus Biotech AB
Doxa AB
Olerup SSP AB
Swemed Lab International AB

1-10 employees
Biopolymer Products Of Sweden AB
Bone Support
Cellmatrix Ab Nidacon International AB
Ellen AB
Karocell Tissue Engineering AB
Senzime
SSP Primers

Biotech medical technology

Sales and marketing companies

1-10 employees
Coatech Lab AB
ZLB Behring AB

CRO companies

221-350 employees
Quintiles

61-120 employees
Clinical Data Care AB

31-60 employees
Nordic Management Of Clinical Trials (NMCT) AB
Trial Form Support AB

11-30 employees
Clinical Data Care
Covance Clinical And Periapproval Services
NDA Regulatory Service
Parexel Sweden AB
PPD Scandinavia AB
Scandinavian Cri AB
Sedoc Pharmaceutical Medicine
Statisticon AB
Trial Form Support

1-10 employees
Berzelius Clinical Research Center AB
Biocontactor AB
Bioperm AB
Cardiocon AB
Carlander Research Unit AB
Chiltern International AB
Clinical Data Care
Connector Medical AB
CRMC I Helsingborg AB
Eureda
Fyzikon AB
Hylae Clinical Research AB
IBAH heter nu (Omnicare Clinical Research AB)
IRW-Consulting AB
Medicon AB
Medilab Kliniska Laboratorier AB
Monitour AB
Mybac-Vettech
Nordic Medical Advisor
Northern Sweden Clinical Research Institute AB
Orphan Europe Nordic AB
Pharma Consulting Group in Uppsala AB
Pharmanet
Scandinavian Regulatory Services
Slaug Data Management
Smerud Medical Research
Stricent AB
Univalid Compliance & Validation AB
Univalid Scandinavia AB
Visionar Biomedical AB

Drug production

351-500 employees
Apoteket AB (PUBL)

221-350 employees
Cambrex Karlskoga AB

61-120 employees
CCS Clean Chemical Sweden AB
Q Pharma AB

31-60 employees
Bioglan AB
Orifice Medical AB
Unimedic AB

11-30 employees
JE-Medic i Gävle AB
Recip AB
Syntagon AB

1-10 employees
Biokraft Pharma AB
BioTekPro AB
Chemilia AB
Metina AB
Synthelec AB

Medical technology

Excluding sales and marketing companies

731-1,000 employees
Gambro
Siemens-Elema AB

501-730 employees
Astra Tech AB

351-500 employees
Becton Dickinson Infusion Therapy AB
Nobel Biocare
ST. Jude Medical

221-350 employees
Mölnlycke Health Care AB

121-220 employees
Arjo Hospital Equipment AB
Elekta
Elos Medical AB
Getinge AB
HemoCue AB
Radi Medical Systems AB

61-120 employees
Atos Medical AB
GE Medical Systems Sverige AB
Gems Pet Systems AB
Kaltoplast, AB
Sectra Imtec AB

31-60 employees
Ademrac AB
Amersham Health R&D
Arcoma AB
Boule
Breas Medical AB
Calibra AB
Cefar Medical AB
CellaVision AB
Dentatus AB
Entific Medical Systems AB
Getinge Skärhamn AB
Linde Gas Therapeutics, formerly Aga linde Healthcare
Medscand Medical AB
Ortivus AB
Partnertech AB (Medicotechnical business unit)
ProstaLund Operations Aktiebolag
Scanditronix Wellhöfer AB
Uppsala Imanet AB

11-30 employees
Aerocrine AB
Aiolos
Amdent AB
Anmedic AB
Artema Medical AB
Belas AB
Bio-Hospital AB
Bladhs Medical AB
Carmeda AB
Chemotechnique MB Diagnostics AB
ContextVision AB
Cresco ti Systems AB
Gridline AB
Link Sweden AB
Instrumentarium AB
Mentice AB
Miwana AB
Neoventa Medical AB
Nordiska Dental AB
Nuclear Diagnostics AB
Oncolog Medical QA AB
Perimed AB
RaySearch Medical AB
Rti Electronics AB
Sectra Mamea AB
Surgical Science AB
Ultrazonix DNT AB
Unfors Instruments AB

1-10 employees
Actimed Plast AB
Aditus Medical AB
Aditus Science
Alcodia AB
Ardent, AB

Medical technology (cont.)

Excluding sales and marketing companies

Ascendia AB
Ascendia MedTech AB
Aspira Medical AB
Biolight International AB
Bregas AB
Breis & Company AB
Bruce Medical AB
Brånemark
Cad.esthetics AB
Capiflow AB
Clinova Medical Innovation Dr Per Ljungvall AB
CogMed - Cognitive Medical Systems AB
Comair Professor Hans Wiksell AB
Comento AB
Craniofacial Reconstruction Ta AB
Demetech AB
Dental in Sweden AB
Dental Therapeutics AB
Dignitana AB
Dynawell International AB
Entomed AB
ENTpro AB
ErySave
Eskilstuna Instrumentverkstad
Eutech Medical AB
GE Healthcare Information Technologies, DB AB
GHI Global Hemostasis Institute MGR AB
HaeMedic AB
Hemapure AB
Ingenjörsfirman Björn Bergdahl AB
Ingenjörsfirman Björn Bergdahl AB
Integration Diagnostics AB
Integrum AB
J.H. Orsing AB
JCL Technic AB
Jolife AB
Kanmed AB
Krucom AB
Limedic AB
Ljungberg & Krögel
MedAir AB
Medeto Medical Device Technology AB
Medirox
Mediteam Dental AB
Medtentia AB
Melerit AB
Melerit Consulting
MENOX AB
Micromuscle AB
Micropos Medical AB
Millicore AB
Milton Medicinteknik KB
Octapump AB
OptoQ AB
Optovent AB
OrthoRIGHT AB
Otre AB
P & B Research AB
Pharma Systems PS AB
Pharmacure Health Care AB
Phasein AB
Plasma Surgical Svenska AB
ProLight Diagnostics AB
qbTech AB
Quickels Systems AB
Reachin Technologies AB
Rsa Biomedical AB
Sacs Medical Gothenburg AB
Samba Sensors AB
SCIBASE AB
Sendoline AB
Servotek AB
Sjöding Sendoline AB
SMM Medical AB
Somedic
Somnovent AB
Swemac Medical Appliances AB
Swemac Orthopaedics AB
TA Contrast AB
Texon Medical AB
Tilly Medical Products
Tl Elektromedicin AB
Triacon Scientific AB

Medical technology (cont.)

Excluding sales and marketing companies

Turon Med Tech AB
Ursus Konsult AB
Utandningstester I Sverige AB
Weaidu In Europé AB
Xenodevice AB

Medical technology

Sales and marketing companies

351-500 employees
Kronans Droghandel AB
Maquet Critical Care AB

61-120 employees
Becton, Dickinson AB
Dab Dental AB
Liko AB
MediCarrier AB
Medtronic AB
Stille AB
Stryker AB

31-60 employees
B. Braun Medical AB
Boston Scientific Nordic AB
FörbandsmateriaL AB
GN Resound AB
Hartmann - ScandiCare AB
Hudson Rci AB
KaVo Scandinavia AB
Lifco
Nucletron Scandinavia AB
Philips AB
Philips Medicinska System AB
Plandent AB
Sectra Skandinavien AB
Smith & Nephew AB
Tamro Medlab AB
Tyco Healthcare Norden AB
Widex AB

11-30 employees
Alaris Medical Nordic AB
ANATOMICA AB
ArthroCare Europe AB
Bergman & Beving Instrument AB
Bergman & Beving Meditech AB
Cea AB
Codan Triplus AB
Cook Sweden AB
Directa Dental AB
Disetronic Medical Systems AB
Dräger Medical Sverige AB
Edwards Lifesciences Nordic AB
Electra-Box
Forshaga Dentaldepå AB
Forssbergs Dental, AB
Fresenius Medical Care Sverige AB
Germa, AB
Gothia Medical AB
Guidant Sweden AB
Ivoclar Vivadent AB
John Sjöding, AB
Karl Storz Endoskop Sverige AB
Kruuse Svenska AB
Heraeus Kulzer Nordic AB
Leica Microsystems AB

Medical technology (cont.)

Sales and marketing companies

LPS Medical AB
LS Support AB
Mediel AB
Meteko Instrument AB
Newmed AB
Nordenta, AB
Optilas
Scanex Medical Systems AB
Smiths Medical Sverige AB
Steris AB
Storz Endoskop Sverige AB
Straumann AB
Sweden Recycling AB
Svenska Labex AB
Synthes AB
Terumo Sweden AB
Topcon Scandinavia AB
Triolab Nordic AB
Unident AB
W & H Nordic AB
Vingmed Svenska AB
Zimmer Scandinavia AB
Össur Nordic AB

1-10 employees

5 S Pharma AB
Active Care in Sweden AB
Active Care Sverup AB
Ally-Tec AB
Artroline Ab
Autoklaver & Desinfektorer Medical I
Axel Ericsson Medical AB
AxMediTec AB
Bioreagens
B-K Medical AB
Bröderna Berner Handels AB
C. A. Tegnér AB
CardioNord AB
Cemvac System AB
Cenger Scandinavia AB
Centerpulse Sweden AB
Claes Yllo Consulting AB
Cortec Medical AB
Creative Laboratory Instruments Dacke & Cuellar AB
Dameca Svenska AB
Danica Biomedical AB
Dentagon AB
Denthouse AB
DIASPEC, Diagnostikspecialisten i Stockholm AB
Dicamed AB
Dideco Scandinavia AB
DORC Scandinavia AB
DSP Promeduc AB
DVT Dental and Chemical AB
Einar Egnell AB
Ellman Produkter AB
Esshå Elagentur AB
Essmed AB
ev3 Nordic AB
Ferno Norden AB
FRIADENT Scandinavia AB GAMA Dental AB
Gestenco International AB
Haemonetics Scandinavia AB
Handelshuset Medic i Borås AB
Hegu Svenska AB
Heine Scandinavia AB
Henry Eriksson, AB
Håkab Medicinteknik AB
Ils Laboratories AB
Infiniti Medical AB
Instrumenta Diagn. Och Kirurg. AB
IntraMedic AB
J F Instrumentkonsult AB
JE Laserservice AB
Jeneric/Pentron Nordic AB
KCI Medical AB
Kungshusen Medicinska AB
L & B Medical AB
Laerdal Medical AB
Levimed AB
Lifecore Biomedical AB
Lohmann & Rauscher AB
M.A. SERVICE AB
Macopharma Nordic AB
Medcore AB
Medeca Pharma AB
Medela Medical AB

Medical technology (cont.)

Sales and marketing companies

Medexa Diagnostisk Service AB
Medical Market I.N.T. AB
Medical Tech Scandinavia AB
MediCall Scandinavia AB
Medilens AB
Meditech Sverige AB
Mediwest Scandinavia AB
MedNet AB
Medpacs Network AB
Medrad Sweden AB
Medtronic Synectics AB
Microbiotech/se AB
Mizarra Business Management
Möllerström Medical AB
N.C. Nielsen AB
Nordic Med - com AB
OP Operations Instrument AB
Optima Scandinavia AB
ORIOLA AB
Ortopro AB
Preisler Instrument AB
Prevancure Medical Device AB
Prevancure Medical Device AB
Prolab Hospital Equipment AB
ResMed Sweden AB
Röntgenteknik Jeppsson AB
Salubrious AB
Sawbones Europe AB
Scandivet AB
Special Produkt Service SPS AB
SSL Healthcare Sverige AB
STADApharm AB
Svenska Dentorama AB
Sysmex Deutschland Gmbh, Swedish branch
Teknident AB
TG Instrument AB
Thermo Life Sciences AB
Toshscan Sverige AB
Twim Nordic AB
Umedico AB
W L Gore & Associates Scandinavia AB
Vascular Technology I Kungsbacka AB
Vetpoint AB
Viktor Bégat AB
Vitatron Sweden AB
V-tech AB
Zenicor Medical Systems AB

Biotech tools and supplies

Excluding sales and marketing companies

1,301-1,700 employees
GE Healthcare AB (formerly Amersham Biosciences AB)

351-500 employees
Getinge AB

221-350 employees
Pharmadule Emtunga AB

121-220 employees
Biacore AB
Biotage AB (formerly PyroSequencing and Personal Chemistry)

61-120 employees
Affibody AB
Gyros Microlabs AB

31-60 employees
Chematur Engineering AB
Novaseptic AB
Prevas AB

11-30 employees
Alligator Bioscience
Biosensor Applications Sweden AB
Global Genomics AB
Protista Fermentation AB
SIDEC Technology AB
Åmic AB

Biotech tools and supplies

Sales and marketing companies

1-10 employees
AbSorber AB
Alphahelix AB[2]
Attana AB
Belach Bioteknik AB
Beta Sensor
BIOETT AB
BioThema AB
Cellectricon AB
Cellfabriken AB
Chemel AB
Crystal Research AB
CyperGene AB
Datainnovation AB
Decipher Genetics AB
Dynamic Code AB
European Institute of Science
Flux Instruments AB
Genovis AB
Gnothis AB
Ingeneous Technology AB
InNetics AB
Inovata AB
IsoSep AB
John Curling Consulting AB
Layerlab AB
Ludesi AB
Magnetic Biosolutions AB
MedProbe
MIP Technologies AB
Mitrionics AB
ModPro AB
Nanoxis AB
Novaferm Aktiebolag
Omnio Aktiebolag
Percell Biolytica
Peviva AB
PhaGen AB
PhPlate Microplate Techniques AB
Q-SENSE AB
Quiatech AB
Quintessence Research AB
Scandinavian Biotechnology Research Ab
Scangene AB
Scanzyme AB
Senset AB
Sequant AB
Tataa Biocenter AB

121-220 employees
VWR International AB

31-60 employees
Bergman Labora AB
Bio-Rad Laboratories AB
Ninolab AB
Sigma-Aldrich Sweden AB

11-30 employees
Amersham Health AB
Axeb AB
Gothenburgs Termometerfabrik AB
JEOL (Skandinaviska) AB
Kovalent AB
Tecan Nordic AB
Vici Jour Research AB

1-10 employees
Charles River Sverige AB
Dakocytomation Norden AB
GE Medical Systems Sverige AB
Invitrogen AB
Lab Vision AB
Labdesign Boule Nordic AB
Labex Instrument AB
Nordic AMS Biosite AB
Oxoid AB

[2] Companies which disappeared during 2003 or 2004 through bankruptcy, merger, buy-out or departure to another country.

Biotech tools and supplies (cont.)

Sales and marketing companies

Saveen & Werner AB
SDS Biosciences KB
Skandinaviska Genetec AB
Sorbent AB
Svenska Laboratorieförsäljningen AB, LABFAB
Techtum Lab AB

Bioproduction

221-350 employees
Pfizer Health AB

121-220 employees
DSM Anti-Infectives Sweden AB
Ferring AB
Polypeptide Laboratories AB

61-120 employees
Novozymes Biopharma AB
Recip AB

31-60 employees
Kemikalia AB
Medipharm AB
Vira Native AB

11-30 employees
Agrisera AB
Mabtech AB
Scandinavian Gene Synthesis AB

1-10 employees
AstaReal AB
Bactochem AB
Immun System AB
Innovagen AB
Inro Biomedtek AB
Medicago AB
Medisera AB
OVA Production AB

Food biotechnology

11-30 employees
BioGaia AB
Probi AB

1-10 employees
Clas Lönner AB
Essum AB
Indevex
LabRobot Products AB
Lipid Technologies Provider AB
Olligon AB[2]
Triple Crown AB
Wasa Medicals AB

[2] Companies which disappeared during 2003 or 2004 through bankruptcy, merger, buy-out or departure to another country.

Agrobiotechnology

221-350 employees
Svalöf Weibull AB

121-220 employees
Syngenta Seeds AB

11-30 employees
BioAgri AB
Plant science Sverige AB

1-10 employees
BINAB Bio-Innovation AB
Bionema AB
Swetree Technologies AB

Environmental biotechnology

11-30 employees
AnoxKaldnes AB
Pegasus Lab AB

1-10 employees
Alron Chemical AB
EkoTec AB (Ekologisk Teknologi i Skellefteå AB)
Invekta Green AB
Sysav Utveckling
Terramek AB
Thalassa AB

Proportion of employees by subject field and activity category

Activity category	Drug discovery and development	Drug delivery	Diagnostics	Biotech medical technology	CRO companies	Drug production	Medical technology	Biotech tools and supplies	Bioproduction	Agrobiotechnology	Environmental biotechnology	Food biotechnology	No. of employees per activity category	Proportion of employees	No. of companies
Broad R&D (prod.)	34%	17%	28%	26%			16%	43%		90%	30%		**11 050**	27%	7%
Broad R&D (no prod.)		9%						3%		1%			**220**	1%	1%
Narrow R&D (prod.)	1%	43%	9%	2%			2%	3%		3%		72%	**750**	2%	11%
Narrow R&D (no prod.)	1%	1%		1%			1%	2%		6%		4%	**320**	1%	9%
Product development	6%	3%	6%	7%			18%	15%	10%		23%	5%	**3 980**	10%	17%
Consultancy		11%			100%			1%			47%		**870**	2%	8%
Production	38%	16%	32%	60%		100%	30%	17%	90%				**14 990**	36%	8%
Sales & marketing	20%		25%	4%			33%	16%				19%	**8 550**	21%	39%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%	100%
No. of employees per Subject field	**19 600**	**200**	**1230**	**1 850**	**720**	**1 200**	**10 700**	**3 500**	**1 050**	**540**	**60**	**80**	**40 730**		

Sources

This study was based on the databases supplied by the regions (approx. 780 companies) and the database built up within the framework of past VINNOVA reports in this field (VINNOVA Report: VINNOVA Analysis VA 2003:2). This data was then supplemented by drawing on data lists for companies with SNI codes 244, 331, 73103 and 51460 from the Market Manager Partners database. Companies within pharmaceuticals, medical technology and dental products according to the Eniro and the Företagsfakta company's categorisation were verified against the list which had been compiled. Where it concerns companies identified by an SNI code from Eniro or Företagsfakta, only companies with more than two employees were categorised. In total, approx. 1,700 companies were categorised within the framework of this study.

The categorisation of companies was made on the basis of information from the companies' web sites, other information on the Internet, various studies and analyses on companies within the field and telephone conversations with approx. one quarter of the companies included.

Contacts

City of Stockholm	Barbro Berg; Anders Nordborg
Stockholm BioRegion	Maj-Inger Nilsson
UppsalaBio	Rhiannon Sanders, Madeleine Neil
Biotechvalley	Bo Norrman
Region Skåne	Gudmundur Kristjansson
Västra Götalandsregionen	Helena L Nilsson
Business Region Gothenburg	Christer Hedman
Biotech Umeå	Gunnar Pohl
BioMedley	Niklas Paulsson
Swedish Labour Market Board	Ann-Christin Johnreden
VINNOVA	Maria Landgren
VINNOVA	Lennart Stenberg
VINNOVA/Addendi AB	Anna Sandström
Addendi AB	Tage Dolk