Universiteit Utrecht

New drug development strategies: The differences between the initial plans and the final results

Final report

Thomas van Zoest
0423386
Science and Innovation Management

Utrecht University - Graduate School of Geosciences

Supervisors: Prof. Dr. Huub Schellekens
Dr. Ellen Moors

Master thesis – 30 ECTS
January 2010 – August 2010

Index

Note: This report has a database file as attachment. This database shows the extensive pipeline for the six investigated companies in order to answer sub research question 1.2. In this version of the report, the database is included after the annex of the report.

Summary

According to the literature, R&D investments in the pharmaceutical industry do not corresponds equally to the number of developed new drugs. The literature indicates that companies do large acquisitions or merge in order to maintain their positions in the top of the industry and compensate the lack of innovative drugs in their pipeline.

The main goal of the first part of this research was to discover to what extent the pharmaceutical companies are in control over their R&D programmes. This was not investigated until know. A lack of control over their R&D programmes could be a cause of the lack of new drugs in their pipeline. If the companies appeared to have full control over their pipelines, the cause of the problem must be searched somewhere else.
The first main research question investigated the control that large pharmaceutical companies have of their own R&D activities and the drugs and disease areas that are present in their pipeline. Therefore, a research population of six large pharmaceutical companies are investigated by means of archival analysis. The main research question was:
What are the differences between the initial new drug R&D strategies and plans and the new drugs that appeared in the pipeline of large pharmaceutical companies in the period 2000 until 2009?
The conclusion of the first main research question was that none of the six investigated companies was able to realise all its ambitions regarding to new drug development and served disease areas. In other words, the companies did not have full control over their pipelines. However, it appeared that transactions of knowledge and technologies are part of daily routines in for pharmaceutical companies. The border between daily routines to maintain the own competitive position, and attempts to compensate inefficiency and failures at the own R&D department is unknown.

The results of the first part show that a framework to investigate which factor influence the success of new drug R&D programmes was needed. Such a framework was not available in the literature so far. Therefore, the second part of this research investigated which factors influenced the success of the R&D programmes. A conceptual framework, based on the Five Phases model of Tidd (et al, 2001) and the Resource Based view of Barney (1991) was developed. In order to refine the conceptual framework, interviews with very experienced employees at three of the six investigated companies were conducted. The central research question was:
What was the influence of the 'ability to provide resources effectively', 'the ability to implement technology', 'dynamic capabilities', and 'possession of strategic resources' on the success of new drug R&D programmes?
Based on the analysis of the answers of the three conducted interviews it can be stated that each of the factors that are named in the second main research question contribute positively to the success of new drug R&D programmes at the investigated large pharmaceutical companies. However, the analysis of the answers on the interview questions indicate that on a more detailed level, some small refinements in the conceptual framework had to be made. The most important were that speed and managerial skills are decisive for the success of the R&D programme.

The main recommendation to improve this research is to investigate a larger research h population, especially for the second part of the research. Furthermore, future research needs to be done because the loose relation between R&D investments and R&D outcomes is a real problem. Future research needs to investigate the border between transactions of technology and compounds as normal routines and as attempt to compensate the own R&D. If there is more insight in the factors that influence the success of new drug R&D programmes, more patients can be helped.

1.0 Introduction

In the last decades, the pharmaceutical industry increased the research and development (R&D) investments every year. However, according to several studies, the number of annual approved new chemical entities (i.e. NCE: a molecule that is not registered before as potential drug)(GAO, 2006, p.2) did not increase proportional to the investments (DiMasi et al., 2003; GAO, 2006, p.15; Fleming and Ma, 2002; GAO, 2006; MacInnes et al. 1994). These studies showed that the pharmaceutical industry has a quit stable output of NCEs but escalating R&D investments. A lack of innovative drugs coming from the own R&D department appears to be a general trend.

The paradox and main problem is that the investments in R&D increase, but the number of innovative drugs lags behind and remains at the same level (EP Vantage, 2008). Gassmann et al. (2004, p. 2) call this paradox the 'productivity gap'. Schmid and Smith (2004) call it an 'innovation deficit'.

The problem becomes even more complicated because many important (blockbuster) patents are currently expiring, also at leading pharmaceutical companies (Smith, 2008). In other words, at the start of the pipeline, the number of new drug candidates decreases. At the end of the pipeline, the number of patented drugs on the market also decreases. This is a major problem because new drugs are needed to generate revenues and fund the R&D that is needed to discover and develop new drug candidates. When drugs with expiring patents are not compensated by new innovative drugs from their own R&D department, major income losses appear (EP vantage, 2008; Pharma Online, 2008). New drugs refer here to all the drugs for which clinical trials are started. Considering this all, the question raises to what extent pharmaceutical companies are able to control their R&D programmes and develop the new drugs they need.

The lack of own productivity regarding to new drug development is underlined by an other trend that is determined in several studies: mergers and acquisitions. Gambardella (et al. 2001) investigated the top ten of leading European pharmaceutical companies in the world in the period 1989 to 1998. They determined that each of these companies did large acquisitions or merged in order to maintain their positions in the top of the industry and compensate the lack of innovative drugs in their pipeline. In this research, the word 'pipeline' refers to the clinical phases (1, 2 and 3) in the drug development process. A trend of merger, acquisition and licensing as secondary solution to compensate the lack of own new drugs is also detected by other scientists (e.g Edwards, 2008; Graul et al. 2008; Rasmussen, 2002; Surowickie, 2004). These studies depict the new drug R&D programmes of pharmaceutical companies as insufficient and assume that mergers and acquisitions are needed as a compensation for the performance of the own R&D department. This trend of merger and acquisition might be part of the strategy to acquire new drugs for the pipeline. However, there is no literature available that gives insight in whether or not the mergers and acquisitions were projected in advance.

To conclude, there is a lack of insights about the control pharmaceutical companies have over their R&D programmes and whether or not they use merger and acquisitions to compensate the lack of new drugs in their pipelines. Therefore, research needs to be done, the following paragraph defines which problem is investigated in this study.

1.1 Problem definition

The main problem is that the R&D investments in the pharmaceutical industry do not corresponds equally to the number of developed new drugs. The number of new drugs remains quit stable while the investments escalate. As a result, gaps in their pipeline appear, leading to a lack of new products on the market and therefore a lack of revenues. These revenues are needed for future R&D investments. In other words: pharmaceutical companies appear to be trapped in a vicious circle when they are not able to add enough new drugs to their pipeline. Pharmaceutical companies appear to have a lack of control over the results of their own R&D department.
This research focuses on the control that pharmaceutical companies have over their own R&D programme. A new drug R&D programme of a pharmaceutical company is defined here as: all the projects concerning the R&D of new chemical entities and new drugs together. A programme is a collection of projects.
Until now, it is not investigated to what extent pharmaceutical companies are able to control the number and kind of drug that are developed by their own new drug R&D programme. Pharmaceutical companies announce all kind of diseases and diseases areas for which they want to develop new drugs. Furthermore, the companies announce collaborations, merger and acquisitions that will be realised in order to developed the drugs. However, it is never investigated how successful they are. The success of a new drug R&D programme of a large pharmaceutical company is defined here as the extent to which the company is able to realise its strategies and plans regarding to targeted disease and disease areas, as announced in 2000, in its pipeline around the year 2007. This means that the pipelines of the year 2006, 2007 and 2008 will be investigated.
In order to fill this knowledge gap, the aim of the first part of this research is to discover to what extent the pharmaceutical companies are in control over their R&D programmes. A lack of control over their R&D programmes might be a cause of the lack of new drugs in their pipeline. If the companies appear to have full control over their pipelines, the cause of the problem must be searched somewhere else.

The second part of this research focuses on factors that influence the success of the new drug R&D programmes of pharmaceutical companies. Because the extent to which companies have control over their R&D programmes is not investigated yet, a framework to understand the success of the programmes and which factors influence success is not available. The goal of the second part of this research is to develop and build and refine such a framework.
The innovation literature shows four factors that might influence the success of new drug R&D programmes at large pharmaceutical companies: the 'ability to provide resources effectively', 'the ability to implement technology', 'possession of strategic resources', and 'dynamic capabilities' (Tidd, et al, 2001, Barney, 1991). These factors will be used to build a first framework and are further elaborated in the theory section.
In order to compare the theory with practice and refine the first framework, respondents from the companies that are investigated in the first part of this research will be interviewed. The aim of these interviews is to discover what the influence of the factors from the theory is, which are factors is the most important and whether or not there are additional factors that have a significant influence on the success of a R&D programme. The final goal is to develop the framework into a refined model that shows several factors that influence the success of new drug R&D programmes.
The following paragraphs show which research questions are used to investigate the pharmaceutical companies and their control over their R&D programmes.

1.2 Research questions

The goal of this study is to develop a conceptual framework that gives an indication which factors affect the output of the new drug R&D programmes of large pharmaceutical companies. Before the factors that influence the programme can be investigated, the results of the R&D programmes must be clear. Therefore, the first part of this study investigates the relation between the initial strategies, and the results of these strategies of pharmaceutical companies in the end. The first main research question is:

1.0 What are the differences between the initial new drug R&D strategies and plans and the new drugs that appeared in the pipeline of large pharmaceutical companies in the period 2000 until 2009?

The first subquestion aims to investigate what the large pharmaceutical companies wanted to do in the period 2000 until 2009. The answer of the question gives an indication of the strategies and goals, more in particular the aimed new drugs and the targeted disease areas that were announced for the future. Therefore, the targeted disease areas and diseases will be mapped.

1.1 Which disease areas and drugs were aimed to be developed to the R&D strategies and plans that the pharmaceutical companies announced in 2000?

The second subquestion leads to an inventory of the new drugs that passed through the pipeline of the companies between 2007 until 2009.

1.2 Which drugs passed through the pipelines of the large pharmaceutical companies in the period 2007 until 2009?

The third subquestion compares the drugs in the pipeline in the year 2006, 2007 and 2008 with the disease areas and drugs that were announced in 2000 and presents the differences to answer the main research question. The focus on these years will be explained in the demarcation.

1.3 Which of the drugs that entered the pipelines fit within the R&D strategies and plans that the large pharmaceutical companies announced in 2000? Which not?

The main research question for the second part of this research investigates which factors, retrieved from innovation literature, influence the success of the R&D programmes:

2.0 What was the influence of the 'ability to provide resources effectively', 'the ability to implement technology', 'dynamic capabilities', and 'possession of strategic resources' on the success of new drug R&D programmes?

The main research question is divided over four subquestions that investigate the influence of the individual factors in the success of the R&D programme.

2.1 What was the influence of *ability to provide resources effectively* on the realisation of the goals regarding to the disease areas targeted drugs as mentioned in 2000?

2.2 What was the influence of *the ability to implement technology* on the realisation of the goals regarding to the disease areas targeted drugs as mentioned in 2000?

2.3 What was the influence of *possession of strategic resources* on the realisation of the goals regarding to the disease areas targeted drugs as mentioned in 2000?

2.4 What was the influence of *dynamic capabilities* on the realisation of the goals regarding to the disease areas targeted drugs as mentioned in 2000?

The next question aim to refine the model by questioning which other factors, that did not came forward from the innovation theory, had important influence on the realisation of the goals regarding to the disease areas targeted drugs as projected in 2000. The last question investigates what the influence was.

2.5 Which other factors played an important role regarding to the realization of the diseases and disease areas as projected in 2000?
2.6 What was the influence of these factors on the realisation of the goals regarding to the disease areas targeted drugs as mentioned in 2000?

1.3 Demarcation

This study is incorporated in the field of innovation studies, in the domain of pharmaceutical innovations. The field of innovation studies focuses on new products and services and the systems in which they are embedded. Pharmaceutical innovations refer to new drugs and medical equipment.
In this case, the new drugs and R&D programmes of individual companies are investigated. Furthermore, the factors that influence the success of new drug R&D programmes are also investigated per company. Therefore, the research is conducted at company level. New drugs refer in this study to all the drugs for which clinical trials are started. These drugs might come from the own R&D department but also from other companies. The research population is formed by large pharmaceutical companies because the literature indicates that large companies have the biggest problems with keeping their pipelines in good condition (Mitchell, 2009; Surowickie, 2004). For this research, six companies that have a leading in the global pharmaceutical industry for many years (c.f. Gambardella et al. 2001; Gassmann et al. 2004, p. 11) are selected: Besides the global position of the companies, the research population is determined by means of the amount of corporate information that is public available and the time that is available for this research. These three factors led to the following research population: Amgen, AstraZeneca, Genentech, GSK, Roche and Schering-Plough. There is no geographical demarcation because the selected pharmaceutical companies are multinationals.
The time scope of this research is the period 2000 until 2009. This time span is chosen because the average development time from pre-clinical phases to phase 3 clinical trials takes around 6,5 to 7 years (c.f. GAO, 2006, p.8; Gassmann et al., 2004, p. 4). It is assumed that companies who announce to develop drugs in a certain disease area, have already some promising drug candidates. Therefore, the R&D strategies and plans that are presented in 2000 are assumed to lead to new drugs that must be visible in the pipeline around the year 2008 (i.e. 2007 until 2009). This all is investigated for the first research question.

The second main question needs innovation theory to build a framework to understand the success of the R&D programmes and which factors influence the success of it. The five phases model of Tidd (et al., 2001, Ch. 9) is chosen because it is designed to analyse the innovation trajectories. This is needed in order to get an overview of what competences and resources are important during the development of new drugs. This model will be combined with the resource based view (RBV)(Barney, 1991; Poole et al., 2004, pp. 109-112). The resource based view is chosen because it can explain the activities and behaviour of companies by means of their resources. This is important because the activities and behaviour of companies determine which of the goals that are announced in the strategy will be achieved.
Beside the five phases model and the Resource Based View, there will be special attention on intellectual property rights (IPR). As mentioned in the introduction, patents are essential to secure revenues from drug on the market. These are needed in order to be able to keep investing in R&D and new drug development.

The following paragraph elaborates about the scientific and social relevance of this research.

1.4 Relevance

1.4.1 Scientific relevance

The field of innovation studies pays attention to new product development strategies of companies and how the development trajectory can be managed. Strategy is important for the development and competitive position of a company. The literature incorporates several examples of studies about the strategies of pharmaceutical companies (e.g. Attridge, 2007; Drews, 2003; Khilji et al., 2006; Rasmussen, 2002; Schmid and Smith, 2004; Saxena, 2006). These studies are mainly about the business models that are used and how these models develop. Other studies compared the performance of the pharmaceutical industry in Europe with the US and Japan (e.g. Gambardella et al., 2001; MacInnes et al. 1994). The R&D productivity and efficiency of pharmaceutical companies are also investigated. Brown and Svenson (1998) investigated how R&D productivity should be measured. Cardinal (2001) focussed on the influence of organizational controls on the R&D activities of R&D professionals. Cooper (1984) investigated the relation between the type of strategy that they choose and the performance they achieve and Hashimoto and Haneda (2008) investigated the R&D efficiency of the Japanese pharmaceutical industry. These studies investigated how productive and efficient the R&D was in number of NCEs and investments.
Despite all these studies, is a lack of knowledge about the factors that influence the success of new drug R&D programme at large pharmaceutical companies. The current studies do not pay attention on the ability of companies to develop the drugs they aim to develop according to their strategies and the factors that influence this ability. Furthermore, although the innovation deficit is a big problem for the pharmaceutical industry, a conceptual framework that helps to understand which factors influence the output of R&D programmes at large pharmaceutical companies is lacking. The aim of this study is to develop such a framework.

1.4.2 Societal relevance

As mentioned in the introduction, the billion dollar R&D budget of pharmaceutical companies increased disproportional with the outcomes of the research. More insight in the possible causes of this phenomenon is needed for the pharmaceutical companies and society in order to improve the revenues of the investments.
More insights in the factors that influence the output and forthcoming success of the new drug R&D programmes may enable pharmaceutical companies to better control and steer the development of new drugs. As a result, the companies might be able to achieve a more sustainable flow of new drugs into their pipelines and be able to innovate more focussed and more efficient. Furthermore, they might be able to take more social responsibility by responding more accurately to unmet medical needs. An increase of new drugs entering the market will lead to a positive effect on the availability of treatments and the health of many patients.

2.0 Theory

The first main research question investigates to what extent the objectives for new drug development that are set in advance, correspond with the final output of R&D projects.
The second main research question investigates which factors are important for success of new drug R&D programmes in large pharmaceutical companies. A new drug R&D programme is considered here as successful if the developed drugs and the disease areas where these drugs are into correspond to the drugs and disease areas that are mentioned in the initial strategy. In this study, the initial strategy refers to the strategy as mentioned in the year 2000. Furthermore, only the drugs that were in the pipeline in the year 2006, 2007 and 2008 are taken into account.
For the second main research question, a conceptual framework is developed. Innovation theory that forms the basis of this model is presented in the following paragraphs.
First, the discussion about the linear relation between R&D input (R&D investments) and R&D output (new drugs) are elaborated in the first paragraph of this section. This shows that an other model that illustrates the relation R&D input and output is needed.
After this discussion a conceptual framework, based on the five phases model and the resource based view is described. The hypotheses for the relations in this framework are also described. This model shows that success of a new drug R&D programme depends on four main factors and is presented after this theory section.

2.1 The innovation deficit and the linear model

Several studies report that the number of NCEs is disproportional to the R&D investments (EP Vantage, 2008; GAO, 2006, p.15; Gassmann et al. 2004, p. 2; Schmid and Smith 2004; Fleming and Ma, 2002; MacInnes et al. 1994). The assumption for this statement is that the R&D output should increase if the R&D input increases. This implies that these scientists assume that the pharmaceutical industry functions according to a 'linear innovation model'. The following figure illustrates this model.

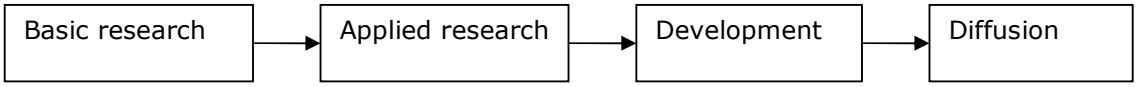

Figure 1: The linear innovation model (based on: Godin, 2005; Kline & Rosenberg, 1986)

The main assumption of this model is that technological development arises more or less automatically as long as investments in scientific research and R&D are on a sufficient level (Boschma et al. 2002, p.150). Science and technology lead to a continuous stream of inventions and innovations. Basic research leads to applied research, applied research to development and development to marketing and diffusion (Kline & Rosenberg, 1986). The stages follow each other automatically. As a result, more R&D input must lead to more R&D output. According to the linear model, the tremendous increase in R&D investments of the last decades should have led to a corresponding tremendous increase in NCEs, but the number of NCEs remained quit stable (e.g. GAO, 2006; NIHCM, 2002).

There are several scientists who cast doubt on the innovation deficit. They argue that the linear model is not a good representation of reality (e.g. Edquist & Hommen, 1999; Lundvall, 1992; Kline & Rosenberg, 1986). The main objection is that the various product development phases can change and the elements in the innovation system may have influence on each other. The linear model has no feedback or feedforward loops. These loops are essential for learning and interactions which lead to continuous change and development of the phases in the innovation trajectories. Therefore, the assumption that the innovation process is linear might be not right. In that case, it might not be expected that additional R&D investments automatically lead to more drugs in the pipeline.
Second main point of discussion is that only NCEs are taken into account as R&D output to measure R&D output (c.f. Frank, 2003; Schmid & Smith, 2004). The use of NCEs as an

indicator for the innovativity of the pharmaceutical industry (e.g DiMasi et al., 2003; MacInnes et al., 2003) is under discussion because NCEs are only a small part of the total number of new drug applications. According to numbers of the FDA from the period 1989-2000, only 35 percent of the new drug applications were drugs with a new active ingredient (NIHCM, 2002, p.9). So, the total number of new drug applications is larger than these studies based on NCEs present.
However, the objection about the use of NCE's as an indicator doesn't matter because the growth in the number of new drug approvals is still not in proportion with the R&D expenditures if all new drugs are taken into account. The Accountability Office of the US government (GAO) analysed all the new drugs applications at the FDA in the period 1993 until 2004 and came to the conclusion that the R&D investments in the pharmaceutical industry increased with 147 percent (from US Dollar 15,7 billion to US Dollar 38,8 billion per year), but the number of new drug applications with only 38 percent (from 74 to 102 per year) (GAO, 2006, p.15). An other study, presented by Fleming and Ma (2002) confirms that even if all the new drug applications at the FDA are taken into account, the R&D productivity of the pharmaceutical industry declined in the period 1991 to 2000 with 25 percent. Drews (2003) investigated the total number of submissions to the FDA and the EMEA as well as only the number of NCEs. His conclusions confirm an overall decline in R&D productivity in the pharmaceutical industry.
All in all, the linear model appears not to be a good representation of the innovation trajectory because it leaves no room for change and interaction between the several phases. Furthermore, the assumption by means of the linear model that an increase of R&D input (investment) leads to a proportional increase in R&D output appears to be wrong. Above that, there is an innovation deficit.

2.2 A new conceptual framework is needed

Although the innovation deficit is a big problem for the pharmaceutical industry, a conceptual framework that helps to understand which factors influence the output of R&D programmes at large pharmaceutical companies is lacking. This research aims to develop a model that give more insight in which factors are important for a successful R&D programme.
Non-linear models that represent the innovation trajectory are available (c.f. Kline and Rosenberg, 1986; Tidd et al., 2001). In this study, the five phases model from Tidd (et al., 2001) will be used. The five phases describe the total innovation trajectory in a company. The innovation trajectory includes two phases where the new drug R&D projects take place (phase 3 and 4). These two phases are important to understand which resources are important for successful new drug R&D programmes.
The model of Tidd gives and overview of what happens in an innovation trajectory. An other model, the resource based view of Barney (1991) focuses on what is needed during an innovation trajectory. The resource based view defines the 'assets, capabilities, organizational processes, company attributes, information and knowledge' that are used during new drug R&D projects as 'resources' (Barney, 1991). The resource based view (RBV) explains what role resources play and why they are important for successful new drug R&D programmes. The RBV also explains why resources should be protected. Intellectual property rights (IPR) are the protection mechanism that is used the most in the pharmaceutical industry. The importance of IPR for the success of new drug R&D programmes will be elaborated after the resource based view.
Together the five phases model, RBV and IPR will be used to develop a conceptual framework to explain the success of new drug R&D programmes in pharmaceutical companies. This framework and the relations that will be investigated are elaborated in the following paragraphs. After these paragraphs, the framework itself and the operationalisation of the relations will be presented.

2.3 The five phases model of Tidd

Tidd (et al., 2001, chapter 9) developed a model for the management of internal new product development processes. The model divides the innovation process in five phases and describes the resources and competences that are needed in every phase. Although the five phases model appears linear, this is not the case because it has feedback and learning loops between the phases. The five phases will be described here, based on chapter nine of Tidd (et al., 2001).

Phase 1 – Enabling scanning
The main activities in this phase for pharmaceutical companies are to define the boundaries of the markets in which they operate and picking up signals about possible inputs for the innovation process. Furthermore, market forecasting is needed to understand the possible future dynamics of new markets and where potential markets may arise. Beside market forecasting, technology forecasting is needed to explore technological futures and developments. Therefore, participating in a network is also important. The more and divers these contacts a company has, the better. Furthermore, one should continuously interact with users in order to obtain information about their needs. These needs and perspectives should be communicated through the whole company. A contact is here defined as any interaction with an other company or institution that leads to a drug in the pipeline that is not entirely developed by the own R&D department (i.e. license agreement, acquisition, collaboration/ partnership).

Phase 2 – Enabling strategy making
In the first phase, a company has collected all kind of market intelligence about the markets where they want to operate in. This second phase should be used to determine what they can do on this market. In other words, a strategy has to be developed. The development of a strategy is a combination of three steps: First, an analysis of the possible options. Second, choosing between the options where resources will be allocated to. Third, planning of how to make the innovation happen. After these steps, one should develop a strategic concept. The perspectives of different people should be collected to evaluate the strategic concept. Furthermore, it is important that experts in the field of regulation are consulted. The main goal of this phase is that only promising projects are continued and other projects are stopped.

Phase 3 – Enabling resource provision
This third phase is dedicated to combining new and existing knowledge (available within and outside the company) in order to realise the ideas that passed the second phase and create a solution for the "problem" of innovation. The problem solving process includes both generation of technological knowledge (via R&D conducted within and outside the organisation) and technology transfer (between internal sources or from external sources). In other words, this phase is where the new drug R&D projects start and all the needed resources, especially from outside the company, are assembled.
A company should posses a number of organizational routines in order to realise effective management: a clear strategic direction; "buy-in" to that direction; effective communication and integration of the efforts across different groups. Furthermore, a company must have the capabilities to find, select and transfer technology from outside the company inside the company. Therefore, the following resources are crucial:
The ability to build and maintain a network of technology sources, resulting in more choice and less suboptimal choices when searching certain technology; to select technology in a way that leads to a good match between internal demand and external offers; to negotiate in order to ensure that not only hardware is transferred but also the surrounding knowledge; to implement the technology and ensure that the project is efficiently managed; to learn and integrate the transferred parts into the routines of the company. These resources enable a company to be an "extended firm", that is, "a company that does not have all the technologies in-house but has a network where he

can obtain it and he knows how to implement it" (Tidd et al, 2001, p.251). The network contacts can be seen as 'extensions' of the company. If a company has good abilities to access and make effective use of technological knowledge from these extensions, it has a good "absorptive capacity". The key management task is to ensure a good match between the selected sources and resources and the absorptive capacity of the company.

Phase 4 – Enabling implementation
In this phase, one has to decide about continuing or stopping R&D projects. Therefore, the following resources are essential: systematically screening and monitoring of continued projects by means of progression frameworks; simultaneous working in order to realise time savings, shorter product development cycles and increases first-to-market opportunities; and clear communication. In other words, the central topic in this phase is efficient management of the innovation project itself.

Phase 5 – Applying the approach to process innovation
The fifth phase is used to complete and review the new drug R&D programme in order to learn. The main learning points to optimise the process of innovation in the future should be implemented in order to increase the efficiency and the innovation capability in the future.

To wind up, the model of Tidd presents and describes five essential phases that embody a complete innovation trajectory. The actual new drug R&D programme is covered by phase 3 and 4. These phases are the phases where the R&D budgets are spent, resources are acquired and allocated, drugs are developed and tested and decisions about continuing or stopping R&D projects are made. Phase 3 and 4 describe which resources and abilities a company must have in order to conduct a new drug R&D programme successfully. Possession of these resources and ability is expected to have a positive effect on the success of the programme. Therefore, the conceptual framework shows both phase 3 and phase 4 from the model of Tidd in a positive relation with the success of new drug R&D programmes. In other words:

- The first hypothesis in the conceptual framework is that the ability to provide resources effectively (i.e. phase 3 of Tidd and all the factors it incorporates) has a positive influence on the success of the new drug R&D programme.

- The second hypothesis in the conceptual framework is that the ability to implement technology (i.e. phase 4 of Tidd and all the factors it incorporates) has a positive influence on the success of the new drug R&D programme.

Despite the descriptions of which resources are needed, the five phases model of Tidd (et al. 2001) does not describe *why* resources are important as a basis for the strategy, competitive position and drug development activities. Therefore, a theory to explain the importance of resources is needed. The resource based view (RBV)(Barney, 1991) offers an explanation for the importance of resources for the own drug development projects and how resources are used by companies to compete with other organisations. The RBV is described in the following paragraphs.

2.4 The resource based view (RBV)

The resource based view describes companies as bundles of resources. Resources of a company can be defined as "all assets, capabilities, organizational processes, company attributes, information, knowledge etc." (Barney, 1991). The RBV assumes that resources are heterogeneous. Resources lead to sustainable competitive advantage if they are valuable, rare, limited mobile, imperfectly imitable or strategically unique with no substitutes. The resource based view defines resources as valuable if they enable a company to increase its efficiency and effectiveness, and rare if they allow a company to implement a strategy that can not be simultaneously implemented by other companies.

Strategic resources enable a company to project and develop unique products. These are needed in order to obtain competitive advantage and build a strong competitive position.
Barney (1991) pays special attention to the implications of environmental change for the resources who embody the competitive advantage of a company. Environmental change and turbulence cause erosion of competitive advantage because it changes the value of strategic resources randomly (Barney, 1991). As a result, some (strategic) resources become valuable, others worthless. Companies may have to adapt themselves to the changing environment and regenerate and develop their resource base continuously in order to maintain competitive. Therefore, 'dynamic capabilities' are essential. A company has dynamic capabilities if it demonstrates "timely responsiveness and rapid product innovation, coupled with the management capability to effectively co-ordinate and redeploy internal and external competencies" (Tidd et al., 2001, p. 269). These capabilities form a major source of competitive advantage. Tidd (et al., 2001) also underline the importance of dynamic capabilities in the fifth phase of their model.
Companies also have to find a balance between the exploitation of existing resources, and the development of new ones. Creation of competences and integrating them into routines might be the most strategic capabilities of a company. Companies need to keep the own resource base in a good condition and prevent erosion of the strategic resource base. This base is essential to be able to project and develop the unique new drugs of their R&D programme and to stay ahead of their competitors.
To wind up, the resource based view underline the importance of dynamic capabilities and their positive influence on the realisation of new drug R&D programmes. Therefore, the third hypothesis in the conceptual framework is that:

- Dynamic capabilities have a positive influence on the success of the new drug R&D programme.

2.5 Intellectual property rights and protection of strategic resources

The resource based view states that a company retrieves its competitive advantages from resources that valuable, rare, imperfectly imitable or strategically unique with no substitutes. Especially resources that are a result of internal learning processes and routines that are specific for a company can resist imitation and therefore lead to strategic advantage. A company can distinct itself from other companies when it is able to use its own unique resources effectively. The more strategic valuable resources a company has, the more possibilities it will have to project unique drugs, develop unique drugs with a minimum of competition (ahead of competitors), and realise a successful R&D programme. In order to protect their resources, pharmaceutical companies must be able to, and will, isolate their strategic resources in order to prolong the competitive advantage that the resources give and to avoid that other companies imitate their activities and products (Poole and Van de Ven, 2000, p.112).
Patents are more important for the pharmaceutical industry as an isolating mechanism to protect benefits from innovation than for other (high-tech) industries (Grabowski, 2002). Each promising new drug candidate is patented to avoid imitation. This gives pharmaceutical companies time to earn back their investments of hundreds of millions dollars (DiMasi et al., 2003; Levin et al. 1987; Cohen et al. 2000; Grabowski, 2002). Successful drugs have to generate revenues to cover the costs all the R&D projects that were not successful and to finance future R&D programmes (DiMasi et al., 2003; Grabowski, 2002; Poole et al., 2004, p.112). This must be a continuous cycle, the revenues are needed to re-invest in new drug development (Saxena, 2006). As soon as a patent expires, the sales of an 'original' drug usually drops dramatically and market share is taken by the 'generic' version (Buurma et al., 2001, p. 53). In other words, patents inhibit erosion of the competitive advantage the resources give. The competitive position of pharmaceutical companies would quickly erode if patents were absent .
An other reason to use patents is that they are used as a basis for collaboration and license agreements with other companies (Crucell, 2009; Edwards, 2008; Galapagos, 2009; Rasmussen, 2002). Companies may even buy entire pipelines or companies in

order to obtain patented blockbuster drugs and the forthcoming revenues (Rasmussen, 2002; Singer, 2009).
The key understanding in the influence of patents is that they make resources exclusive and therefore that the possession of patents is an indication for the possession of strategic resources. Furthermore, strategic resources are essential for the competitive position of a company and the ability of a company to develop new and unique products. Therefore, the fourth hypothesis in the conceptual framework is that:

- Possession of strategic resources has a positive influence on the success of the new drug R&D programme.

The conceptual framework shows which four main factors, retrieved from the resource based view and the model of Tidd (et. Al., 2003), are expected to be important for the success of a new drug R&D programme. This framework is shown in the following section. After the framework, a more detailed overview of the four main factors and how they are investigated in the interview is given.

3.0 Conceptual framework

The output of a new drug R&D programme determines whether or not a programme is successful. A new drug R&D programme is successful if the developed drugs and the disease areas where these drugs are into correspond the drugs or disease areas that are mentioned in the initial strategy. Which drugs were aimed to be developed and which drugs were developed in the end is investigated by the first main research question.
The second main research question investigates which factors are important for a successful new drug R&D programme. If the output corresponds with the initial strategy, the programme was successful. Based on the theory, the following factors are expected to have a positive influence on the success of the programmes: The ability to provide resources effectively (phase 3 of Tidd); the ability to implement technology (phase 4 of Tidd); Dynamic capabilities; the possession of strategic resources.

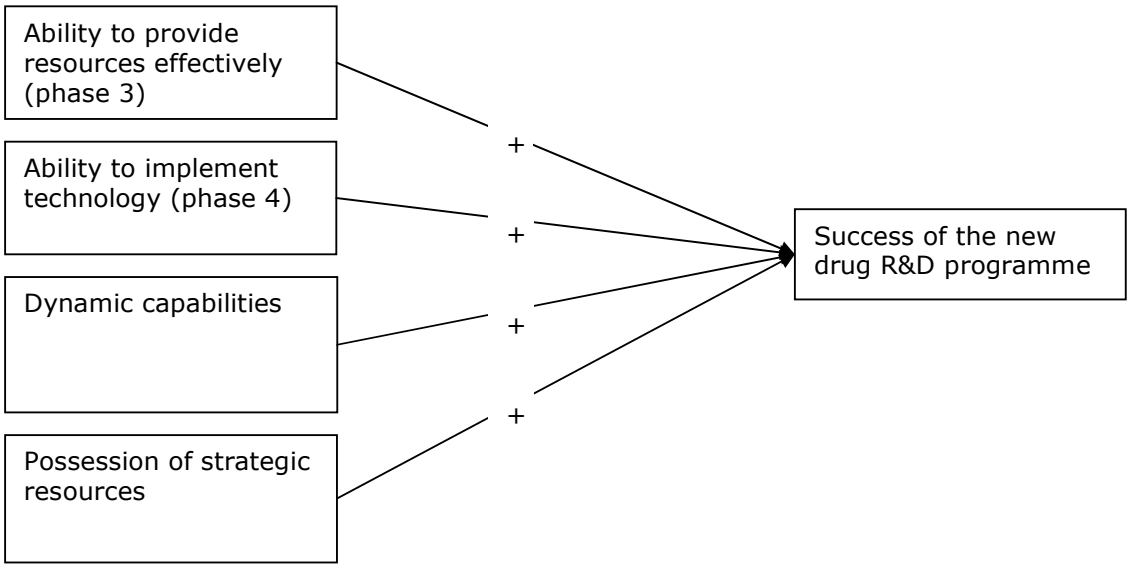

Figure 2: Conceptual framework

The figure above shows the four factors and their influence of the success of new drug R&D programmes. It is expected that if a factor is possessed or well developed by a company, the factor will have a positive influence on the success of the new drug R&D programme. This is illustrated with the plus sign.

The following operationalisation section gives a more detailed overview of the four main factors and formulates the questions that are used in the interview. After the operationalisation section and the methodology, the results on for the first main research question are presented first. The result of the first part are followed by the outcomes of the interviews and the answer on the second main research question. After the results of part two, a refined model is presented.

4.0 Operationalisation

The following paragraphs describe the independent and dependent variables as presented in the conceptual framework. For each variable, a more detailed description and operationalisation, and interview questions are presented.

4.1 Dependant variable - success of new drug R&D programmes

The success of the R&D programme of the large pharmaceutical companies is determined by comparing the new drugs and disease areas in the pipeline around the year 2007 with the drugs and disease areas that were projected in 2000. The pipelines include both drugs from the own R&D department and drugs from outside the company (due to licensing, mergers or acquisitions). New drugs are all the drugs for which clinical trials are started. The pipeline refers to the clinical phases (1, 2 and 3) in the drug development process. It is important that projected drug and not projected drugs (both from the own R&D department and from outside the company) are discerned because it is used to show how well pharmaceutical companies can steer and control their R&D and how successful their R&D programme is. The more unprojected drugs and disease areas, the less control a company has over its own R&D.

The pipelines of the six large pharmaceutical companies are unravelled and investigated to determine by means of the definition of successful R&D programmes how successful the R&D programme of the companies were. The results of this first part of this study are shown in the results for the first main research question.
For the second part of this research, questions about the influence of theoretical factors on the success of new drug R&D programmes are asked to answer the second main research question. Therefore, the a new drug R&D programme is defined as successful if the *developed drugs* and the *disease areas where these drugs are into* correspond the drugs or disease areas that are mentioned in the initial strategy. In other words, the success of a new drug R&D programme consists out of two dimensions: the developed drugs, and the disease areas where these drugs are into.
The questions in the interview will question the influence of the independent variables on the developed drugs and the disease areas. The meaning of these concepts is as follows:
The developed drugs include the following variables: all the drugs from the own R&D departments, but also all the drugs that are developed in collaboration with other companies or organisation; drugs that are acquired; and drugs that are licensed-in. The source of the drugs (own R&D, license or collaboration) in the pipeline are used as indicators for these variables.
The disease areas include the disease areas as mentioned in the pipeline in the year 2006, 2007 and 2008 as variables. The disease areas as mentioned in the annual reports of the corresponding years are used as an indicator for the disease areas for each drug.

4.2 Independent variables

The conceptual framework shows four independent variables: The ability to provide resources effectively (phase 3 of Tidd); the ability to implement technology (phase 4 of Tidd); Dynamic capabilities; and the possession of strategic resources. The following paragraphs describe these variables more detailed and how these variables are investigated. At the end of each of the variables, the indicators and questions that will be used in the interview are presented.

4.2.1 The ability to provide resources effectively

According to Tidd (et al., 2001, p. 250: 251), technology develops rapidly nowadays. As a result, a company is not able to develop all (potentially promising and useful) technologies on its own. Furthermore, interesting technologies might be developed by other companies. Above that, the own R&D budget and capacities are limited. Therefore, Tidd states, more and more companies may become, or have to become an "extended company". An extended company is defined as: "one in which it is not necessary to have all the technological resources in-house but rather one in which the firm knows how, where and when to obtain them from external and complementary sources" (Tidd et al., 2001, p. 251). The extreme of an extended company is a virtual company. To be an extended firm and transfer the technology and resources it needs for its new drug R&D programme, a company should have developed five abilities. These are shortly elaborated here:

The ability to provide resources effectively refers here to the competences that a company should posses and use in order to successfully exploit its network by obtaining technology from outside the company. The dimensions of this concept are the following abilities: to build and maintain a network of technology sources; to select technologies; to transfer technology; and to implement the technology.

1. *The ability to build and maintain a network of technology sources*

A network of technology sources must provide both a wide range of choice of technology and a wide range of availability of technology. These conditions are essential to enable a company to choose the optimal technology and not a second-best technology. A second-best technology may harm new product development (process) because the technology does not fulfil the internal needs entirely (Tidd et al., 2001, p. 250). This may lead to second-best products.
The two indicators that are used to investigate this ability are:

- The ability to build a network of contacts who posses technologies that might be useful for the own company
- The ability to maintain a network of contacts who posses technologies

The influence of this ability on the on the diseases and disease areas in the pipeline is investigated by means of the following questions:

A. What was the influence of a network with contacts who posses technologies that might be useful for your company on the diseases and disease areas in the pipeline?
B. What did maintenance of this network of contacts mean for the diseases and disease areas in the pipeline of your company?

2. *The ability to select*

The second ability is the ability to select technology. Once a company has many contacts and indeed a wide range of choice and a wide range of availability, the proper technology must be chosen. Demand articulation is needed in order to ensure that the buy-decision is done by a well informed person. Buyers have to know exactly know what the situation is where the technology is needed, what the problem is, and what kind of technology is desired. If they do not know this, the buyers may buy an inappropriate technology for

the project (Tidd et al., 2001, p. 250). Therefore, a good fit between internal needs and external offers is needed to be able to select.

The ability to select technology is investigated by means of the following indicators:
- a wide range of technology at other companies to choose
- a wide range of technology available at other companies
- the ability to manage a good fit between internal demands and external offers regarding to technology

The indicators are investigated by means of the following questions:
C. What did having a wide range of choice in technology from the contacts in your network mean for the diseases and disease areas your company targeted?
D. What did the availability of technology at the contacts in your network mean for the diseases and disease areas your company targeted?
E. How did a good fit between internal demands and external offers regarding to technology influence the ability to develop the projected disease and disease areas?

3. To negotiate

The ability to negotiate is important when technology is transferred from outside to inside the company. It is important that the receiving company negotiates that both the tangible and the intangible parts of the technology are transferred. This means that not only the hardware or a license are transferred, but also the surrounding knowledge and experience (Tidd et al., 2001).

The indicator for this ability is presented by the second sentence:
- The ability to negotiate that intangible parts of the technology are included when new technology is transferred from outside the company.

The next question determines the influence of this indicator:
F. What was the influence of the competence to negotiate that intangible parts of the technology are included when new technology is transferred from outside the company on the diseases and disease areas that could be developed?

4. To implement

The aim of this ability is to ensure that the process of technology transfer is effectively managed (Tidd et al., 2001, p.250).

The indicator that describes this ability can be derived one on one. The influence of the ability to implement will be measured by means the ability to manage technology transfer efficiently.

The question that investigates the influence of the ability to implement is as follows:
G. What was the influence of the ability to manage technology transfer efficiently on the realisation of the projected diseases and disease areas in the pipeline?

5. To learn

This fifth ability a company should have, is the ability ensure that once the technology is transferred, the internalization and development of the technology takes place (Tidd et al., 2001, p. 250). The technology should become part of the standard competences and routines of the company and may not be unused after it is acquired. Furthermore, the technology should be further developed.

The ability to learn is incorporated in the following indicators:
- the ability to internalize technology from outside the company efficiently
- the ability to develop technology from outside the company further

The indicators will be questioned as follows:

H. What was the influence of the ability to internalize technology from outside the company efficiently on the realisation of the announced diseases and disease areas in the pipeline?
I. Which role played the ability to develop technology from outside the company further during the realisation of the announced diseases and disease areas in the pipeline?

4.2.2 The ability to implement technology

The fourth phase is the phase were all the required resources are already available and the development of the new drugs starts. The fourth phase focuses on the organisation of the R&D projects, how these should be managed and organised.
Therefore, the ability to implement technology refers here to the competences to manage and structure new drug R&D programmes. This concept has several dimensions that are considered as important by (Tidd et al. 2001): Learning before doing; working with a stage-gate model; team working; and appropriate project structures. These are elaborated here:

Learning before doing
Learning before doing means that one has to anticipate on future problems that might occur during the production and when the product is on the market must be prevented by adapting the design of the product before further development takes place (Tidd et al., 2001, p. 256). The anticipating actions must be based on feedback from consulted producers, sellers, patients, doctors et cetera. The aim of learning before doing is to make product development cycles shorter, save time and save costs. However, a drug is not a regular product that can easily be changed. The properties of the working compound limit the possibilities to change the product (e.g. the way of production, scaling up, pharmacokinetics, and administration). The adaptations that can be done by means of the feedback might be limited. Nevertheless, good interaction and feedback between involved parties is needed to prevent problems during the further development and marketing of the drug.

Learning before doing is investigated by means of the following indicator:

- consulting experts for feedback about new drugs before manufacturing started

The influence of learning before doing is questioned as follows:

J. Did your company consult experts for feedback about new drugs before manufacturing started? (This question will be asked first).
K. What were the consequences of the feedback from these experts for the disease areas and targeted disease in the pipeline?

Stage-gate model
Tidd et al (2001) state that companies should manage new drug development processes by means of a stage-gate model: One has to cut the process into several stages and set up targets and criteria for each stage (Tidd et al., 2001, p. 258). At the end of each stage, there is a gate. If all the criteria are passed, one may go through the gate to the next stage and continue the project. If the criteria are not passed, one has to decide to stop the project. The aim of the stage-gate model is to structure new drug R&D projects and clarify the goals that must be achieved to make the project a success.

Working with the stage-gate model is investigated by means of the following indicators:

- the company cuts new drug development projects in parts with clear goals and criteria that must be achieved
- the company makes *go* or *no-go* decisions for the whole project at the end of each part, based on the achievements regarding to the goals and criteria

These indicators are investigated by means of the following questions:

L. Did your company cut new drug development projects in parts with clear goals and criteria that must be achieved? (This question will be asked first.)
M. What was the influence of cutting the projects into several parts on the success of the new drug development projects in your company?
N. What was the influence of making hard go no-go decisions after each part of the project on the realisation of the goals regarding to the projected drugs and disease areas in the pipeline?

Team working
During a drug development process, the people that are involved in the new drug development projects have to work together as a team. It is important that representatives from the different involved disciplines interact with each other and talk about the problems and conflicts they have. Together, they have to solve these problems and conflicts in order to continue the project smoothly (Tidd et al., 2003, p. 258).

Team working is questioned by means of the following indicator:
- Active interaction about problems and conflicts that come forward during the project.

This is questioned as follows:
O. What was the role of active interaction between people and different disciplines about problems and conflicts that appeared during new drug development projects?

Appropriate project structures
Tidd (et al. 2001, p. 261) underline that not every project is the same. Every project needs a specific type of managers and management structure. These two correlate with the success of projects. It is important that people who have the skills to search and solve problems are among the project members. The managers must have a deep understanding of the requirements during the project. This is needed in order to adapt the project to particular situations and bring the project successfully to an end.

Appropriate project structures are indicated by means of the following indicators:
- project managers have deep understanding of the requirements during the project
- project managers are able to adapt the project to changing situations when needed

The following questions investigate these indicators further:
P. What was the influence of project managers with deep understanding of the requirements during new drug development projects on the success of the R&D programme?
Q. What did it mean for the success of new drug development projects to have manager who were able to adapt the project to changing situation when needed?

4.2.3 Dynamic capabilities
The resource based view and the model of Tidd state that the competitive environment of a company is continuously changing. In order to remain competitive, a company must be able to anticipate quickly on the changing environment and develop practical innovations rapidly (Barney, 1991; Tidd et al., 2001). Therefore, "effective coordination and redeployment of internal and external competences (i.e. dynamic capabilities)" is needed (Tidd et al., 2001, p. 269).
The pharmaceutical industry has long product development trajectories. Nevertheless, situations may change quickly, for example when a drug fails to pass a clinical trial. When a drug development project is terminated, many resources can, and must be redeployed. Furthermore, competing companies may develop new drugs for the same

disease (area) and put time pressure on the projects in order to be first on the market. Forthcoming patents may force other companies to find an other solution.
A company with good dynamic capabilities is able to react quickly on occurring situations and react more sufficient and faster than other companies. As a result, the company stays ahead of competitors regarding to time and solutions. In other words, the dynamic capabilities do not focus on which resources a company has, but on the capability to manage and exploit them in a way that does not lead to loss of competition when situations change.
The influence of dynamic capabilities is questioned by means of the two following indicators:

- Having the ability to anticipate quickly on the changing environment and adapt projects if necessary
- having the ability to develop practical innovations rapidly.

These will be questioned as follows:

R. How important was it for the fulfilment of the goals regarding to the diseases and disease areas as projected by the initial strategy to have the ability to anticipate quickly on the changing environment and adapt projects if necessary?
S. How important was it for the fulfilment of the goals regarding to the disease and disease areas as projected by the initial strategy to have the ability to develop practical innovations rapidly?

4.2.4 Possession of strategic resources

According to the resource based view, the key understanding in the influence of patents is that they make resources exclusive (Barney, 1991). The possession of patents is assumed to be an indicator for the possession of strategic resources. The resource based view states that strategic resources are essential to develop unique products and create a and protect strong IPR-based competitive positions.
Levin (et al. 1987) and later Cohen (et al. 2000) have surveyed R&D managers in many different industries in the US in order to investigate which methods were important to secure revenues from the own innovations. The R&D managers were asked to give a valuation at the following factors: patents, superior sales and service efforts, secrecy and complexity of production and product technology and the competitive advantages of being first in the market. In both studies, the R&D managers in the pharmaceutical industry considered patents as the most important method to protect the own innovations. Annex 1 shows that hundreds to thousands of patent requests were approved for the six large pharmaceutical companies that are investigated in this study for the years 2006, 2007 and 2008. In other words, the answers on questions about the influence of patents will be answered with a predictive answer.
Therefore, this study focuses on the methods that large pharmaceutical companies use to share or access patented (strategic) resources: license agreement, acquisitions and collaboration. As mentioned in the introduction, this kind of interactions with contacts to obtain new drugs or technologies for new drug development are used. These interactions might be used to keep the own pipeline in a good condition. Some of these interactions are announced in advance in the strategy, others appear to be ad hoc interactions. These interactions give an indication of the capabilities of the own R&D department. The question is: what is the influence of these interactions on the success of the new drug R&D programmes?
Therefore, the first part of this study gives an indication of the interactions that affected the drugs in the pipeline for each company in this study. The interview questions for the second part of this study investigate what the influence of these interactions (collaborations, acquisitions and license agreements) was on the ability to realise the R&D programme as projected.

The following indicators investigate not only the influence of the own patents for a successful R&D programme, but also the importance of obtaining access to patents from outside the company .

- licensing of patents (or patented IPR).
- acquisition of patents (or patented IPR)
- collaboration induced by patents (to obtain access to these patents) .

The following questions investigate the patent-related interactions of companies:

T. What was the influence of licensing patents on the ability of your company to realise the goals regarding to the disease areas and diseases that were projected in initial the strategy?
U. What was the influence of acquisition of patents (or patented IPR) on the ability of your company to realise the goals regarding to the disease areas and diseases that were projected in initial the strategy?
V. What was the influence of collaboration induced by patents (to obtain access to these patents) on the ability of your company to realise the goals regarding to the disease areas and diseases that were projected in initial the strategy?

4.2.5 Others factors

At the end of the interview, an extra question is added to investigate which other factor s that are not included in the model had a significant influence on the success of the new drug R&D programme.

W. Which other factors, not questioned in this interview, have significant influence on the ability to of companies to realise the goals regarding to the disease areas and diseases that were projected in initial the strategy?

Annex 2 shows all the interview questions in a short list.

The following section elaborates the methodology regarding to data collection and data processing that is used further in this study.

5.0 Methodology

This study investigates the strategies and plans regarding to the development of drugs and disease areas (the R&D programme) of six selected pharmaceutical companies. Furthermore, a model with factors that might influence the success of the R&D programmes is developed, investigated and refined. In order to answer the main research questions, multiple embedded case studies are conducted. This research design is chosen because are six companies (i.e. multiple cases) are studied. Within each company, several variables are studied: the strategy in 2000 and the pipeline in 2006, 2007 and 2008; the factors that influenced the R&D programme. Because there are multiple variables investigated, the case studies are so called 'embedded' (Yin, 2003, p.40).
This study incorporates two parts, each focussing on one main research question. The following paragraphs elaborate about the data collection and data processing methods that are chosen for each part.

5.1 Methodology for the first part

5.1.1 Data collection

The first part (i.e. first main research question) of this research focuses on the differences between the initial new drug R&D strategies and plans as announced in 2000 and the new drugs that appeared in the pipeline of large pharmaceutical companies in the years 20006, 2007 and 2008. This research question is divided into three sub questions.
The main data sources for this first part are archival records and documentation. These are chosen above other types of sources because there is exact and complete data needed in order to reconstruct the pipelines (Yin, 2003, p. 86). The disadvantage of archival data and documentation is the accessibility. Therefore, one of the criteria to choose a company was the availability of public data. This did not hinder this research because there appeared to be a sufficient number of companies for which the required data was public available. However, the main advantage is that archives enables researchers to reconstruct historical events in great detail. This is needed here for the description of the strategies and especially for the reconstruction of the pipelines.

For the first sub research question, about which disease areas and drugs were aimed to be developed, the annual report of each company for the year 2000 and articles from the newspaper Financial Times are used.
In order to determine the strategy considering the diseases and disease areas, the annual reports are retrieved from the websites of the companies. The following queries are used to investigate the annual reports: strategy; vision / future; direction; disease (areas); drug(able) targets; NCE / NME; new drugs; (Drug) Innovation(s); New product development (NPD); treatment; products; cure; and markets. This set of queries was identical for each company.
Newspaper articles from the Financial Times are used as additional references. The articles from the Financial Times are retrieved from the LexisNexis database. The Financial Times is chosen because it is a renowned international business newspaper, which offers by far the largest public archives at the Lexis Nexis databases. The Financial Times offers, other than other news papers, also articles for the year 2000. The articles for each company are searched with the following query combinations: (company name) AND strategy; and the combination (company name) AND new drugs OR new products OR pipeline. Both series of articles are searched in the interval 01/01/2000 till 31/12/2000. Websites of registration agencies (FDA, EMA) and the companies themselves are used as supportive sources when additional detailed information was needed.

The second subquestion, about which drugs passed through the pipelines uses two sources to reconstruct the pipeline for each of the six companies: The annual reports of 2006, 2007 and 2008 and the database ClinicalTrials.gov. The annual reports give an overview of each compound that is investigated in clinical phases. This information is combined with the information from Clinicaltrials.gov which provides small reports about each trial that is subscribed by a company. Clinical trials of each of the six companies are searched by means of the following queries at ClinicalTrials.gov: Search term: (company name inserted); Recruitment: (closed studies); Study results: (all studies); Study type: (all studies); Lead sponsors: (company name inserted); Phase: I, II, and III ticked; First received: from 01/01/2006 to 12/31/2006. This was repeated for 2007 and 2008. All the other search options were not changed or used. Again, websites of registration agencies (FDA, EMA), the companies themselves and newspaper articles were used as supportive sources when additional detailed information was needed.

The third research question, about which drug in the pipeline fit within the initial strategy and which not, uses the collected data and answers of the first and second subquestion to answers on the first two questions.

5.1.2 Data processing

For the first sub question, each annual report and selected article from the Financial Times is investigated by means of the queries and useful statements regarding to disease areas and drugs that are projected for the future. These are combined to make an overview of what each company projected for the future. The projected strategy including the drugs and disease areas of each company is described by means of: General statements about the strategy; Current disease areas in 2000; Future disease areas; and Specific future disease areas; and specific future diseases. So, the question is answered by means of six overviews of the projected drugs and disease areas.

The second research question will not be answered by a text but by an extensive schematic overview for each company of the pipelines for the year 2006, 2007 and 2008. This is based on the combined data from the annual reports which is verified and combined with the data from ClinicalTrials.gov and shows for each company the pipeline by means of: drug name; description; indication; disease areas; co sponsor; own R&D; acquired; licensed in; partnered/collaboration; objected area; general remark/ is partner announced?; remark about area; area projected in advance? This overview gives for each drug in the pipeline (for 2006, 2007 and 2008) a description about what it is, who developed it, and whether or not it was projected. One can read directly from the overview which drugs and disease areas passed through the pipeline in 2006, 2007 and 2008.

The third sub question is answered by means of the overview of the pipelines alone. Though, the question is answered more extensively. The overview of the first research question brings several topics forward, all of these topics are examined by means of the compounds that are present in the pipelines in the year 2006, 2007 and 2008. This leads to an overview that compares what was projected regarding to General statements about the strategy; Current disease areas in 2000; Future disease areas; and Specific future disease areas; and specific future diseases with what appeared in the pipeline for each company. This analysis elaborates also about the ambitions regarding to the development of new disease areas and drugs that can not be incorporated in the overview of the pipelines. For example, how many drugs that were announced in 2000 were not developed and whether or not companies were able to obtain leading positions in certain disease areas. By checking this kind of ambitions, a richer view on the ability of companies to fulfil their goals appears. In the end, the first main research question is answered by one general conclusion for the six investigated companies summarizes the main differences between the initial plans and the final results regarding to the developed drugs and disease areas.

5.2 Methodology for the second part

5.2.1 Data collection

The second part if this research focuses on the question what the influence of the ability to provide resources effectively', 'the ability to implement technology', 'possession of strategic resources', and 'dynamic capabilities' on the success of new drug R&D programmes is. The relation between these four variables and the success of new drug R&D programmes is based on innovation theory is depicted in a conceptual framework. In order to explore what the relations in the framework and to refine the framework, information about the influence of the different variables needs to be collected.

There is no public information available about the influence of these variables on the R&D programmes in the companies. Therefore, analysis of documents like annual reports or archives as done in the first part of this research is not an option. Other methods like participant observation and direct observation are not appropriate because this research studies the period 2000 – 2008. However, persons who worked in the period 2000 to 2008 for the companies that are investigated are expected to know which factors had influence on the success of the R&D programmes. Since this is tacit knowledge, interviews with these employees who 'witnessed' the development of the plans and strategies are expected to be the best method to collect information about the influence of the several factors and verify the conceptual framework. Interviews are also chosen because the aim is to explore the what the influence of the factors is and interviews enable the researcher to ask open questions. The researcher is able to hear the rationale behind the answers and ask additional questions to explore the answers further. These properties of interviewing, which can not be offered by other sources, are needed to refine the framework in the end.

Based on the framework and the surrounding theory, the interview questions are formulated. This process is presented in the operationalisation section. The questions are as close to the theory as possible, in order to ensure that each question really investigates what is aimed to be investigated. Each expected relation between a factor and the success of the R&D programme was investigated by means of a series of questions. These questions had to be asked to employees of pharmaceutical companies who were expected to have a good overview of what happened regarding to new drug and disease area development in the last decade in their company. Therefore, several high-level employees, at as much of the investigated companies as possible, were contacted with a request for an interview.

5.2.2 Data processing

The interviews are conducted according to a protocol. The protocol is written down and followed during the interviews. This includes the elaboration of the purpose of the interview and the definitions as used in the investigated conceptual framework before the first question is asked. The interviews are recorded and written down, this enables the researchers to retrieve the information from the respondent's answers more accurately. Furthermore, the date, time and place are noted for the archive.

As mentioned before, each of the four factors that are mentioned in the second main research question is investigated by a series of questions. The analysis of the influence of each factor on the success of the new drug R&D programmes is done by comparing the answers of each company for each series of questions. The core question is: does the factor have influence: yes or no? The most important remarks about the influence will be elaborated.

The last subquestion investigates whether or not there are any other factors that might have important influence of the success. Suggestions from the respondents will be elaborated separately. In the end, the question about the influence will be answered for each factor and the refined model will be presented.

According to Yin (2003, p. 97), a researchers should keep three principles in mind during data collection: Use of multiple sources of evidence; Create a case study database; and maintain a chain of evidence.
The first principle means that there must be triangulation during a case study, this means that evidence from several points has to converge into the same information and facts. During both the first and the second part of the research, multiple sources of evidence are used: documentation and archives for the first part and innovation literature and interviews for the second part. This results in data triangulation in the whole study, leading to more robust results. The second part even builds upon a conceptual framework with expected relations based upon several theories from the innovation literature, which is verified by means of interviews. In other words, the second part includes so called "method triangulation" (Yin, 2003, p. 100).
The second principle is that the collected data that is used as evidence for the case study must be well documented and enable other researchers to replicate the results and the forthcoming report. Therefore, all annual reports, Financial Times articles and data from ClinicalTrials.gov and recording from the interviews are documented and saved digitally. All other sources that are used are mentioned in the reference list. So, all sources that are needed to replicate this study are available.
The last principle is that a chain of evidence should be constructed to increase the reliability of the information in the case study (Yin, 2003, p. 105). This means that one has to be able to track down why and by means of which protocols. The most important is that one is able to track down where the conclusions come from and vice versa. Therefore, this extensive method is written and there are many cross-references in the text to methodological procedures and results.
Yin (2003, p. 34) also presents four types of validity that increase the quality of the research design: Construct Validity; Internal validity; external validity; and reliability. The construct validity and reliability are already covered by the three principles that are elaborated above (compare Yin 2003, p. 34 with pp.96-106).
Internal validity is, according to Yin, not relevant in this study because this study is descriptive in the first part and explorative in the second part. "First, internal validity is only a concern for causal (or explanatory) case studies, in which an investigator is trying to determine whether event *x* led to event *y*" (Yin, 2003, p. 36). The larger the population for which the outcome of a study can be generalized beyond the research population, the higher the external validity. For this study, the external validity will be limited because the research population is small and does only incorporate large pharmaceutical companies. Furthermore, the number of respondents for the interview might be even smaller. However, the aim of this research is get an impression of the extent to which pharmaceutical companies are able to realise their initial plans and strategies and to explore which factors affected the success of the R&D programmes in order to refine the conceptual framework. Therefore, generalisation for the whole pharmaceutical industry is not a goal of this study. This study is a first exploration in a small population, aimed to result into a refined model that can be used for further studies in a larger population.

6.0 Results part 1

6.1 Subquestion 1.1

For the first subquestion, an overview is made that describes for each company the most important elements regarding disease areas and drugs that are projected for the future. This is done by means of the following topics:

1. General statements about the strategy
2. Current disease areas (2000)
3. Current targeted disease areas in the pipeline (2000)
4. Future disease areas (focus areas)
5. Specific future disease (treatments noted in text)

The first company is Roche, the other companies are Schering-Plough, AstraZeneca, Genentech, Amgen and GSK. After the first subquestion, the second subquestion gives an extensive overview of the pipelines of the six investigated companies in 2006, 2007 and 2008 (in the attachment of this report). The answers for the first and second subquestion are used and compared in order to answer the third subquestion and determine the success of the new drug R&D programmes of the companies.

6.1.1 Roche

1. **General statements about the strategy**

According to the annual report of 2000, Roche was focusing on therapeutic areas with significant unmet medical needs (Roche, AR, 2000). More specific, the areas where they had special expertise and experience. They made significant progress in these areas in 2000.
The annual report indicated that Roche wanted to continue with a strategy of focusing on its core disease areas. Therefore, it spun off some of its drug discovery activities into a new biotech start-up company: Basilea Pharmaceutica. Basilea Pharmaceutica embedded decades of accumulated knowledge about antibiotics, antifungals and dermatology. Although it is was spin-off, Roche had a minority interest in the company and the option to acquire global development and marketing rights for certain selected compounds (Roche, AR, 2000). This was not the first spin-off company. Roche created the biotech companies Novuspharma (Italy) and Actelion (Switzerland) earlier.
Roche also invested in Genentech. According to the Financial Times, the aim of this investment was to isolate new business and create a place were people can do thing differently, but still with support of resources from the parent company (Day & Schoemaker, Financial Times, 9 October 2000, p. 6). Furthermore, it created flexibility.
For the long term, Roche was betting on genomics. Because the human genome was more and more unravelled, critical genetic data and information about which units of the genome affect wellbeing and illness became available. However, it was expected that it would take years before this information could be incorporated into a new drug (Pilling, D., Financial Times, 1 July 2000, p.1). Roche decided to intensify its efforts and involvement in the field of genetics and genomics and changed therefore the focus of the research at the Basel Institute for Immunology (Roche, AR, 2000).

2. **Current disease areas (2000)**

Roche indicated that it would develop or maintain activities in the following disease areas (Roche AR, 2000):

- Metabolic disorders
- Central nervous system
- Vascular diseases
- Oncology
- Inflammation/bone diseases
- Genitourinary diseases
- Virology

3. **Current targeted disease areas in the pipeline (2000)**

According to the annual report, the pipeline of Roche was filled with potential treatments for numerous diseases: treatment of bone metastases in breast cancer patients; several types of solid tumours, in combination with chemotherapy; anemia in hematologic malignancies; adjuvant therapy in breast cancer; intermediate-/high-grade non-Hodgkin's lymphoma; combination therapy in breast cancer; HIV infection; prevention of cytomegalovirus disease in solid organ transplantation; treatment of cytomegalovirus disease in AIDS; Chronic hepatitis C; HIV/hepatitis C co-infection prevention and treatment of post-menopausal osteoporosis; moderate/severe psoriasis; severe/nodular acne; treatment and prevention of type 2 diabetes; severe chronic heart failure; post-myocardial infarction; allergic asthma and seasonal allergic rhinitis; and acute myocardial infarction (Roche, AR, 2000).
Beside these diseases which were already in the pipeline, Roche and Genentech signed an agreement with OSI pharmaceuticals in early 2001. They initiated the co-development and commercialisation of a novel anticancer drug, known as OSI-774. This drug was in clinical phase II in early 2001. The drug was a potential treatment for lung, head and neck and ovarian cancer (Roche, AR, 2000).

As mentioned in the first paragraphs, Roche wanted to focus on its core disease areas. Therefore, Roche licensed out two new drugs to Actelion, one of their spin-off biotech companies: Tezosentan, to treat acute heart failure, and Bosentan for chronic heart failure. Both drugs were in phase 3 clinical trials and were expected to enter the market between 2001 and 2003. The revenues from the license were used to fund new drug discovery projects (Hall, W., Financial Times, 24 March 2000, p. 38).

4. Future disease areas (focus areas)

In 2000, Roche announced that it would invest 100 million Swiss francs in its Pharmaceutical and Diagnostics Divisions in order to reinforce their research in the field of proteomics. The company expected that proteomics would lead to an increased number of potential target molecules and more momentum for the discovery of new therapeutic compounds (Roche, AR, 2000).
According to David Pilling, Roche believed that the importance of diagnostics would increase due to the future ability to link genes with the predisposition to diseases (Pilling, D., Financial Times, 27 June 2000, p.15). Therefore, proteomics were expected to be important for the diagnostics divisions because Roche wanted to use proteomics to identify proteins that could be used as new markers during the pre-clinical and clinical tests. The company expected to use proteomics during tests for cancer, metabolic disorders, inflammatory disease and cardiovascular disease. The markers in the tests were aimed to provide information about the development of the diseases and the efficacy of the drugs to treat them (Roche, AR, 2000).
Roche saw also major growth opportunities in the field of virology and wanted to build leadership in the field of oncology. They also wanted to expand their number one position in weight management (Roche, AR, 2000).

5. Specific future disease (treatments noted in text)

The annual report of 2000 announces that Roche had eighteen new drug compounds that were expected to enter the preclinical phase by the end of 2001. These compounds were expected to be developed into treatments for obesity, depression, Alzheimer's disease, cancer, osteoporosis and HIV (Roche, AR, 2000). Beside these compounds, Roche made some advances in the development of an entirely new class of anti-HIV medicines. This class was based on fusion inhibitors which prevent HIV from penetrating and infecting host cells. The company made also some progress in the field of schizophrenia. Roche had an alliance with deCode Genetics (Iceland), and identified a gene linked to schizophrenia. This gene provided the first genetic target which could be used for the development of new diagnostic approaches and treatments for the disease. Furthermore, gene locations for several other diseases, like Alzheimer's disease, stroke, osteoporosis and peripheral arterial occlusive disease were identified (Firn, D., Financial Times, 31 August 2000, p. 31; Roche, AR, 2000). Based on these discoveries, Roche hoped to develop drugs and genetic tests. Roche had an agreement with Vernalis and paid them to develop new anti-obesity compounds (Firn, D., Financial Times, 27 September 2000, p. 27).

6.1.2 Schering-Plough

1. General statements about the strategy

The annual report of Schering-Plough for the year 2000 stated that Schering-Plough would focus her R&D efforts on therapeutic areas where there are 'opportunities to achieve significant medical advances' (Schering-Plough, AR, 2000).

2. Current disease areas

In 2000, Schering-Plough focussed on the following disease areas (Schering-Plough, AR, 2000):

- allergy and respiratory
- anti-infective and anticancer
- cardiovasculars
- dermatologicals
- central nervous system
- and other disorders

3. Current targeted disease areas in the pipeline (2000)

The annual report of 2000 gave an overview of which disease areas were served by the drugs in the pipeline. These included: SAR (Seasonal allergic rhinitis); chronic idiopathic urticaria CIU; allergic rhinitis and asthma; chronic myelogenous leukemia; malignant melanoma; solid tumors; chronic hepatitis C; brain cancers; breast cancer; HIV; rheumatoid arthritis; opportunistic fungal infections; broad-spectrum antibiotics; drug resistant bacterial infections; cholesterol-management; acute myocardial infarction; atherosclerosis; restenosis; cognitive disorders and degenerative nervous system diseases; obesity-management; and dementia associated with Alzheimer's disease (Schering-Plough, AR, 2000).

Beside developing completely new drugs, Schering-Plough was also searching for additional indications for products that were already on the market. (Schering-Plough, AR, 2000). Schering-Plough also tried to expand and reinforce their pipeline by means of licensing agreements for new compounds and advanced research technologies. Important examples of pipeline reinforcements were two partnerships with Merck. The first partnerships aimed to develop a fixed-combination tablet of Ezetimibe (Schering-Plough's cholesterol absorption inhibitor) and Zocor (Merck's cholesterol-management drug). Additionally, the two companies wanted to use Ezetimibe as monotherapy, co-administered with statins (Schering-Plough, AR, 2000). The second partnership was also related to a combination tablet. This time the nonsedating antihistamine Claritin (Schering-Plough) and leukotriene receptor antagonist Singulair (Merck) were combined for the treatment of allergic rhinitis and asthma on the US market (Schering-Plough, AR, 2000). According to Merck and Schering-Plough, these agreements enabled them to bring the drugs faster to the market and market them better (Column, L., Financial Times, 24 May 2000, p. 26). The two companies conducted clinical trials wit the combination of the two drugs with promising results (Michaels, A., Financial Times, 24 May 2000, p.27).

Schering-Plough had also an agreement with British Biotech for Marimastat, a drug to treat small cell lung cancer. This drug was under development but did not show promising results. Therefore, Schering-Plough licensed a follow-on compound from British Biotech: BB3644, they would also pay the clinical trials for the compound (Firn, D., Financial Times, 6 July 2000, p. 29; Pilling, D., Financial Times, 26 January 2000, p. 25).

4. Future disease areas (focus areas)

Schering-Plough described itself as a leader in the field of allergy and asthma. The company focussed on the development of new and more effective treatments to prevent or block the body's allergic and immunological responses. In 2000, Schering-Plough was the leader in the market of allergy and respiratory treatments in the US and has the ambition to expand this position over the rest of the world. According to its annual

report, the main focus areas for R&D in the future were cancer, infectious diseases and immunology (Schering-Plough, AR, 2000). However, Schering-Plough also noted that they were expanding their position on the worldwide market for cardiovascular diseases by means of internal development programmes and strategic license agreements.
Schering-Plough also continued to explore the potential of gene therapy. The opportunities of gene therapy were explored for several diseases. The research was conducted at Canji, the centre for gene therapy of Schering-Plough. One of the results was p53 tumor suppressor gene therapy for treating ovarian cancer that was in phase 2 clinical trials (Schering-Plough, AR, 2000).
The company also abandoned some activities in order to be able to focus their marketing resources on their core areas. Schering-Plough ended its agreement with Novo Nordisk for the co-promotion of Prandin (Type 2 diabetes) and some other insulin products and devices.

5. Specific future disease (treatments noted in text)

In line with their ambitions in the field of asthma, Schering-Plough had a collaboration and licensing agreement with Texas Biotechnology Corporation in order to discover, develop and commercialize VLA-4 antagonists. These antagonists were a new class of compounds that could possibly be used as a treatment for asthma. Furthermore, Schering-Plough had an expanded agreement with Genome Therapeutics Corp in their quest to find novel asthma treatments. This company had capabilities for genomics sequencing, high-throughput positional cloning and bioinformatics that could be used to identify genes that were possibly related to asthma (Schering-Plough, AR, 2000).
An other disease for which future treatments were in the discovery phase was Hepatitis C. Researchers at Schering Plough identified the protein NS3. This protein appeared to be essential for the maturation and replication of the Hepatitis C Virus. NS3 became a promising target for future drugs. Researchers also identified AGI-1067 as the first compounds of a new class of orally delivered compounds that protect vascular tissue. The compound was still in the discovery phase and had the potential to be used to prevent atherosclerosis and restenosis (Schering-Plough, AR, 2000). However, the compounds was sold in 2001 to AtheroGenics, Inc. (Schering-Plough, AR, 2001).
In early 2000, Schering-Plough extended its collaboration with the University of Toronto. Their aim was to investigate the function of presenilin genes as possible tool for new drug development and develop drugs prevent and treat Alzheimer's disease (Schering-Plough, AR, 2000).

6.1.3 AstraZeneca

1. **General statements about the strategy**

AstraZeneca announced in its annual report that it wanted to discover, develop, manufacture and market innovative products. The company wanted to realise new products and product life cycle initiatives, including expansion of the application areas of existing drugs. AstraZeneca also wanted to obtain leading positions in the most important pharmaceutical markets: Europe, the US and Japan (AstraZeneca, AR, 2000). The further growth of their business was expected to driven by a range of new product that AstraZeneca launched on the market in the period 1995 till 2000 (e.g. Seroquel, Atacand, Casodex, Zomig and Arimidex).
The company wanted to double the value of their R&D pipeline every five years. Furthermore, the candidate drug output had to be 15 per year in 2003. The success of development projects had to be doubled to twenty percent in 2005. In the same year, the number of medically important and commercially attractive new products had to be three or higher per year.
AstraZeneca called licensing products from external organisations a key activity to augment their product pipeline with promising therapies (AstraZeneca, AR, 2000). An example of such a license was the agreement with Oxford BioMedica to use their LentiVector gene delivery technology as a drug-discovery tool (Pilling, D., Financial Times, 15 February 2000, p. 30). The technology enabled companies to determine what part a particular gene plays in a given disease .
Additional to their own in-house R&D and its active in-licensing programme, AstraZeneca had a network involving more than 300 collaborations with universities and biotechnology companies in 2000 (AstraZeneca, AR, 2000).
AstraZeneca, Novartis, American Home Products, Pharmacia, Aventis and Monsanto separated their pharmaceutical and agrochemical businesses and all off their agrochemical activities as separate companies (Benoit, B., Financial Times, 13 March 2000, p. 6; Column, L., Financial Times, 16 November 2000, p. 28).

2. **Current disease areas**

AstraZeneca had the following disease areas in its pipeline in the year 2000 (AstraZeneca, AR, 2000):

- Gastrointestinal
- Cardiovascular
- Oncology
- Respiratory
- Inflammation
- Central nervous system
- Pain
- Infection

3. **Current targeted disease areas in the pipeline (2000)**

In 2000, AstraZeneca had a pipeline with a wide range of disease areas for which it had new compounds in clinical trials phases (AstraZeneca, AR, 2000).

- Gastrointestinal: GERD and IBS
- Cardiovascular: Thrombosis, Metabolism, Arrhythmia
- Oncology: Pan-carcinoma
- Respiratory: Asthma, COPD, Rhinitis
- Inflammation: Rheumatoid arthritis, Osteoarthritis, Transplantation
- Central nervous system: Alzheimer's disease (also license Targacept Inc.,) Depression, Multiple sclerosis
- Pain: Acute pain, Neuropathic pain, Analgesia
- Infection: Antibacterials and Antifungals

Although AstraZeneca itself had great ambitions, it also faced some uncertainties.
In the first place, the company has a large product amount of products that were expected to enter or leave the market (Column, L., Financial Times, 25 February 2000, p. 20). AstraZeneca was facing one of the greatest patent expirations in the pharmaceutical sector, mainly caused by the patent of Losec (anti-ulcer) that represented an annual sales of six billion dollars, 40 percent of AstraZeneca's sales. Second, AstraZeneca had one of the best pipeline in the pharmaceutical industry (Firn, D., Financial Times, 15 November 2000, p. 36; Pilling, D., Financial Times, 26 October 2000, p. 24). This had an disadvantage: the number of products that left the pipeline was lagging behind, causing additional overhead costs (Pilling, D., Financial Times, 3 may 2000, p. 32). According to Claes Wilhelmsson, the head of R&D at AstraZeneca, the problem was as follows: "Our problem is that we have been too successful in research and very few products have fallen out in the past few years. There are projects which we have had to slow down." (Pilling, D., Financial Times, 18 October 2000, p. 32). AstraZeneca had to choose which projects got priority funding and which they had to slow down.
Merril Lynch and Lehman Brothers expected that AstraZeneca was able to launch ten new therapies on the market before the end of 2002. Five of them were expected to develop into a blockbuster (annual sales above 1 billion dollar). These were, "Nexium, an improved version of Losec; the superstatin ZD4522 (Crestor), a cholesterol-lowering drug; H376/95, an anti-clotting treatment; Viozan, for chronic obstructive pulmonary disorder; and Iressa for cancer" (Firn, D., Financial Times, 30 August 2000, p. 23; Pilling, D., Financial Times, 3 may 2000, p. 32; Pilling, D., Financial Times, 18 October 2000, p. 32).
According to AstraZeneca itself cardiovascular diseases and cancer were the most promising fields for blockbusters (Pilling, D., Financial Times, 26 October 2000, p. 24).

AstraZeneca was hoping that Nexium took over all the marketshare that Losec left behind when its patent expired. Later in 2000, it became clear that Nexium was not able to replace Losec one on one (Pilling, D., Financial Times, 2 August 2000, p. 21). Because Losec was such a good drug, patients would choose for the generic versions instead of Nexium, only slightly better but way more expensive than the generic versions of Losec (Column, L., Financial Times, 2 August 2000, p. 20). However, Nexium wasn't launched on the American market yet (only in the EU so far).
Furthermore, the company projected the market launch of a new cholesterol lowering drug in 2002 which would capture a twenty percent market share (Column, L., Financial Times, 25 February 2000, p. 20). The first phase 2 trial showed that the drug was highly effective and well tolerated (John, P. Kibazo, J., Financial Times, 29 June 2000, p. 58).
All in all, AstraZeneca could realise a wide range of profitable drugs for the next five years (Column, L., Financial Times, 25 February 2000, p. 20).
Not all the drugs in the pipeline were successful. AstraZeneca stopped the development of Zendra, a therapy for stroke (John, P., Kibazo, J., Financial Times, 16 November 2000, p. 62).

4. Future disease areas (focus areas)

Regarding to the future, AstraZeneca was very ambitious in their annual report for the year 2000. They wanted to build on their leading positions in the field of gastroenterology and asthma. Above that, they wanted to be the worldwide leader in oncology in 2005, the number one in pain control in 2009, and the worldwide leader in cardiovascular therapies in 2010.Furthermore, AstraZenenca planned to be at the forefront in the field of genetics and informatics (AstraZeneca, AR, 2000).

5. Specific future disease (treatments noted in text)

AstraZeneca mentioned in their annual report specific disease for which they expected to develop compounds that could be tested later in trials.
In the field of gastrointestinal diseases they targeted GERD, H.pylori infection, peptic ulcer disease, dyspepsia, Inflammatory bowel disease and IBS. In the field of cardiovasular diseases they targeted, thromboembolism, dyslipidaemia (drug licensed in

from Crestor from Shionogi & Co., Ltd.) , type II diabetes/insulin resistance , atrial fibrillation, and vascular disease prevention. In the field of oncology AstraZeneca targeted a wide range of cancers. (Succeeded, e.g. thyroid cancer. Solid tumours, breast cancer, prostate cancer). Chronic obstructive pulmonary disease (COPD) and rheumatoid arthritis were the targeted diseases in the field of respiratory and inflammation. Acute stroke and depression/ anxiety were targeted in the area of the central nervous system.
The last area where new compounds were in the pre-clinical phase was the infection area with a compound against Tuberculosis (AstraZeneca, AR, 2000).

6.1.4 Genentech

1. General statements about the strategy

Genentech is a biotech company. In its annual report for the year 2000 it stated that its mission was to be the leading biotechnology company. The company wanted to use human genetic information do develop, manufacture and market drug for markets with significant unmet medical needs (Genentech, AR, 2000).
Genentech patented over 1000 full-length DNA sequences that encode novel human proteins with therapeutic potential. Many of these patent application came forward from their own successful Secreted Protein Discovery Initiative (SPDI). The patents included data from actual biologic assays that disclose the function and utility of these sequences (Genentech, AR, 2000).
The company stated that their activities would be focussed on the area of oncology and cardiovascular therapies because those two areas represented the two leading causes of death by disease in the United States. Beside these two areas, Genentech would also focus on other areas where they saw opportunities and had strong biological insights and a deep understanding of the basis of disease. However, they underlined that they saw the cancer area as the main driver of growth. Their pipeline was also dominated by projects for cancer treatments, many monoclonal antibodies. Other areas were respiratory disease, inflammation and immunology.
Genentech had so called "5 x 5" goals. Part of these goals referred to the pipeline and were: to gain approval of five new products or indications by 2005; and to have 5 promising therapies in late stage clinical trials by the end of 2005. Therefore, they wanted to add four new promising compounds to their pipeline per year, starting in 2000. An other part of the 5 x 5 goals was to measure their productivity by means of their net income as a percent of revenues. In 2000, this was 19 percent, they wanted it to be 25 percent in 2005 (Genentech, AR, 2000). An other part of the 5 x 5 goals was the ambition to generate 500 million US Dollars in new revenues from alliances and acquisitions by the year 2005.
Genentech was one of the pharmaceutical companies that have set up a new unit dedicated to the development of new ideas. This enabled the company to develop new ideas differently and created flexibility for Genentech (Day & Schoemaker, Financial Times, 9 October 2000, p. 6).
The therapies that Genentech made were mostly proteins. These proteins were used to treat cancer and cardiovascular diseases. As a result, they were prescribed by specialists, not by doctors. Therefore, Genentech could use a smaller salesforce than other companies to promote their drugs. Proteins are also harder to copy. When a protein's patent expires, the market share of the drug did not drop as dramatically as other drugs. Therefore, new drugs that were launched on the market did not replace older drugs with expiring patents but simply added sales (Pilling, D., Financial Times, 10 October 2000, p. 12).

2. Current disease areas

In 2000, Genentech presented their pipeline in a scheme. The drugs were labelled in three categories (Genentech, AR, 2000):

- oncology
- cardiovascular
- opportunistic

3. Current targeted disease areas in the pipeline (2000)

Genentech had many compounds in their pipeline in 2000. These compounds targeted the following diseases (Genentech, AR, 2000):

Oncology

• chemotherapy in previously untreated patients with aggressive non-Hodgkin's lymphoma.

• early-stage breast cancer (no early-stage)
• untreated HER2-positive metastatic breast cancer.
• anti- VEGF as a single agent in patients with relapsed metastatic breast cancer
• anti-VEGF in colorectal and breast cancers.
• Solid-tumor cancers
• OSI's lead anti-cancer drug,

Cardiovascular Medicine
• anti-thrombotic agents in the treatment of AMI.
• Acute heart failure.
• Pulmonary hypertension and Acute and chronic heart failure
• non- ST-segment acute coronary syndrome, and TNKase and Activase for acute ST-segment elevation AMI (Acute myocardial infarction).

Opportunistic
• asthma and seasonal allergic rhinitis
• prevention of kidney transplant rejection.
• growth failure due to inadequate endogenous growth hormone
• (early-stage) cystic fibrosis
• growth-hormone-deficiency
• inflammatory bowel disease
• chronic bronchitis

4. Future disease areas (focus areas)

In the years before 2000, the main efforts of the R&D at Genentech were for the development of humanized monoclonal antibodies. This led to successful market launches in the US for therapies based on monoclonal antibodies such as Rituxan (non- Hodgkin's lymphoma) and Herceptin (breast cancer). The humanized monoclonal antibodies increased the market worth of Genentech and generated significant sales (Budden, R., Financial Times, 22 January 2000, p. 18). Genentech was trying to develop comparable therapies also for other disease areas (Genentech, AR, 2000).
The company also formed several alliances to strengthen their bio-oncology (beside Herceptin and Rituxan) and cardiovascular activities.

Genentech investigated also new administration forms of proteins. Instead of injectable proteins, the company initiated efforts to discover pill – based therapies. They wanted to develop small-molecule drugs and announced further efforts for three or four years after 2000. Genentech denied that proteins were no longer enough to fill the pipeline (Pilling, D. Financial Times, 28 August 2000, p. 20). According to Pilling, Genentech had an internal programme which developed a pill that attacked T-cells in order to treat psoriasis. Although Genentech had a injectable drug that was based on antibodies close to market introduction, they had also developed a small-molecule programme that blocked the same interaction. Their explanation was that the small-molecule drug enabled market expansion beyond the injectable proteins (Pilling, D. Financial Times, 28 August 2000, p. 20).

5. Specific future disease (treatments noted in text)

Genentech launched two successful therapies based on humanized monoclonal antibodies. The company wanted to expand their leading position in the field of monoclonal antibodies and develop therapies for asthma, seasonal allergic rhinitis, psoriasis, organ transplant rejection and inflammatory bowel disease and osteoarthritis (Genentech, AR, 2000).

6.1.5 Amgen

1. General statements about the strategy

Amgen had in 2000 the ambition to double its revenues and number of products on the market by the year 2005. Furthermore, the company wanted to increase the number of patients that were treated by its drugs. Amgen aimed to continue its monoclonal antibody activities, and expand its activities in the field of small molecules (Amgen, AR, 2000).

2. Current disease areas

The pipeline of Amgen in the year 2000 included the following disease areas (Amgen, AR, 2000):

- Chronic kidney disease
- Cancer
- Inflammation
- Neurology/Metabolism
- Other

3. Current targeted disease areas in the pipeline (2000)

In 2000, therapies for the following diseases were present in the pipeline of Amgen (Amgen, AR, 2000): Secondary hyperparathyroidism; Neutropenia; Anemia; Aplastic anemia; Mucositis; Bone metastases; Prostate cancer; Rheumatoid arthritis; Obesity; Parkinson's disease; Osteoporosis; Endometriosis; and Primary hyperparathyroidism

Amgen aimed to launch four new products on the market in early 2001. Main focus was on ARANESP™ (darbepoetin alfa). This therapy was expected to be the new standard therapy for the treatment of anemia, especially in chronic renal failure. The other three therapies were anakinra, abarelix-depot, and SD/01 (Amgen, AR, 2000).

In 1999, Amgen licensed the antibody epratuzumab from Immunomedics. This antibody was a novel cancer therapy. The company evaluated the ability of the antibody to treat indolent (low grade) and aggressive non-Hodgkin's lymphoma (NHL) (Amgen, AR, 2000).

According to Griffith, Amgen had a rich pipeline and the sales of their product Epogen (anemia), their best selling drug, was increasing (Griffith, V., Financial Times, 14 February 2000, p. 28). The company also announced a new anaemia therapy, Aranesp, to be approved in June 2000 (Griffith, V., Financial Times, 9 November 2000, 28). Furthermore, Amgen announced that they had positive results from late stage clinical trials for their drug Abarelix, a therapy for prostate cancer. Amgen developed the drug together with Praecis Pharmaceuticals. The market approval was expected in early 2001. If the drug was approved, it would have been the third success for Amgen and the first success for Praecis (Griffith, V., Financial Times, 24 March 2000, p. 34).

4. Future disease areas (focus areas)

According to their annual report for the year 2000, Amgen would become the world leader in the field of anemia. The company aimed to enhance and protect this position. This ambition would be supported by expanding to therapies based on monoclonal antibodies and at the same time growing in the field of small molecules (Amgen, AR, 2000).

5. Specific future disease (treatments noted in text)

Amgen had also licensed-in a new compound that was already in its clinical trials phase. Amgen licensed-in or acquired eight compounds that were in pre-clinical phases. The intention of Amgen was to start five new product-registration and label-extension trials and file two new-product or label-extension applications in 2001 (Amgen, AR, 2000). The company underlined their R&D efforts to discover new cancer therapies and stated that compounds would be licensed-in if they were promising (Amgen, AR, 2000).

6.1.6 GSK

1. General statements about the strategy

GSK had a Strategic Master Plan (SMP). This plan was build on three interdependent initiatives: Manufacturing Excellence; Network Rationalisation; and Procurement Excellence. These were embedded in a network of supply and manufacturing locations. The aim of the plan was to enhance competitiveness and productivity of GSK (GSK, AR, 2000). Furthermore, GSK wanted to add new compounds to their pipeline by means of in-licensing.

GlaxoSmithKline is a company that was created in 2000 by merging Glaxo Wellcome and SmithKline Beecham. The new company had an annual R&D budget of US dollar 4 billion. This implied that it had the largest R&D budget in the whole pharmaceutical industry (Cookson, C., Financial Times, 18 January 2000, p. 23). The company had 15000 scientists searching for new compounds (Pilling, D., Financial Times, 27 December 2000, p. 17).
Column stated that the reason for their merger was genomics: "As the entire human genome is catalogued over the next five to 10 years, drug companies have a once-in-a-lifetime chance to explore (and possibly patent) a finite number of biological targets, forming the basis for a wealth of new medicines. The more targets a company can seize and develop the better. And for that, it needs vast resources." (Column, L., Financial Times, 18 January 2000, p. 20). Jan Leschly, SmithKline's chief executive, supported these statements and saw a period of five year were a company, if it had enough resources, could patent and exploit crucial data about the interaction of genes and proteins that cause diseases (Cookson, C., Financial Times, 6 April 2000, p. 2). The heavy investments in genomics had to pay-off in the long term. GSK needed also some time for the fine tuning of the merged divisions (Pilling, D., Financial Times, 20 April 2000, p. 28).

GSK had 7500 sales representatives in the US, more than any other large pharmaceutical company. This salesforce was able to contact 250 000 physicians within a week of launch in the US. GSK would have a salesforce of 40 000 people worldwide (Pilling, D., Financial Times, 6 April 2000, p. 2). This enabled them to give a giant momentum to their drugs that entered the market. Above the enormous number of sales representatives, GSK had also expertise in consumer products and direct-to-consumer advertising. These capacities would help to attract other pharmaceutical companies and make license agreements for new compounds (Pilling, D., Financial Times, 6 April 2000, p. 2). The rationale was that small companies were willing to share their best compounds in return for an enormous marketing reach (Pilling, D., Financial Times, 25 July 2000, p. 26).
In late 2000, there were some analysts with concerns. A giant company needed enough new drugs in the pipeline and on the market in order to grow. However, GSK had to stop some promising drug in late stage development phases and withdraw Lotronex for Irritable bowel syndrome from the market (Pilling, D., Financial Times, 27 December 2000, p. 17). The company needed (potential) blockbusters. In order to obtain these blockbusters, there would be a strategy to attract the compounds actively from other companies and launched on the market by means of their massive salesforce (Pilling, D., Financial Times, 27 December 2000, p. 17). Jean-Pierre Garnier, the leader of GSK even stated that: "Putting this engine together will produce more drugs. The quality is here, the scale is here . . . We will be the kings of science."(Pilling, D., Financial Times, 22 January 2000, p. 15). According to Sir Richard Sykes, the Glaxo chairman, it was impossible for Glaxo to build up a database on clinical genetics, even with their R&D budget of 1.2 billion pounds. After the merger, the establishing such a database was possible (Cookson, C., Financial Times, 6 April 2000, p. 2).
Despite its size, GSK would be under- represented in Japan. However, a license agreement of SmithKline Beecham reinforced the links of the company with the pharmaceutical sector in Japan (Column, L., Financial Times, 26 July 2000, p. 20).

Furthermore, the company had to decide whether or not it would stay active in the field of consumer health products (Pilling, D., Financial Times, 27 December 2000, p. 17).

2. Current disease areas

In the year 2000, GSK discerned the following disease areas in its pipeline (GSK, AR, 2000):

- Anti-microbials & Host Defence
- Anti-virals
- Cardiovascular & Urogenital
- Metabolic & Musculoskeletal
- Neurology & Gastro-intestinal
- Oncology
- Psychiatry
- Respiratory & Inflammation
- Hepatitis Vaccines (child/adol.)
- Paediatric Vaccines
- Other vaccines
- Pharmaccines for Treatment of Chronic Infectious Diseases or Cancer

3. Current targeted disease areas in the pipeline (2000)

GSK was active in international collaborations in six of these disease areas. These collaborations took place in networks with clinicians, experts in diagnosis and centres specialised in analysing genetic data (GSK, AR, 2000).
"In 2000 we invested £2.5 billion in R&D. That, and our previous investment in key technologies – now fully integrated into our business – have yielded a formidable early stage pipeline of promising compounds that offer great hope for better medicines against diseases such as cancer, obesity, diabetes and heart disease".(GSK, AR, 2000). In the same year, sixteen new compounds entered phase I clinical studies in 2000 (GSK, AR, 2000, p. 15).
Despite their size and abilities to develop new drugs, GSK had several setbacks: Drug '570' (diabetes) had a delay of two years and they abandoned the development of a stroke therapy (Pilling, D., Financial Times, 25 July 2000, p. 26). Furthermore, the European Commission decided that GSK had to dispose two overlapping drugs, a therapy for herpes and a therapy for chemotherapy-induced nausea (Pilling, D. Financial Times, 16 June 2000, p. 23). The Federal Trade Commission (FTC) in the US was expected to make a comparable decision. The FTC also investigated the activities and therapies of GSK in the field of diabetes in order to avoid market dominance (Pilling, D. Financial Times, 16 June 2000, p. 23). Before their merger, European anti-trust authorities ordered also SmithKline Beecham to license-out a new therapy for nausea in cancer patients. Furthermore, SmithKline Beecham had to sell the rights for Ariflo (smoker's cough) and its antivirals. Glaxo Wellcome announced that there would be a similar agreement with the US authorities (Firn, D., Financial Times, 6 July 2000, p. 26). SmithKline Beecham stopped also with the development of Lotrafiban (heart) and Idoxifene (osteoporosis and breast cancer) (Pilling, D, Financial Times, 18 December 2000, p.24). Furthermore, the American Food and Drug Administration (FDA) informed SmithKline Beecham that it could not approve Factive (antibiotic). Although Factive was not expected to become a blockbuster, the refusal of the FDA implied that Smith Beecham would not have any significant product launches in the years after 2000 (Devi, S., John, P., Financial Times, 19 December 2000, p. 56).

The combined pipelines after the merger appeared to be relatively lean. This led to more focus on finding new uses for and improved versions of therapies that were already on the market (Pilling, D., Financial Times, 25 July 2000, p. 26). Analysts were concerned about the ability of GSK's pipeline to develop enough new drugs to maintain their current sales levels and growth. Therefore, the strategy of GSK to attract new compounds from other companies was very important. The analysts underlined their concerns by stating

that: "You should write a note about the pipeline. Of course, it would be a pretty short note," (Pilling, D., Financial Times, 20 April 2000, p. 28). Especially in the last stages of the pipeline there were (almost) no potential blockbuster left due to some high-profile failures (Pilling, D., Financial Times, 27 December 2000, p. 17). Furthermore, the company had to withdraw also Lotronex (Irritable bowel syndrome) from the market after worries about potential bowel infections (Devi, S., John, P., Financial Times, 19 December 2000, p. 56).

In order to fill the pipeline, SmithKline Beecham announced that it was buying rights of a cancer therapy that was about to enter phase I clinical trials (Pilling, D., Financial Times, 25 July 2000, p. 26). Jean-Pierre Garnier, chief executive of GSK, announced that their strategy to attract promising compounds from other companies would become more aggressive (Devi, S., John, P., Financial Times, 19 December 2000, p. 56). A senior team was appointed to search for therapies open for license (John, P., Financial Times, 28 December 2000, p. 38). GSK had also an agreement with the Canadian company Shire to sell Zeffic (hepatitis B) in Asia (Firn, D., Guerrera, F., Financial Times, 12 December 2000, p. 32). GSK licensed-in also two products from Human Genome Sciences, a fast-acting ulcer drug, and a protein for healing leg ulcers. Above that, the company made an agreement with an Italian company to develop and market a new type of blood-pressure therapy.

4. Future disease areas (focus areas)

GSK created six Centres of Excellence for Drug Discovery (CEDDs), each centre focussed on specific diseases. These six centres were (GSK, AR, 2000):

- Anti-bacterials & Host Defence, centred in Upper Providence (USA)
- Cardiovascular, Cancer and Urogenital, centred in Upper Merion (USA)
- Metabolic, Musculoskeletal & Viral Diseases, centred in Research Triangle Park (USA)
- Neurology, centred in Harlow (UK)
- Psychiatry, centred in Verona (Italy)
- Respiratory, Inflammation and Respiratory Pathogens, centred in Stevenage (UK)

The centres were established in order to have beside the economies of scale, the flexibility of small units (Pilling, D., Financial Times, 27 December 2000, p. 17). These centres had to compete with each other for funds from the main organisation and other external sources. Other organisation were allowed to invest in individual business units. The units also have to pay the central organisation for services such as the use of technologies (Guerrera, F., Pilling, D., Financial Times, 11 November 2000., p. 1). Furthermore, the centres passed on their most promising compounds to a central new drug development unit (Michaels, A., Pilling, D., Financial Times, 20 November 2000, p. 36). The strategy of GSK was to develop only the most promising compounds into a drug and therefore sell or stop the less promising projects. The rationale was that if they preferred to make big money from one drug than little money with several drugs (Michaels, A., Pilling, D., Financial Times, 18 March 2000, p. 12).
Beside specific disease areas, GSK also heavily invested in genomics and modern drug discovery methods (Column, L., Financial Times, 21 August 2000, p.16; Pilling, D., Financial Times, 20 April 2000, p. 28).

5. Specific future disease (treatments noted in text)

GSK aimed to identify the genes that are most relevant for common diseases with large unmet medical needs. These diseases were for example "asthma, non-insulin dependent diabetes, migraine, osteoarthritis, metabolic syndrome, depression, chronic obstructive pulmonary disease, early onset heart disease and Alzheimer's disease" (GSK, AR, 2000).

GSK was expected to be strong in asthma, HIV, depression, antibiotics and vaccines (Pilling, D., Financial Times, 25 July 2000, p. 26; Michaels, A., Pilling, D., 18 December 2000, p. 1).

GSK and Oxford Glycosciences (OGS) announced an alliance. The agreement implied that OGS identified proteins that were present in patients with particular diseases. Some proteins in the human body may change if a person has a disease. These proteins would be considered as bio-marker-protein and analysed by OGS. OGS would focus on patients in disease areas where GSK had a strong position: AIDS, Asthma and related to the central nerve system like migraine and depression. GSK would fund the research conducted by OGS. GSK also wanted to use the bio-markers to optimise their clinical trials and as diagnostic tests (Pilling, D., Financial Times, 4 December 2000, p. 28).

6.2 Subquestion 1.2

The second sub research question investigates which drugs passed through the pipeline in the year 2006, 2007 and 2008. Therefore, an extensive overview of these pipeline if made for each of the six companies. The database that shows these pipelines can be found in the Excel file or on the CD that is delivered together with this report.

6.3. Subquestion 1.3

The third subquestion compares the drugs in the pipeline in the year 2006, 2007 and 2008 with the disease areas and drugs that were announced in 2000 and presents the differences that are needed to answer the first main research question. The comparison will again be conducted by means of the following topics:

1. General statements about the strategy
2. Current disease areas (2000)
3. Current targeted disease areas in the pipeline (2000)
4. Future disease areas (focus areas)
5. Specific future disease (treatments noted in text)

At the end of these comparisons, the answer on the first main research question will be given in a general conclusion.

6.3.1 Roche

1. **General statements about the strategy**

According to the annual report of 2000, Roche was focusing on (its core) therapeutic areas with significant unmet medical needs (Roche, AR, 2000).
Roche spun-off Basilea pharmaceutica and thereby knowledge about antibiotics, antifungals and dermatology. Although Roche had the first option to buy their compounds if these would appear, there did not appear any new drug from Basilea or the involved areas in their pipeline.
The company also intensified its efforts in the field of genetics and genomics. This did not result in specific new drugs, but supported new drug development at Roche and other companies because Roche Applied Science Services made research kits. These kits were also sold and that could be used in the field of genetics and genomics, especially DNA sequencing kits (Roche, AR, 2006; 2007).
Roche invested further in Genentech. The investments appeared to pay off. Genentech delivered a substantial part of the new drugs in the pipeline of Roche.

2. **Current disease areas (2000)**

Roche was in 2000 active in the following disease areas: Metabolic disorders; Central nervous system; Vascular diseases; Oncology; Inflammation/bone diseases; Genitourinary diseases and Virology.
Around 2007, (i.e. in 2006, 2007 and 2008), Roche was active in all the seven disease areas they projected except for genitourinary diseases. Furthermore, it had two unprojected areas in its pipeline: Hematology & nephrology (2006 & 2007) which disappeared in 2008, and opt-in opportunities (2006, 2007, 2008). The area of bone diseases also disappeared.

3. **Current targeted disease areas in the pipeline (2000)**

Almost all the drugs that were in the pipeline in 2000 were still under development in 2006, 2007 and 2008. The drugs that were no longer in the pipeline were already in phase III or applying for market approval in 2000. None of the diseases in the pipeline were not served.
Roche and Genentech signed an agreement with OSI Pharmaceuticals to develop a novel cancer drug. Although they were not able to develop a drug for *all* the types of cancer they projected, the collaboration was quit successful.

4. **Future disease areas (focus areas)**

Roche expected in 2000 that further investments in proteomics would lead to more potential new drugs in their pipeline. Intensified efforts in the field of genomics and genetics also had to support the development of new drugs. Despite the efforts, the number of own developed drugs did not increase.
The company saw major growth opportunities in the field of virology, wanted to build leadership in the field of oncology, and expand their number one position in weight management. Roche failed to grow in the field of virology, they were more successful in the field of oncology. According to its annual report in 2006, it had a leading position in that area. New drug from Genentech made a great contribution to this. Roche was leading in the field of weight management in 2000, but increased competition and decreased sales of its only drug in the area around 2007 made Roche lose this position (Roche, AR, 2006 - 2008).

5. **Specific future disease (treatments noted in text)**

Roche had several compounds that were expected to enter the pre-clinical phases in 2001. Only two of the six compounds were present is the pipeline later (Roche, AR, 2000; 2006).
Furthermore, Roche had an alliance with deCode Genetics, and identified a gene linked to schizophrenia. Nevertheless, alliance the name deCode Genetics or schizophrenia were

not present in the pipelines around 2007. An agreement with Vernalis to develop new anti-obesity compounds had a similar result (Roche, AR, 2006).

Contacts
Although the contacts of Roche with other companies did not have always the projected results, the company kept building new contacts. Roche developed drugs with many other companies (e.g. Biogen Idec, Apsreva, BioCryst and Genmab). Although many contacted companies were not projected in the annual report for 2000, most of the contact led to drugs that fitted within the projected disease areas. Overall, the vast majority of the developed drugs fitted within the projected disease areas.

Conclusion
Although Roche invested in genomic and genetics and technologies to support new drug discovery and development, the company was not able to boost the productivity of the own R&D department. Therefore, contact with other companies like Genentech has became crucial for Roche. This is remarkable because obtaining new drugs by contacting other companies was not a main strategy of Roche. Contacts with other companies did not always bring the expected results. Above that, some of the contacts and forthcoming drugs were unprojected. The majority of the drugs in the pipeline in 2006, 2007 and 2008 was not fully developed in the own R&D department. Genentech delivers many new drugs for Roche, especially for the area of oncology. Roche itself focuses on seven areas but some areas (e.g. virology and metabolic disorders) were poorly developed.

6.3.2 Schering-Plough

1. General statements about the strategy

Schering-Plough focussed on five disease areas where they expected 'opportunities to achieve significant medical advances' (Schering-Plough, AR, 2000). These areas included allergic and respiratory disorders; anti-infective and anticancer; cardiovasculars; dermatologicals; and central nervous system disorders.

2. Current disease areas (2000)

In 2000, Schering-Plough was active in five disease areas: Allergy & respiratory; Anti-infective & Anticancer; Cardiovasculars; Dermatologicals; Central nervous system; and Others (Schering-Plough, AR, 2000). The company was active in all its projected diseases areas except for "dermatology", according to the pipelines of the year 2006, 2007 and 2008. Schering-Plough added the disease area of "Inflammatory diseases" to their portfolio. This area was not projected, but was represented by several new drugs.
Schering-Plough acquired Organon in 2007. This acquisition more than doubled the pipeline of Schering-Plough compared with 2006. Most of the drugs from Organon fitted within the projected disease areas of Schering-Plough but the acquisition added also a new disease area, "Women's Health, Contraception and Fertility", to the portfolio.
The pipeline of Schering-Plough also included five drugs in the area of "other disease". Three of these drugs were developed at the own R&D department, one was acquired and an other was licensed-in.

3. Current targeted disease areas in the pipeline (2000)

The company underlined 23 diseases for which it wanted to develop a new drug. Only three of the projected diseases could not be served around 2007. All the other disease had a drug that was already approved or still in the pipeline. Thirteen of the targeted diseases had still a new drug in the pipeline around 2007, the other drugs were approved or stopped. Nine of these thirteen drugs were developed in the own R&D department, four were developed with contacts.
In general, many of the other drugs were co-developed with Novartis, Aston University, Centocor, Organon and Merck. However, only Centocor and Merck were a projected contact in the annual report of 2000. The acquisition of Organon did not lead to more projected diseases being served. The acquisition introduced for example more asthma drugs in the pipeline, but Schering-Plough would still have a drug candidate for asthma without Organon. Though, the acquisition reinforced the pipeline with many drugs, also for diseases that were not specifically named. As a result, less than half of the drugs in the pipeline of Schering-Plough were completely developed by the own R&D department in 2006.
Most remarkable is that 'Organon' was not even named in the annual reports until 2005. Schering-Plough announced the acquisition of Organon acquisition for the first time in their financial report for 2006 (Schering-Plough, FR, 2006).

4. Future disease areas (focus areas)

Schering-Plough indicated that their main focus areas for R&D in the future were cancer, infectious diseases and immunology (Schering-Plough, AR, 2000).
The area of "Infectious diseases and Cancer" represented quit stable a quarter of the new drugs in the pipeline in the year 2006, 2007 and 2008. The drugs for cancer fluctuated from three in 2006 and to four in 2007 (but the pipeline doubled) and nine in 2008 (when the pipeline almost doubled again). The drugs for infectious diseases increased from two in 2006 to six in 2007 and remained six in 2008.
Although the company considered it as a main focus area, Schering-Plough did not have a disease area called "immunology". Nevertheless, there were five new drugs who referred in their condition description to 'immunology' but these were only present in the pipeline in 2007. In other words, "immunology" could be considered as undeveloped.

In 2000, Schering-Plough was market leader in the area of allergy and respiratory treatments in the US and had the ambition to expand this position over the rest of the world. The company did not succeed. Even after the merger of Schering-Plough with Merck in 2009, they companies together were not a leader in the field of respiratory diseases (Merck, AR, 2009).
Schering-Plough also projected to expand its position on the worldwide market for cardiovascular diseases by means of internal development programmes and strategic license agreements. The company failed to do this. In 2006, Schering Plough had only one candidate, coming from a joint venture with Merck. In 2008, the company had two drugs from the own R&D department and two candidates from joint ventures with Merck.
Regarding to gene therapy, Schering-Plough continued to explore the potential of gene therapy. In 2001 and 2002, their annual report even stated that: 'The Company is a recognized leader in biotechnology, genomics and gene therapy" (Schering-Plough, AR, 2001; 2002). This statements is remarkable because the words "gene therapy" and "genomics" were no longer present in the annual reports that followed after 2002.

5. Specific future disease (treatments noted in text)

Schering-Plough had some specific diseases for which they wanted to have new drugs in the future pipeline: Alzheimer and (VLA-4 antagonists) for asthma. Despite their efforts, Schering-Plough did not have any new Alzheimer or antagonists in its pipeline around 2007. However, the company managed to develop new asthma drugs. In 2006, Schering-Plough had five asthma treatments in the pipeline, one of it was co-developed with Novartis. In 2007, the company had only two co-developed drugs with Novartis and in 2008 they had again two drug from the own R&D department, three co-developed with Novartis and one acquired from Organon. It was not clear whether or not the support facilities of Genome Therapeutics Corp contributed to their own new drug development, but Schering-Plough retrieved many of their asthma drugs from contact with other companies.

Contacts

If one looks at the pipelines in 2006, 2007 and 2008. One can see that Schering-Plough had only a limited number of contacts. Some of these contacts were projected and led to new drugs. Almost half of the contacts that were present in the pipeline were not projected, but all the forthcoming drugs fitted within the projected disease area, except for drugs that were licensed-in from Santarus and Novartis. Schering-Plough had already contact with Novartis in 2000. The companies developed several drugs in joint-ventures and Schering-Plough even acquired a Novartis facility. This last acquisition was not projected in 2000 and implied some unprojected drugs in the pipeline. Due to the acquisition of Organon the number of unprojected drugs increased from only one in 2006 to a hand full in 2007 and 2008. Most of these drugs were in the area of 'Women's Health, Contraception and Fertility'. This disease area came along with the acquisition of Organon.
Some of the contact that Schering-Plough had resulted into no drugs at all. An agreement with Texas Biotechnology Inc. did not leave any trace. An extended collaboration with the University of Toronto to develop a treatment based on genes to treat Alzheimer's disease had the same result, nothing. British biotech agreed to develop a new compounds for Schering-Plough to treat lung cancer but this compound did not pass the second clinical phase. Genome Therapeutics Corp would be development partner for the development of new asthma drugs. It is not clear whether or not this contact led to success, but Schering-Plough was able to develop several new asthma drugs.
In other words, Schering-Plough had different success in working with other companies and appeared to make relatively "instant" decisions regarding to making contact with other companies or acquisitions (like Organon and the Novartis facility). However, without these acquisitions, Schering-Plough would have had a very lean pipeline.

Conclusion

Schering-Plough wanted to serve five disease areas. In the end, the company discarded one area and added two others to its portfolio.

It appears that Schering-Plough was capable of developing new drugs for diverse diseases. However, the developed drugs were not enough to serve all the diseases they wanted to target and the number of drugs for each disease was very low. The acquisition of Organon implied both an increase in the number of (projected) diseases that could be targeted and some diseases were targeted by more than one drug.

Schering Plough had ambitions in the field of cancer, infectious diseases, immunology, allergy and respiratory diseases and cardiovasculars but only their ambition in the area of cancer and infectious diseases was fulfilled. The company failed in the other three areas. Furthermore, the company was not successful in the field of gene therapy.

Although the success of developing drugs with other contacts was fluctuating, the company managed to develop and attract several new drugs from its contacts. The acquisition of Organon appeared to be a quick solution to avoid that the pipeline became to lean. The vast majority of the contacts with other companies was unprojected in advance and thereby also a part of the drugs.

6.3.3 AstraZeneca

1. General statements about the strategy

AstraZeneca announced in their annual report that it wanted to discover, develop, manufacture and market innovative products. They wanted to realise new products and product life cycle initiatives, including expansion of the application areas of existing drugs.

One of the goals the company set for itself was to have a candidate drug output of 15 per year in 2003. AstraZeneca succeeded and reached a number of 22 new drug candidates in 2003. Furthermore, the success of development projects had to be doubled to twenty percent in 2005. It is unclear whether or not the company achieved this goal because it did not mention this rate in their annual report of 2005 at all. In the same year, the number of medically important and commercially attractive new products had to be three or higher per year. According to the annual report of 2005, AstraZeneca launched three drugs on the market, but these were line extensions of existing drugs. AstraZeneca had completely new drugs in phase III, but none of them were filed for approval yet (AstraZeneca, AR, 2005).

2. Current disease areas (2000)

AstraZeneca had in 2000 several diseases areas in their pipeline: Gastrointestinal; cardiovascular; oncology; respiratory; inflammation; central nervous system; pain; and infection (AstraZeneca, AR, 2000).

All the disease areas where AstraZeneca projected to be active were still present in the pipelines around 2007. The company took "respiratory" and "inflammation" into one disease area "respiratory and inflammation" and took "central nervous system" and "pain "together in the area of "neuroscience" . The only remarkable thing is that AstraZeneca did not have new drugs in the area of "Infection" in its pipeline after 2007.

3. Current targeted disease areas in the pipeline (2000)

AstraZeneca had twenty diseases in the pipeline for which they wanted to develop new drugs. Ten of these targeted diseases were not present in the pipelines around 2007. The other ten were developed in the own R&D department and present in the pipeline. One disease (Alzheimer) was also served by a drugs that was licensed-in from Targacept Inc.

Merril Lynch and Lehman Brothers named five new drugs of which they expected they would develop into a blockbuster (annual sales above 1 billion dollar) after their launch in 2002 (Firn, D., Financial Times, 30 August 2000, p. 23; Pilling, D., Financial Times, 3 may 2000, p. 32; Pilling, D., Financial Times, 18 October 2000, p. 32).

In the end, only two of the five drugs, Nexium (in 2003) and Crestor (in 2005) reached annual sales of more than 1 billion US dollar. Nexium even reached an annual sales of US Dollar 5,2 billion in 2007 and took over, despite the fear of analysts, most of Losec's market share (AstraZeneca, AR, 2007). Iressa reached US Dollar 389 million in 2004 but was withdrawn from the EU market in 2004, the sales of Iressa declined after that to an annual sales of US Dollar 273 million in 2005. The development of Viozan was terminated in phase III according to annual report 2001and H376/95 was no mentioned anymore after the annual report of 2000.

According to AstraZeneca itself cardiovascular diseases and cancer were the most promising fields for blockbusters (Pilling, D., Financial Times, 26 October 2000, p. 24).

In 2007, AstraZeneca had 11 blockbusters in its product portfolio (AstraZeneca, AR, 2007). The area of cardiovascular diseases and cancer were indeed the disease areas with the most blockbusters (both 3 blockbusters). However, the areas of respiratory and gastrointestinal diseases followed closely with both 2 blockbusters.

4. Future disease areas (focus areas)

Regarding to the future, AstraZeneca was very ambitious in their annual report for the year 2000. AstraZeneca wanted to be worldwide leader in oncology in 2005; in pain control in 2009; and in cardiovascular diseases in 2010. Furthermore, the company wanted to be leading in gastroenterology and asthma.
The company succeeded in the field of oncology; cardiovascular diseases and gastroenterology. Furthermore, the company build a strong position, but not a leading position, in the field of asthma and an average position in the area of pain control.
Despite that the company had ambitions to be leading in genetics and informatics, it did not compare themselves with other companies regarding to this field.

5. Specific future disease (treatments noted in text)

AstraZeneca mentioned in its annual report of 2000 specific disease for which it expected to develop compounds that could be tested later in trials. The company mentioned 16 diseases in total. Only half of these diseases (eight) were served in the pipelines of 2006, 2007 and 2008. All these new drugs were developed at the own R&D department of AstraZeneca. Only one disease, dyslipidaemia was served by a drug that was licensed-in from Crestor from Shionogi & Co., Ltd.
AstraZeneca had for each disease area specific diseases for which they projected new drugs, but for the field of oncology they just stated that they targeted "a wide variety of cancers", which they indeed developed.

Contacts

AstraZeneca called licensing products from external organisations a key activity to augment their product pipeline with promising therapies (AstraZeneca, AR, 2000). Additional to their own in-house R&D and their active in-licensing programme, AstraZeneca had a network involving more than 300 collaborations with universities and biotechnology companies in 2000 (AstraZeneca, AR, 2000). For example, AstraZeneca collaborated with Oxford BioMedica to use their LentiVector gene delivery technology as a drug-discovery tool (Pilling, D., Financial Times, 15 February 2000, p. 30).
Around 85 percent of all the drugs in the pipelines came from the own R&D department. The number of in-licensed products in 2006 was seven, eight in 2007 and two in 2008. If one looks at the total pipeline, which included around eighty (2006), seventy (2007) and forty (2008), one can only conclude the contribution of in-licensed new drugs was low. Furthermore, none of the partners was projected in advance.

Conclusion

AstraZeneca developed a around 85 percent of the drugs in their pipelines of 2006, 2007 and 2008 in its own R&D department. This is remarkable because the company claimed to have an enormous network and active in-licensing policy. Therefore, it is remarkable that none of the partners was projected in advance. Nevertheless, all the drugs in the pipeline fitted within the disease areas that were projected in advance.
On the one hand, the company had eleven blockbusters in 2007, divided over five disease areas. Above that, AstraZeneca announced in 2000 five major goals regarding to their (leading) position in several areas. The reached leading positions in three of these goals, the other two were only partly reached.
On the other hand, AstraZeneca has realised only one of their three goals regarding to new drug development and pipeline value clearly. The company also managed to develop half of the drug that they had in their pipeline in 2000 and serve half of the diseases they projected for the future. Furthermore, the area of infection diseases appeared to be underdeveloped and the pipeline of 2008 (around 40 drugs) was much smaller than the pipeline of 2007 (around 70 drugs).

6.3.4 Genentech

1. General statements about the strategy

In the annual report of 2007, Genentech repeats its main strategic mission: "Genentech's mission is to be the leading biotechnology company, using human genetic information to discover, develop, manufacture and commercialize biotherapeutics that address significant unmet medical needs." (Genentech, AR, 2007, p. 1).
In 2000, Genentech stated that its main activities would be focussed on the area of oncology and cardiovascular therapies (Genentech, AR, 2000). Cancer would be the main driver of growth. Other areas were respiratory disease, inflammation and immunology.
The pipelines of for the year 2006, 2007 and 2008 showed that there was no drug for cardiovascular diseases in the pipeline anymore. Oncology represented half of the drugs in pipeline. Drugs to treat respiratory diseases, asthma, were present but called in the field of "immunology", the second largest field in the pipeline around 2007. The area of inflammation disappeared.
Genentech translated its strategy in so called "5 x 5" goals. Two of the five goals referred to the pipeline, both goals were achieved:

- 5 new products/indications approved in 2005: "With seven new products approved and multiple new indications, we have exceeded our 5X5 goal of five new products or indications approved by 2005" (Genentech, AR, 2005, p. 8).
- 5 significant products in late-stage clinical trials: "We ended the 5X5 period with six products for 21 potential indications in our late stage Development pipeline, exceeding our goal of five late stage products in clinical development" (Genentech, AR, 2005, p. 8).

2. Current disease areas (2000)

In 2000, Genentech presented its pipeline in a scheme. The drugs were labelled in three categories: oncology; cardiovascular; and opportunistic (Genentech, AR, 2000). Beside these main areas, the areas of respiratory diseases, inflammation and immunology diseases were expected to be developed.
In the pipelines of 2006, 2007 and 2008, only the field of oncology remained. Cardiovascular diseases and opportunities were no longer considered as a disease area in the pipeline. On the other hand, new disease areas indeed appeared: Immunology (which included respiratory diseases) and Tissue Growth & Repair.

3. Current targeted disease areas in the pipeline (2000)

Many of the new drugs that were in the pipeline in 2000 were already in phase III clinical studies. Some of the drugs that were in phase III in 2000 were already approved before 2006 and therefore not present in the pipeline anymore. However, seven of the initial 21 diseases were not served because the projects were terminated.

4. Future disease areas (focus areas)

The humanized monoclonal antibodies increased the market worth of Genentech and generated significant sales (Budden, R., Financial Times, 22 January 2000, p. 18). Genentech was trying to develop comparable therapies also for other disease areas (Genentech, AR, 2000). Genentech achieved this goal. The pipelines around 2007 showed several other monoclonal antibodies that targeted other diseases. Furthermore, Genentech marketed antibodies like Avastin ®, Xolair ® and Lucentis ® after 2000.
Genentech formed several alliances to strengthen their bio-oncology (beside Herceptin and Rituxan) and cardiovascular activities. The company succeeded and introduced Avastin ® and Tarceva ® in the area of oncology in 2004 (Genentech, AR, 2004). Genentech was also successful in the field of cardiovascular diseases. The company marketed several thrombolytics (i.e. Activase®, TNKase® and Cathflo® Activase®). However, the Genentech did not have any new cardiovascular drugs in the pipeline.
Beside new drug development, Genentech indicated that it also investigated new administration forms of proteins. Instead of injectable proteins, the company initiated

efforts to discover pill – based therapies (Pilling, D. Financial Times, 28 August 2000, p. 20). The annual report of 2006 underlines in an example that: "Alan and his group work on the design and synthesis of drugs that attack targets inside the cell and can be taken in *pill* form" (Genentech, AR, 2006, p. 18). Furthermore, the annual reports mention that there is a department of Pharmaceutical and Device Development (Genentech, AR, 2007; 2008)

5. Specific future disease (treatments noted in text)

Regarding to the future, Genentech wanted to expand their leading position in the field of monoclonal antibodies. The company mentioned 'monoclonal antibodies', 'MAB' and 'antibodies' in its annual report of 2006, 2007 and 2008 and still develops them, they did not claim to be a leader in the field (Genentech, AR, 2006-2008). Furthermore, the company underlined five disease for which it wanted to develop a drug in the future, but it succeeded only for two of them (asthma and psoriasis).

Contacts

Genentech stated in its annual reports that it had several contacts with other companies. For example, Genentech developed Xolair® together with Novartis. The pipelines of 2006, 2007 and 2008 showed that Genentech had several contacts (e.g. Biogen Idec, OSI pharmaceuticals). Only a few of the contact were not projected in advance, as a result, most of the developed drugs fitted within the projected disease areas. Even the drugs from Tanox, which was acquired by Genentech and not projected in advance, fitted within the targeted disease areas.

The disease area of Tissue growth and Repair and the drugs that were involved in this area were not projected in advance. It is remarkable that Genentech developed the drugs in this area at its own R&D department.

Finally, one of the most important contacts of Genentech was Roche. Roche owned the majority of Genentech but let Genentech operate as if it was an independent company. In the annual report of 2008 Genentech states that: "In February 2009, Roche commenced a tender offer to acquire all of the outstanding shares of Genentech stock not already owned by Roche." (Genentech, AR, 2008, p. 2). A few months later, Genentech announced on her website: "In March 2009, Genentech became a *wholly owned member* of the Roche Group" (Genentech, 2010).

Conclusion

Regarding to their projected disease areas, Genentech developed only a part of the areas that it projected. Most remarkable is that the company left the cardiovascular area and introduced the growth tissue and repair area. Despite the confusing line in their strategy, the company achieved and exceeded two important goals regarding to number of new product development and approval.

Genentech targeted 21 diseases in their pipeline of 2000, the company succeeded to develop 14 of these drugs further. However, the company was not able to serve all five diseases that it underlined for the future. Genentech quit efficiently developed new drugs with their contacts. Only a few of the contact were not projected in advance, as a result, most of the developed drugs fitted within the projected disease areas.

Furthermore, the company wanted to develop more drugs based on antibodies, develop more biotechnological drugs for cancer and cardiovascular diseases. Genentech succeeded to achieve these goals but left eventually the area of cardiovascular diseases. Despite these successes, Genentech did not make clear whether or not they achieved to expand their leading position regarding to antibodies.

6.3.5 Amgen

1. General statements about the strategy

Amgen had in 2000 the ambition to double its revenues and number of products on the market by the year 2005. In 2000, Amgen had four products on the market (Amgen, AR, 2000). In 2005, the company had 8 products on the market. In others words, they succeeded to double the number of marketed products by the year 2005 (Amgen, AR, 2005).
The company aimed also to continue with its monoclonal antibody activities, and expand its activities in the field of small molecules (Amgen, AR, 2000). Regarding to monoclonal antibodies and small molecules, Amgen stated the following in its annual report of 2007: "We study molecules in the areas of proteins (sometimes referred to as "large molecules"), including *monoclonal antibodies* and peptibodies, and *small molecules*." (Amgen, AR, 2007, p. 2). However, Amgen did not write anything about expansion of small molecule activities in the report.

2. Current disease areas (2000)

The pipeline of Amgen in the year 2000 included the following disease areas (Amgen, AR, 2000): Cancer, Inflammation, Neurlogy/Metabolism, Chronic Kidney disease, and Other.
Only cancer, Inflammation and Metabolic disorders were active in the pipelines of 2006, 2007 and 2008. The field of Neurology was only present in 2007, with a drug in early clinical phases. The area of 'Other diseases' disappeared but a new area: 'general medicines' appeared to fill the gap. This field included also the drugs that were formerly included by the area of 'Chronical kidney disease'. In 2007, a new disease area: 'Bone', appeared. This area was continued in 2008. However, the pipelines around 2007 were dominated by Oncology and Inflammation, followed by "general medicines'. These three areas represented almost all the drugs in the pipeline.

3. Current targeted disease areas in the pipeline (2000)

In 2000, new drugs for 13 diseases were present in the pipeline of Amgen (Amgen, AR, 2000). The company succeeded to develop 9 of these drug further, two of them were even approved already in 2001 and 2004. Above that, Amgen expected to get market approval for four new drugs in 2001: Aranesp, (Kinerit (anakinra), Abarelix-depot, and SD/01 (Amgen, AR, 2000). According to its following annual report, the company succeeded to achieve this goal except for Abarelix-depot (Amgen, AR, 2001). Abarelix was developed in collaboration with Praecis pharmaceuticals Inc., Amgen ended this collaboration in 2001 (Amgen, AR, 2001, p. 4).
Amgen licensed the promising antibody epratuzumab from Immunomedics. The drugs was developed further and noted as being in phase III clinical trials in 2002 (Amgen, AR, 2002, p. 20). However, Amgen decided not to start a market approval procedure for the drug (Amgen, 2003a).

4. Future disease areas (focus areas)

According to its annual report for the year 2000, Amgen would become the world leader in the field of anemia. The company indicated that this ambition would be supported by expanding to therapies based on monoclonal antibodies and at the same time growing in the field of small molecules (Amgen, AR, 2000).
Amgen had several drugs in its pipeline and on the market to treat anemia, in its annual report of 2006 (p.23) the company states that: "With Amgen's *leadership in anemia* management comes a responsibility to advocate for the best possible care for patients, to improve their health and well-being.". Furthermore, as mentioned before, Amgen still developed monoclonal antibodies and small molecules around 2007. The pipeline of Amgen contained many antibodies and also protein/peptibodies.

5. Specific future disease (treatments noted in text)

The company underlined their R&D efforts to discover new cancer therapies and stated that compounds would be licensed-in if they were promising (Amgen, AR, 2000). The pipelines of 2006, 2007 and 2008 did not show any licensed-in drugs. Instead, many drugs were obtained by the acquisition of Abgenix (2005) and Immunex (2006) (Amgen, AR, 2005; 2006). Immunex delivered several new drugs in the field of inflammation, Abgenix in the field of cancer, inflammation and metabolism. Regarding to the the pipelines around 2007, Amgen did not use license agreements anymore: all the new drugs were developed in the own R&D department or acquired.

Contacts

Amgen had the ambition to license-in promising new drugs and had contact with several companies. Around 2007, the company worked closely together with companies but acquired most of the drugs that were in its pipeline and not developed in the own R&D department. Amgen acquired Abgenix and Immunex but did not mention both companies in its annual report of 2000. However, the drugs that were acquired fitted within the projected disease areas. Abgenix was a company with expertise in the field of discovery and development of monoclonal antibodies. This also fitted within the ambition of Amgen to continue its monoclonal antibody activities. On the other hand, Amgen also ended collaborations with other companies. A good example is Praecis Pharmaceuticals Inc. which was partner of Amgen to develop Aberelix. This drug was in phase III when Amgen ended the collaboration to "focus our resources more efficiently" (Annual report 2001, p. 4). Amgen ended its collaboration with Guilford Pharmaceuticals Inc for the same reason.

Conclusion

Amgen obtained its main goals regarding to pipeline output. The company managed to double its number of marketed products by 2005. Furthermore, Amgen maintained active in the field of monoclonal antibodies and small molecules, it even reinforced itself with Abgenix.

Regarding to the disease areas, Amgen made some major changes. The pipeline of Amgen in the year 2000 included: Cancer, Inflammation, Neurlogy/Metabolism, Chronic Kidney disease, and Other diseases. Around 2007, the pipelines were dominated by Oncology and Inflammation, followed by "general medicines'.

Regarding to new drug development, Amgen was quit successful, 9 of the 13 diseases in the 2000 pipeline were served and 3 of the four projected market approvals for 2001 were granted. However, Amgen also stopped drug development projects, for example with Praecis, Immunomedics and Guilford.

The initial strategy of Amgen was to license-in promising compounds and focus on cancer therapies. Amgen did not license-in any of the new drugs in the pipelines around 2007. Instead, the company acquired two other companies, involving several new cancer drugs. However, none of the acquisitions was projected. Nevertheless, there were no drugs that did not fit within the projected disease areas, also because of the area "Others".

6.3.6 GSK

1. General statements about the strategy

GSK (GlaxoSmithKline) was established in 2000 by means of a merger between GlaxoWellcome and SmithKline Beecham.
According to its annual report for 2000, GSK had a Strategic Master Plan (SMP). This plan was build on three interdependent initiatives: Manufacturing Excellence; Network Rationalisation; and Procurement Excellence. These were embedded in a network of supply and manufacturing locations. The aim of the plan was to enhance competitiveness and productivity of GSK (GSK, AR, 2000).

Column stated that the reason for their merger was genomics (Column, L., Financial Times, 18 January 2000, p. 20). Sir Richard Sykes, the Glaxo chairman, confirmed this. He stated that it was impossible for Glaxo to build up a database on clinical genetics, even with their R&D budget of 1.2 billion pounds. After the merger, the establishing such a database was possible (Cookson, C., Financial Times, 6 April 2000, p. 2).
Regarding to genomics, stated the following in 2005: "Within GSK, Genetics Research aims to take advantage of this by identifying genes which influence common diseases …." (GSK, AR, 2005, p. 7). Furthermore GSK stated that: "R&D is collecting DNA samples in clinical studies to identify pharmacogenetic information that can help predict a patient's response."(GSK, AR, 2005, p. 8). In other words, the company was eager to develop and use genomics for new drug development. Therefore, GSK also joined the "Critical Path Initiative" of the FDA and NIH. The initiative aimed to develop the fields of pharmacogenomics and surrogate markets of efficacy to boost new drug development and make it more efficient. GSK worked at several projects, including biomarkers (GSK, AR, 2005). One year later, GSK reported that: "New tools and processes such as pharmacogenomics, surrogate markers of efficacy and manufacturing innovations are being pursued to enhance development of safe and effective drugs" (GSK, AR, 2006, p. 22).
In 2006, GSK itself established a pharmacogenetics group. The aim of this was to be able to help patients better and develop new drugs more efficiently (GSK, AR, 2006). However, the company did not go into detail about what the impact of these advances were on the (number of) new developed drugs in their pipelines.
It is remarkable that the words "Genetic" or "Genomic" were no longer mentioned in the annual reports for 2007 and 2008 (GSK, AR, 2007; 2008).

In 2000, GSK would have a salesforce of 40 000 people worldwide (Pilling, D., Financial Times, 6 April 2000, p. 2). The rationale was that small companies were willing to share their best compounds in return for an enormous marketing reach, and GSK needed these drugs to fill its pipeline (Pilling, D., Financial Times, 25 July 2000, p. 26). This would also help to attract other pharmaceutical companies and make license agreements for new compounds (Pilling, D., Financial Times, 6 April 2000, p. 2).
Later in 2000, Jean-Pierre Garnier, chief executive of GSK, announced that their strategy to attract promising compounds from other companies would become more aggressive (Devi, S., John, P., Financial Times, 19 December 2000, p. 56). Regarding to its more aggressive strategy to license-in new drugs, the annual reports show that in 2001: "an unprecedented in-licensing initiative has strengthened the pipeline, particularly in the later stages." (GSK, AR, 2001, p. 13). In 2002, GSK reported that the extensive in-licensing strategy that started in 2001 was continued and focussed on both early and late stage drugs (GSK, AR, 2002, P 14). One year later, the company states that it had tempered its efforts to obtain new licenses because the productivity of the own R&D department started to make progress in the discovery and development of new drug candidates after the merger in 2000 (GSK, AR, 2000, p. 9). In 2004, the company even reconsidered its approach regarding to development of new drugs in order to balance its resources as efficient as possible. This included: "including the use of external partners in

development and out-licensing products that no longer fit within the strategic portfolio (GSK, AR, 2004, p. 12).

GSK used only 'own R&D' or "In-license or other alliance relationship with third party" (GSK, AR, 2007, p. 18) to discern the drugs in its pipeline (acquisitions can be determined elsewhere in the reports). Therefore, one can not determine how many drugs were licensed-in but only which drugs did came from outside GSK. In 2006 (44 of 135), 2007 (33 of 115) and 2008 (29 of 100), the percentage of drugs in the pipeline that was not developed at the own R&D department fluctuated around 30 percent.

2. Current disease areas (2000)

In the year 2000, GSK discerned 12 main disease areas in its pipeline (GSK, AR, 2000).
The area of Paediatric Vaccines, Other Vaccines, and Oncology were all three under their original name present in the pipeline around the year 2007.
Two disease areas, Anti-microbials & Host Defence and Anti-virals were both represented in the area of Infectious Diseases in the year 2006, 2007 and 2008.
Two other disease areas, Cardiovascular & Urogenital and Metabolic & Musculoskeletal and were partly represented by the area of Cardiovascular & Metabolic and the large area of Musculoskeletal, Inflammation, Gastrointestinal & Urology. Neurology & Gastro-intestinal and Respiratory & Inflammation were also disease areas that were partly covered by this large area.
The area of Neurology was apart represented in the area of Neuroscience. The area of Respiratory diseases kept its original name until 2008.
In 2008, the area of Musculoskeletal, Inflammation, Gastrointestinal & Urology disappeared. As a result, the area of Musculoskeletal, Gastrointestinal and Urogenital diseases were no longer present in the pipeline. The area of inflammation was covered by the new area of Respiratory & Immuno-inflammation. This new area also included the area of Respiratory Diseases after 2007.
The last three disease areas: Psychiatry; Pharmaccines for Treatment of Chronic Infectious Diseases or Cancer; and Hepatitis Vaccines (child/adol.) were not present at all in the pipelines around the year 2007.
Beside the older disease areas, GSK introduced the new area of Biopharmaceuticals in 2008, representing drugs for several areas.

3. Current targeted disease areas in the pipeline (2000)

On a detailed level, GSK gave in its annual report of 2000 an overview of sixteen new drugs that recently entered the first clinical phase (GSK, AR, 2000, p. 15). Four of these sixteen drugs were further developed and present in the pipelines around the year 2007.

4. Future disease areas (focus areas)

GSK created six Centres of Excellence for Drug Discovery (CEDDs), each centre focussed on specific diseases (GSK, AR, 2000). Corresponding to the changing disease areas, the CEDDs also had to change. Urogenital and Musculoskeletal were no longer present in the pipeline of 2008 and Psychiatry was not even named as an disease area in 2006, 2007 and 2008. The annual report of GSK for 2006, 2007 and 2008 show that GSK was restructuring its CEDDs. GSK itself described it as: "a major transformation of Drug Discovery was conducted in our company in 2008 to create an even more nimble, creative, and entrepreneurial environment, building on the success of the existing CEDD model" (GSK, AR, 2008, p. 21). Although the CEDD's were restructured, GSK was still focussing on a mix of 'new' and 'old' disease areas: "Biopharmaceuticals, Immuno-inflammation, Infectious diseases, Metabolic pathways, Neuroscience, Oncology, Ophthalmology and Respiratory" (GSK, AR, 2008, p. 8).

According to several sources, GSK was heavily investing in genomics and new drug discovery methods (Column, L., Financial Times, 21 August 2000, p.16; Cookson, C., Financial Times, 6 April 2000, p. 2; Pilling, D., Financial Times, 20 April 2000, p. 28). A good example is the SNP Consortium, established in April 1999. The rationale behind this

consortium was that: "Many of the applications of genetic science to healthcare will be driven by single nucleotide polymorphism (SNP) high-density mapping". (GSK, AR, 2000, p.20). The main goal of the consortium was to build a high-density SNP map of the human genome.
GSK underlined that it was: "Crucial to the success of R&D is its capacity to embrace and develop new technologies to streamline the drug discovery process." (GSK, AR, 2002, p. 20). GSK believed that information about genomics and proteomics would change the way that disease targets were identified and validated (GSK, AR, 2000). This process was supported by information technology infrastructure. Advanced computers were needed for their processing power during the analysis of the databases.
Beside this consortium, GSK established in 2002 a new internal group: Translational Medicine & Technology (GSK, AR, 2002). One of the goals of this group was to optimise the use of the variety of available (new) technologies (GSK, AR, 2002).
Furthermore, GSK formed an alliance with Exelixis Inc. in 2002 (GSK, AR, 2002). Exelixis was attractive because the company could deliver new drug candidates by means of a gene-to-drug discovery technology platform.

5. Specific future disease (treatments noted in text)

GSK announced in 2000 that it hoped to develop new drugs for cancer, obesity, diabetes, and heart diseases (GSK, AR, 2000). GSK managed to have new drugs for all these diseases in its pipeline around 2007. Only obesity was no longer present in the pipeline of 2008.

Contacts

To boost its pipeline and obtain new drugs, GSK had contact with several different companies. The most important are elaborated here.
GSK had an agreement with the Canadian company Shire to sell Zeffic (hepatitis B) in Asia (Firn, D., Guerrera, F., Financial Times, 12 December 2000, p. 32). The annual reports of GSK did not report anything about the drug Zeffic. However, GSK established a joint venture with Shire in order to "co-market Combivir, Trizivir and Epivir in certain territories" (GSK, AR, 2007, p. 20).
GSK licensed-in two products from Human Genome Sciences. The company did not mention Human Genome Sciences in its reports until 2004. GSK indicated a GLP-1 albumin fusion protein in pre-clinical development for type 2 diabetes that it licensed-in from Human Genome Sciences in that year (GSK, AR, 2004). In 2005 GSK took an option for: "LymphoStat B for rheumatoid arthritis and systematic lupus erythematosus and an other option for mapatumumab for various cancer indications (GSK, AR, 2005). One year later, LymphoStat B was licensed-in (GSK, AR, 2006).
GSK and Oxford Glycosciences (OGS) announced also an alliance. The agreement implied that OGS identified proteins that were present in patients with particular diseases in disease areas where GSK had a strong position. These proteins would be considered as bio-marker-protein and analysed by OGS. GSK also wanted to use the bio-markers to optimise their clinical trials and as diagnostic tests. GSK would fund the research conducted by OGS (Pilling, D., Financial Times, 4 December 2000, p. 28). Despite their promising alliance, the company Oxford Glycosciences (OGS) was not mentioned in the annual reports anymore (GSK, AR, 2000).
GSK formed an alliance with Exelixis Inc. in 2002 (GSK, AR, 2002). Exelixis was attractive because the company could deliver new drug candidates by means of a gene-to-drug discovery technology platform.

Conclusion

The goal of GSK was to be productive, competitive and to build a genomic database. Therefore, the company was active in developing and implementing new drug development technologies and methods based on genomics and licensed-in (aggressively) drugs from other companies. The in-licensing strategy became later less aggressive when the own R&D department became more and more efficient after the merger and delivered more drugs. It appeared that GSK used the more aggressive in-

licensing strategy to give the own R&D departments the time to merge and optimise their processes and secure a filled pipeline. Nevertheless, about thirty percent of the drug in the pipeline came not from the own R&D department around 2007.
GSK changed much of the names of the disease areas it was targeting. Some disease areas even disappeared. Nevertheless, all the drug that were in the pipelines around the year 2007 were incorporated in projected areas. Forthcoming of their efforts into new areas of product development, GSK introduced also the new area of BioPharmaceuticals in its pipeline of 2008. Furthermore, GSK joined the SNP consortium to build a high-density SNP map of the human genome and tried to implement new technology and insights from the genomics research into their new drug development processes. The company established an new internal group to streamline the use of all the available technologies.
In 2000, GSK stated that it wanted to develop new drugs for cancer, obesity, diabetes, and heart diseases and the company succeeded for all these diseases except for obesity.
On a more detailed level, GSK was less successful: only four of the sixteen drugs that entered phase I were further developed and present in the pipelines around the year 2007.
GSK created six Centres of Excellence for Drug Discovery (CEDDs), each centre focussed on specific diseases. Corresponding to the changing disease areas, the CEDDs also had to change and GSK restructured them. After the CEDD's were restructured, GSK focussed on a mix of 'new' and 'old' disease areas.
GSK joined several initiatives in the field of genomics and implemented the results in the company. These collaborations were not literally projected. The pipeline also didn't give names of the contacts of GSK and discerned only drugs from inside and drugs from outside. Therefore, it is hard to see whether or not collaborations were projected. However, when GSK started, it a strategy to aggressively license-in new drugs from other companies and to invest in genomics, and that is was they did.

6.4 Answer on main research question 1

This conclusion will give an answer of the first main research question. The main research question of this first part was:

What are the differences between the initial new drug R&D strategies and plans and the new drugs that appeared in the pipeline of large pharmaceutical companies in the period 2000 until 2009?

In order to answer this question, six pharmaceutical companies are studied. This study showed that none of the companies was able to realise all its ambitions regarding to new drug development. Furthermore, each company changed at least one of the disease areas that were projected for the future. Each company kept some core disease areas, stopped some old disease areas and introduced new ones. As a result, some companies (Roche, Schering-Plough) had some areas that were underdeveloped.
The companies had also certain targets, they wanted to become the leader in a certain field. Some companies were very successful in reaching their goals (AstraZeneca), others failed (Schering-Plough). Regarding to future disease that companies wanted to serve, most of the companies were able to serve more than half of the diseases they aimed to serve. However, differences were large, Schering Plough served 20 of 23, GSK served 4 of 16 projected diseases.
Beside disease areas, several companies also aimed to develop and invest in the field of genomics or genetics. All the companies did so, but the results of their investments were not always clear. The trend is that companies try to implement technologies and insights into their routines for new drug development and during clinical trials.
All of the investigated companies had contact with other companies. The most remarkable point is that these contacts are often not projected in advance if companies have many contacts in their pipeline. All companies had several unprojected contacts (this is not clear for GSK). This is also valid for some of the (major) acquisitions.
Despite the conclusion that none of the companies managed to realise each ambition it had and that there are large differences between the companies, the number of drugs that does not fit within the initial projected disease areas of 2000 is low. Three of the companies (GSK, Amgen, AstraZeneca) did not have a drug in their pipeline that did not fit within their initial targeted areas.

7.0 Results part 2

The second part of this research focuses on the second main research question which investigates the influence of the 'ability to provide resources effectively', 'the ability to implement technology', 'possession of strategic resources', and 'dynamic capabilities' on the success of new drug R&D programmes. These factors and their relation with the success as presented in the conceptual framework are investigated by means of the interview questions that are presented in the operationalisation (and annex 2). The central question in this second part explores what the influence of the 'ability to provide resources effectively', 'the ability to implement technology', 'dynamic capabilities' , and 'possession of strategic resources' on the success of new drug R&D programmes was. As mentioned in the method, the answer on this question is obtained by means of interviews with respondents from pharmaceutical companies in the research population.
Several high-level employees are contacted by email with a request to participate in this study. Almost all the contacted persons responded positive on the request. However, due to summer recess at several companies, most of the people were not able to participate on short term. Nevertheless, three of the desired respondents, with decades of experience at various positions in the pharmaceutical industry, were interviewed about their companies: Schering-Plough, Amgen and GlaxoSmithKline.

The conceptual framework investigates the influence of four factors on the success of new drug R&D programmes, corresponding to four sub research question: the ability to provide resources effectively (2.1); the ability to implement technology (2.2); dynamic capabilities (2.3); and possession of strategic resources (2.4). The last questions in the interview elaborate about the last sub questions (2.5 and 2.6) about possible other important factors.
The interviews took about one hour each and are recorded. The recordings are written down and the following paragraphs present the most important findings from the three interviews.
For each factor, the sub research question is introduced and the main outcomes of the related interview questions are elaborated. At the end of each factor, the most important findings are summarized to answer the sub research question. Furthermore, the answers are compared with the hypotheses from the theory and how the factor in the conceptual framework should be refined. The last sub questions are used to discover whether or not extra factors have to be added to the conceptual framework. At the end of the results, the second main research question will be answered and the refined model presented.

7.1 Influence of the ability to provide resources effectively

7.1.1 Analysis of the interview answers

The ability to provide resources effectively focuses on the competences that a company should have and use in order to exploits its network by means of technology that can be obtained from outside the company. Therefore, the first sub research question (2.1) investigates what the influence was of the ability to provide resources effectively on the realisation of the goals regarding to the disease areas targeted drugs as mentioned in 2000.

The first two interview questions (A and B) for this factor investigate the ability to build and maintain a network of technology sources. Question A investigates the influence of having a network with contacts that posses technology.
All three respondents recognize the importance of having a network for the success of the R&D programme. Two of the respondents stated that a company that innovates in isolation has a much smaller change to succeed than a company that interacts in a network. All three companies have many active interactions with other companies and universities. These interactions are important for several reasons.
One reason is to get in contact with research groups or (small) companies which have, or are willing to, develop interesting technology or drug candidates. This might be because the large company is looking for specific new compounds or is interested in a certain technology. It might also be the other way around. In that case, the external party offers its invention to the larger company.
However, the way companies interacts with its network, for example to obtain access to technology or compounds, differs per situation. Sometimes a collaboration agreement is preferred but licensing appears to be the most common solution. This is often done when a technology is widely available. However, when market exclusivity implies a strategic position, or when the collaboration is really intensive, acquisition is often preferred. Though, the attitude of the company appeared to have influence on the type of interaction that is chosen. One company appeared to prefer collaboration based on resource investments from both sides and profit sharing. The first company actively contacts small companies, universities and had a clear open attitude because it considers itself as a leader in its field. This makes the company attractive to contact for parties in the field if they are looking for a partner in biotechnology. The second company appeared to prefer more aggressive approaches like acquisition to obtain more control over the technologies and compounds, for example the control over a certain platform which can be used to develop vaccines. This is not surprising because the strategy of the company was to acquire and attract promising compounds and technologies to keep the pipeline filled and feed the enormous marketing department. The third company did not show a clear attitude about what kind of interaction was preferred.
An other reason to interact with the network is to use the network as a reference in order to determine which new developments regarding to new drugs or technologies are (most) promising. Two respondents indicated that there is a large pool of public information about all kind of (scientific) developments that are relevant for the pharmaceutical industry. These are published in for example scientific magazines, on websites, in market intelligence reports, in patents, at the registration authorities and at congresses. In order to discuss and valuate new developments and information, interaction with colleagues at other organisations and scientists are needed.
Question B investigates the influence of the maintenance of the network. The answers of the respondents are clear: If you do not maintain your network as a company, you will lose your network. It is important that the interaction in the network comes from both sides. Sustainable relationships only occur when you are be open to help others, if others are open to help you. Furthermore, if you are active in a field, you must be active in

order to avoid that you are lagging behind. Therefore, continuous interaction with your network is required.

The following questions focused on the selection of technology regarding to the availability of technology and the ability to comply to the internal need for technology.
Question C investigated the influence of having a wide range of choice in technology at other companies to choose on the success of the new drug R&D programme.
Pharmaceutical companies themselves seem to be not eager for development of new technology by themselves. The rationale is that technology development is expensive and once the technology is developed, it must be updated continuously to the same level as every other company that offers the technology because this is (almost) impossible. If a technology is really promising, specialized companies will start to develop and offer similar technology as well because of the expected market demand. Therefore, mainstream technology is almost automatically widely available. For example, high-throughput screening of DNA. These companies have often a business model that is based on licensing-out their technology. As a result, it is more efficient regarding to costs and people to retrieve the technology from specialized companies by means of a license agreement of buying of complete company that offers the technology. Therefore, mainstream technology is a success factor, but not decisive.
A large variety in available technology is appreciated when a company searches for a something more specific, like a new way to treat a particular disease. A disease can be treated by means of several different approaches. When a company is looking for a solution, a broad availability of approaches (e.g. small-molecules, monoclonal antibodies) increases the chance to find a suitable approach and thereby the chance to realise an initial goal in the R&D programme.
Question D questioned the influence of a wide availability of technology at other companies. The availability of technology has, according to the respondents, both advantages and disadvantages. It depends on the situation whether or not a wide availability is advantageous.
On the one hand, as mentioned at the previous question, a wide availability of technology increases the chance to solve the problem when a company is looking for a solution. Other technologies or compounds can be seen as a kind of back-up when the first solution did not work. However, different compounds can be based on different technologies. For example monoclonal antibodies, peptibodies or small-molecules. In other words, diverse technology may imply diverse compounds and vice versa. Furthermore, a wide availability of technologies brings demanding parties in a good bargaining position because they have plenty of choice.
On the other hand, a technology may be the basis for a strategic position if it is not widely available. For example, GSK has the exclusive rights for a certain method to develop vaccines and Amgen is one of the few companies that is able to develop peptibodies. This might imply that they have an (almost) exclusive possibility to develop a certain type of compounds. Competing drugs from R&D programmes of other companies will be less successful if such a technology appears to be the key to superior drugs to treat a specific (group of) disease(s).
Question E focussed on the ability to manage a good fit between internal demands and external offers regarding to technology.
In the first place, internal demand develops over time. People talk and communicate with other researchers and colleagues in the field and on congresses or read about new possibilities in the literature. If a new technology or approach is interesting and relevant, people will wonder whether or not their company should have it too. If a company decides that it is interesting enough, it may decide that the new technology or approach must become internally available. For example, high throughput screening, combinatorial chemistry, fragment-based synthesis et cetera. This decisions is dependant on many factors. For example, the knowledge and skills that the company already has; how the technology fits within the R&D programme and strategy; and what the trend of the (future) market is.

When the new technology or approach is offered by an external party, the large company will explore what the possibilities are. A company may decide to set up an own group that works on the new development in order to make it available for the rest of the company. An other possibility is to acquire the new technology or license it in. This depends on which parties (e.g. small companies or university research groups) offer the new technology or approach and how they are willing to share the technology. However, large companies generally want to have new relevant technologies intramural. All large companies have all the mainstream technologies, for example to screen compounds, available at their own R&D department. Regarding to these kind of technologies, there is almost no difference between the companies. So, it is not likely that differences in success are caused by possession of these technologies.

Question F investigates the influence of the competence to negotiate that intangible parts of the technology are included when new technology is transferred from outside the company on the diseases and disease areas that could be developed.
The people who have the most extensive knowledge about the technology work at the company where it comes from. Therefore, the most optimal solution is sometimes to transfer the surrounding people together with the technology. Technology is worthless without people who have the skills to work with it. If transfer of the surrounding people is not possible, specialists from inside the own company or hired specialists are needed. The chosen solution depends on how much effort a company wants to do and how complex the technology is. Sometimes, if the negotiations about contracts and intellectual property rights become too complex, this might be an incentive to acquire a company. However, buying a company may have negative influence on the further development of the technology because the innovative and entrepreneurial environment of the smaller company is affected and key-people may leave the company. In that case, outsourcing or establishment of a separate business unit might be a solution.
If the technology fits within the projected strategy or is interesting enough for further exploration of the possibilities and applications, collaboration might be preferred. Beside the technology itself, knowledge about the competing technologies and knowledge about the end market is required.

The next question, G, investigates the influence of the ability to manage technology transfer efficiently on the realisation of the projected diseases and disease areas in the pipeline.
According to the respondents, it must be clear that (most of) the initiative to transfer technology often comes from scientists at the R&D department, not from the managers. However, managers determine the (strategic) course of the company, how the programme is conducted and which technology is transferred. The management decides how the resources are allocated.
If there is more than one technology available, it can be that the management has to choose, in order to avoid inertia, which technology will be the technology to work with. These choices have to be made because the resources that can be allocated are limited. In that case, good management is essential to make the right decisions. Good management is considered as essential for efficient technology transfer. Therefore, the companies have heavy-weight project managers to ensure that the technology is transferred smoothly.

Question H and I investigate the ability to learn in a company. First, the influence of the ability to internalize technology from outside the company efficiently on the realisation of the announced diseases and disease areas in the pipeline was questioned.
Once a technology is chosen an transferred, it is important that the technology is implemented as fast as is possible. Speed is a very important factor during new drug development and makes the difference between the first on the market or be one of the followers. So, the more efficient you can implement and apply new technology as a company, the better. The role of the management is to ensure commitment of all the involved employees towards the new technology. Speed is considered as an important

success factor. The competitive environment is constantly monitored, if the forthcoming drug candidate is considered as inferior or the process lagging to far behind, it is stopped.
It is important to notice that this means that sometimes companies are able to develop the drugs and serve the disease areas that they projected in advance which would mean that they are successful according to the definition of success in this study. However, sometimes the company stop their projects because they consider competing products as superior and therefore choose to stop their own project in order to avoid a commercial debacle. However, later answers (about dynamic capabilities) later on in the interview indicate that the comparison of the own compounds with the competition starts at clinical phase I studies and the information about the competitive compounds become available. These compounds are also included in this study. So, the fundamental question of this study about whether or not companies are actually capable of developing the drugs and serve the disease areas as projected in the strategy in 2000, which does not take the commercial success in the end into account, can still be answered.

Question I investigated which role the ability to develop technology from outside the company further played during the realisation of the announced diseases and disease areas in the pipeline.
First, it is crucial to develop the technology that is in-house further. Once technology is in-house, the company doesn't need to retrieve if from elsewhere.
Second, technology from outside the company is often generic, not custom-made. Further development after the transfer is therefore (almost) always needed. The further development can take place at the own R&D department or in collaboration with the supplier. As mentioned before, the supplier has the most extensive technology about the technology it offers. The respondents indicated that once a technology is available, further development and implementation of the technology will follow because a company will explore further possibilities to apply the technology.
Furthermore, the respondents consider new compounds also as new technology: the technology to make that particular compound. Sometimes, new compounds are offered by other companies or research groups from universities who discovered new methods to treat a disease. The compounds are offered because the external party does not have the resources or knowledge to develop the compound further and is looking for a company who can. The offered technology or compound are always examined by means of criteria like: Can we do something with it?; Do we want to do something with it? Do we have knowledge about it?; Does it fit within the activities of our company? Though, companies have a certain flexibility in their criteria. Sometimes companies see an offered invention as an unique opportunity to explore a new disease or disease area.
Even when a compound or an approach to treat a disease already led to a successful drug, they are always explored further. For example, a new compound to treat solid tumours with an indication for lung cancer might also work for other indications like head and neck cancer. The development, however, will not be started for all indications at once, because the clinical trials are very expensive and become too expensive when the are conducted simultaneously. Furthermore, the risk of doing all clinical trials simultaneously is also too high.

7.1.2 Conclusion

The network of a company brings it in contact with new technologies, insights, knowledge and compounds that can be used to realise the projected R&D programme. The theory states that a company is not able to develop all the promising and useful technologies at its own R&D department. This statement is confirmed by the respondents who state that a company can not survive without a network. The interviews also reveal that the network is used as a reference and a forum to discuss new developments in the pharmaceutical industry. This is essential to valuate the new developments.
If a network is not maintained, it is lost. Furthermore, it must be maintained actively in order to avoid that the company is lagging behind regarding to the competition. Though,

having and maintaining a network is no guarantee for a successful R&D programme, but it is impossible to be successful without a network.
Technology that is available outside the company can be specialized or mainstream. Mainstream technology is widely available and although it is considered as a success factor, it is not decisive. Specialized technologies are not widely available and imply an opportunity to obtain exclusivity to develop particular compounds and to build a strategic position. Technology is worthless without the knowledge to apply it. This is an important factor to take into account when technology is transferred.
A good match between internal demand and external offers is important to realise the R&D programme. However, opposed to what the theory sketches, there is often no 'clear' internal demand because the external solution for internal problems might have different forms. So, a good fit between internal demand and external offers is not as clear as the theory depicts. Furthermore, the demand for solutions develops over time. Companies appear to scan for new technologies and whether or not these might be useful for existing or future activities. As a result, it might even be that demand follows after external offers.
When technology is transferred, a company must ensure that the surrounding knowledge is also transferred or the technology will be worthless. This is also stated by the theory. The interview answers show furthermore that the method to transfer the knowledge depends on two factors: the extent to which the technology already is developed and what kind of interaction is optimal to develop the technology further.
Although transfer of technology is often initiated by the scientists of a company, the managers have to make the final decisions about which technology is transferred. Heavy-weight managers take care of the process, this indicates that a good transfer is considered as very important for the R&D programme. Good management is also essential for speed, commitment of all involved employees and good project management. Speed is a main factor for success. Large pharmaceutical companies want to best the first on the market, or the best in class. The more drugs are developed to treat a specific disease, the lower the chance to be the first on the market or be the best in class. If the competing drug development processes are too far ahead, the own drug development projects will be stopped or licensed-out to other companies in order to save resources and money. The theory only states that the process must be managed efficiently, the interviews specify this to rapidly.
Technology that is new for the company is (almost) always developed further because it must be adapted for the particular situation and problems where it will be applied. If the technology is incorporated into a compound it will also be further developed because other indications of the compound will be explored, which contributes to the success of the programme. The respondents show that further development of technology, as indicated by the theory, is obvious and happens all the time. Furthermore, they note that further development does not stop after one success.

7.1.2 Answer on sub research question 2.1

The first sub research question (2.1) investigates what the influence was of the ability to provide resources effectively on the realisation of the goals regarding to the disease areas targeted drugs as mentioned in 2000. The answer is that a well developed ability to provide resources effectively has a positive influence on the realisation of the goals as mentioned in 2000.
The first hypothesis in the conceptual framework is that the ability to provide resources effectively (i.e. phase 3 of Tidd and all the factors it incorporates) has a positive influence on the success of the new drug R&D programme. This hypothesis is confirmed. More specific, one can say that having a network and maintaining a network are essential for every company to prosper in the industry. Technology in general appears to play a minor role because most of the technology is widely available. Most of the technology is not decisive for success, but companies will not be successful without technology. Speed and skilled management or resources and projects appear to be more important to become competitive and realise the goals regarding to new drug development.

7.2 Influence of the ability to implement technology

When technology is obtained and all the required resources are available, the focus shifts to the organisation of R&D projects and how these should be managed and organised. Therefore, the second sub research question (2.2) investigates what the influence was of the ability to implement technology on the realisation of the goals regarding to the disease areas targeted drugs as mentioned in 2000.

7.2.1 Analysis of the interview questions

The first two questions for this factor, question J and K, investigated 'learning before doing' by asking whether or not companies consulted experts when they develop new drugs, and what the consequences of the feedback of these experts were for the disease areas and targeted disease in the pipeline.
The answers were unambiguous, each company always consults experts about new drug development projects. New drug development projects are first discussed with other scientist in the own company, heads of research departments and the own experts before the project proposal is approved. The experts of large pharmaceutical companies have continuously contact with other experts and world class scientists in the field. Furthermore, companies have often an external scientific advisory board. These are heavy-weight experts from outside the company, for example from top universities, who give a very critical review of whole pipeline one or two times a year. These experts look at the pipeline from an other perspective, which is very valuable for the company. These experts sometimes review several companies and may know about new developments that are not known at the company. As a result, these experts are able to review other companies with business intelligence information that the companies may not have collected themselves.
Sometimes, a company may discover a new pathway and an appropriate molecule that uses that pathway for an indication. In that case, experts are consulted for their opinion about the new discovery. Furthermore, if the indication is new for the company, experts who know all about the disease and its patient population are attracted to work for the company.
The clinical trial protocol is also reviewed by external experts about the feasibility. During clinical trials, patients and doctors are asked about how they experience the new drug. However, these patients and doctors are not consulted for advice about how things must be done. The experience of patients is important for the final label of the drug.
Experts are consulted to share scientific insights and have a discussion based on scientific arguments. The feedback of the consulted experts about the new drugs that are developed and the disease areas that are served is taken very serious. It might be that the discussion of the experts does not lead to an unequivocal advice. In that case, the company has to decide for itself. However, in general, it is likely that the companies follow up the advice of the experts.

Question L, M and N investigate the use of the stage-gate model at large pharmaceutical companies. According to the theory, the stage gate model is important to structure the drug development projects and to clarify the goals. The first question L, determined whether or not a company used the model at all by asking if the projects were cut into parts.
The pharmaceutical development process itself is always divided in the standard part of pre-clinical research, followed by clinical phase I, II and III, registration and phase IV. However, all three interviewed companies these phases in smaller parts, with a main focus on the clinical phases. Before a company starts, the requirements for registration and the description that is desired in the label of the drug in the end are well defined. These criteria not only include the criteria regarding to safety, quality and efficacy, but also criteria regarding to health-economics and criteria to ensure that the final product is competitive regarding to other drugs that are already on the market, or developed at the same time.

After each part of the drug development process, decisions about go or no-go are made. There is a so called critical path with steps that follow on each other. The criteria of each step must be fulfilled before one goes to the next step. The results are compared with the initial goals and minimum criteria regarding to the label and competing drugs. A minor side effect does not automatically lead to abortion of the project, an extra warning can be added to the label. However, if the drug deviates too much from the initial criteria, for example due to unexpected side effects, one might decide to stop further development.
The most important decision moments are starting the clinical trials and going to clinical phase III. Many decisions are made by the own project team but the most important results and decisions are discussed with senior management from headquarters. For example, going to a next phase in clinical trials, which implies an enormous investment of money and resources. The most important clinical phase, regarding to decision making, is phase III. This clinical phase is the most expensive clinical trial and implies that a company also should start with many other processes like registration preparation, production facilities, marketing plan, start talking with insurance companies et cetera.
Question M investigated what the influence was of the use of a stage-gate model on the success of the new drug development projects.
The answer of the respondents was that it enabled the company to 'kill projects in time'. The criteria enable companies to identify drug development projects that do not comply to the criteria as determined in advance, or inefficient projects. Time consuming projects that are inefficient and /or do not lead to results must be intervened or stopped as soon as possible in order to focus the resources and the creative energy of employees on efficient projects that lead to results. The stage-gate model also enables companies to determine the critical path in a systematic way and identify the restraints that determine the time that is needed for the drug development and thereby the progression speed of the project. In other words, the model leads to more accurate new drug development and increases the chance to keep up with competition in terms of speed.
The last question regarding to the stage-gate model, N, investigates the influence of hard go no-go decisions on the realisation of the goals regarding to the projected drugs and disease areas in the pipeline. Partly, the answer on this question is already given in the answer on question M: It lead to more focussed application of resources and the capabilities of the employees are used more efficient. As a result, the chance to develop successful drugs and serve disease areas increases.
The management plays an important role, they have to make the go no-go decisions. The targets and labels that are projected in the beginning of a project are never just 'achieved' or 'not achieved'. There is no checklist that must be ticked completely and if one criterion is not ticked, the project is terminated. The decisions are often more complicated and the management has to decide what is acceptable and what isn't. One has to be flexible, but these decisions do not only have influence on the projects, but also on the entire strategy of the company. For example, by approving a project that is on the edge of a disease area, nuances in the name of that disease area and a small shift in the focus of the company may appear. Good management is here really an important success factor. The management must be able to make deliberate decisions. Bad management decisions or no decisions at all may harm the company.

Question L investigates the role of team working by asking what the role of active interaction between people and different disciplines about problems and conflicts that appeared during new drug development projects was.
All three respondents recognised the importance of good team working. However, good team working is essential for *all* the processes in the companies, not particular during the R&D programme.
The project members have to trust each other, there must be open communication. If there are conflicts, the communication is closed. Open communication is very important. When people work for their own interests and not share what they do with other people because they think that other people do not have anything to do with their activities, they do not work in teams, cooperate or share their knowledge. Team working,

cooperation and knowledge sharing are essential for good new drug development projects. However, there must be a balance in the amount of communication. Each project member must receive the information that is relevant for his task. Furthermore, commitment of every project member to the product is needed for a project without unnecessary delay and the will to bring the product on the market in the end.
Again, the management plays an important role. They have to decide whether or not the project will be continued or stopped. When a project is stopped, the management must ensure that every project member shows commitment to the new project and leave the old compound behind. So, during projects, open communication and commitment to the product are important factors. Projects will be less successful if one of these factors is lacking.

The answers of the previous questions elaborated already the role of managers. This was not expected in advance. Instead, the following questions were aimed to investigate the role of managers regarding to an appropriate project structure. Question P explored the influence of project managers with deep understanding of the requirements during new drug development projects on the success of the R&D programme.
The respondents indicated that most of the top managers and board members ni their company made a hands-on career within the pharmaceutical industry. In other words, these people have due to their own career path a deep understanding of how the processes in the pharmaceutical industry work.
During a new drug development process, one needs two types of people: professionals who have deep understanding of the material, and project managers. The professionals have to contribute to the project with their expertise. The project managers have to ensure that the project is structured, is progressing, deadlines are reached and meeting are planned in time. Furthermore, the respondents indicated that because scientists are very curious to explore all kind of other applications of the compound, the project managers must ensure that they keep focussed. Good focus on the content and structure of the project are important for the final success of the projects and the R&D programme.
Question Q investigated what it mend for the success of new drug development projects to have manager who were able to adapt the project to changing situation when needed.
The decision to change projects depends on two things: the manager that is capable of making the decision to change the project, and scientists who have the knowledge and capabilities to realise the change. Sometimes, manager have to take the opportunity to apply the enormous pool of knowledge that is available at the large pharmaceutical companies in order to learn and try alternative solutions. The decision to adapt the project might be wrong, but taking risks is part of the game. As long as the company takes enough good decisions, it will go well and projects will be successful.

7.2.2 Conclusion

The questions for the second factor investigated: the ability to implement technology, investigated learning before doing, the use of a stage-gate model, team working and appropriate project structures. The main conclusions regarding to these factor are that:

In order to anticipate on possible future problems that might appear, all companies consult experts before and during in new drug development projects. The advice of the has a major influence on the decision to start, continue or stop new drug development projects in the pipeline, the disease areas it serves and the strategic direction of the company. However, if compared with the theory, the diversity of experts that is consulted about possible future problems that might appear is more limited. By far the most important (if not all) consulted experts are scientists.
A stage-gate model is used at every interviewed company. The model has several functions: it enables companies to work by means of clear goals and criteria regarding to the label that one wants to achieve and kill inefficient projects in time. Furthermore, the restraints regarding to time and the critical path help to get a good indication of the required time and make a proper planning. By killing inefficient and result lacking

projects in time, efficient allocation of employees and resources is stimulated. The result is a more focussed way of developing new drugs and serving disease areas. This corresponds to the theory of Tidd (et al. 2001), which states that the stage-gate model is used to structure the projects and clarify the goals that must be achieved. The interviews add to this statement that the model also enables companies to detect less successful project in time, leading to more efficiency in the R&D programme.
Team working is important to achieve good project results. Crucial factors are balanced, but open communication and commitment to the project and the forthcoming new drug. The theory indicates that communication is required, but the interviews reveal that commitment is an other important factor that must be taken into account.
The management appear to play an important role during projects in the new drug R&D programme. Managers have (almost) always a deep understanding of the processes and what is needed during the projects because their own career path passed through multiple layers of the process. They must decide about what deviations from the projected strategy or projected label are acceptable. The management determines how flexible the company can be. Furthermore, the management must ensure that every project member shows commitment and is focussed.
The theory indicated that managers must be skilled and projects must have a good structure. The interviews show what is mend with these words: managers must be able to decide which results are acceptable and which is not, what to do about it; ensure balanced communication; focus and commitment of the project members.

7.2.3 Answer on sub research question 2.2

The answer in the first sub question (2.2) about what the influence was of the ability to implement technology on the realisation of the goals regarding to the disease areas targeted drugs as mentioned in 2000 is that a well developed ability to implement technology has a positive influence on the success of the new drug R&D programme. This means that the second hypothesis: the ability to implement technology (i.e. phase 4 of Tidd and all the factors it incorporates) has a positive influence on the success of the new drug R&D programme, is confirmed.
The theory corresponded with the answers of the respondents regarding to all the factors. It can be concluded that the following factors were important for their positive contribution to the success of the new drug R&D programme: the advice of consulted experts; use of stage-gate models to structure new drug projects; use of stage gate models to examine the performance of new drug projects; skilled management (decisions); killing projects in time; balanced communication between project members; commitment of employees; focussed employees. Of these factors, the advice of consulted experts, killing projects in time (which expresses skilled use of the stage-gate models); and skilled management appeared to be the most important.

7.3 Influence of dynamic capabilities

A company should have the capacities to realise practical innovations rapidly in order to stay competitive and be able to anticipate on changing situations. Therefore, dynamic capabilities ("timely responsiveness and rapid product innovation, coupled with the management capability to effectively co-ordinate and redeploy internal and external competencies" (Tidd et al., 2001, p. 269)) are necessary. The fourth sub research question (2.3) investigates the influence of these dynamic capabilities on the realisation of the goals regarding to the disease areas targeted drugs as mentioned in 2000.

7.3.1 Analysis of the interview questions

The first question, R, investigates how important it is for the fulfilment of the goals regarding to the diseases and disease areas as projected by the initial strategy to have the ability to anticipate quickly on the changing environment and adapt projects if necessary.

The respondents noted that the pharmaceutical industry is not as dynamic as the theory sketches. The environment of large pharmaceutical companies changes, but is quit conservative in its behaviour. The activities before clinical trials are more or less secret. Those activities are hided behind the walls of the companies. However, even in that phase, patents reveal which compounds are used and for what purpose. In other words, the dynamics are detected very early.

The most important dynamics are present during phase I and phase II clinical trials. Before one decides to start phase I or phase II, an extensive analysis of the own position regarding to the competition is made. The own label and progression in compared with labels and progression of competitors.

As mentioned before, large pharmaceutical companies aim to be the first on the market or the first in class. Due to extensive business intelligence, the companies are (almost) never surprised. When companies start clinical trials, the have to contact hospitals, contact ethical commissions et cetera. The companies also present what they discovered on congresses and publish in magazines. Furthermore, the public domain provides information about which company is conducting which studies, what the indications are, which molecules they use. This is for example written down at ClinicalTrials.gov (the database that is also used in this study). If the business intelligence information shows that the medical need for a new compound is already fulfilled or the new drug is not innovative enough, leading pharmaceuticals are no longer at the front line. This means that they expect no longer to be able to become first on the market or first in class. So, for example, if three or four competing companies appear to be ahead of a company. It will reconsider its project and use your business intelligence information to decide whether or not to continue. A second option is to license-out or sell the compound. A third option is to increase the amount of resources, money and employees that work on the project and try to speed it up. It is important to know that every pipeline reflects already how a company thinks about the position of its own drugs regarding to the competition.

In other words, active anticipation is essential for the realisation of the own R&D programme. The answers of the respondents indicated that it is an essential factor for success. A company must know exactly what other companies are doing. If a company does not know what other companies are doing and only pays attention on its own the projects, it won't work.

The second question about dynamic capabilities, S, investigated how important it was for the fulfilment of the goals regarding to the disease and disease areas as projected by the initial strategy to have the ability to develop practical innovations rapidly.

As mentioned also earlier during the first factor, speed is very, very important for success. For example, when a new compound appears to have an unexpected side effect, one has to develop a solution as soon as possible. A company must be able to analyse

the problem with a group of internal or external experts. The expert panel has knowledge and experience with many other products and may have seen the problem before.
Management is also very important again. The management must have the courage to take radical decisions. For example to change the indication of a new compound if it appears that a side effect of the compound is far more attractive than the original indication (like happened with Viagra). Other examples are to change the focus of the compound on an other patient population to discern the own compound from superior products that are developed for the same indication.

7.3.2 Conclusion

The environment of large pharmaceutical companies changes but is quit conservative in her behaviour. Each pharmaceutical company monitors the dynamics in the pharmaceutical industry are extensively. So, the dynamics in the pharmaceutical industry are already detected very early in the new drug development trajectory. These movements and progression of other companies affect the decisions about the own new drug development projects. Active anticipation is a very important success factor for the own R&D programme.
During new drug development projects, each compound is verified not only with the own criteria regarding to label one wants to achieve, but also with the position regarding to competing products. Active anticipation on changes in the competitive position or problems during the development is an important success factor. Again, good management decisions are also essential. The management must have the courage to change the project radically if needed, or take losses. Therefore, an expert panel that helps to analyse the problem and suggest solutions is needed. The management must also ensure that the progression speed is high enough to keep up with the front line of new drug development. Speed is an other very important success factor. Development of quick innovations is essential to keep up with competing drug development projects and ensure progress without large delays. This is needed to keep the projects in the own R&D programme commercially attractive. One can continue the projects, but if the drugs are not competitive if they enter the market, there will be not financial resources to finance future research.

7.3.3 Answer on sub research question 2.3

The fourth sub research question (2.3 investigates the influence of these dynamic capabilities on the realisation of the goals regarding to the disease areas targeted drugs as mentioned in 2000. This question can be answered by stating that dynamic capabilities have a positive influence on the success of new drug R&D programmes. More specific, active anticipation on the environment is important to keep the own projects at the front line or reject them in time. Therefore, speed and good management decisions are essential. If a company anticipates actively and rapidly responds to its environment, the own projects can be kept at the front line, which means further developed into commercial attractive drugs. Active and rapid response is also needed to stop the projects that are no longer capable of being at the front line in time. As mentioned in the answers about the stage-gate model, this is also important for efficient use of resources and people and increases the change of successful projects.
All in all, the third hypothesis, which states that dynamic capabilities have a positive influence on the success of the new drug R&D programme is confirmed. The most important factors regarding to dynamic capabilities are active anticipation, management skills and speed.

7.4 Influence of possession of strategic resources

The possession of strategic resources is the third main factor that is investigated. The possession of strategic resources is important for the competitive position of a company. Patents are used in order to obtain or defend strategic positions. The literature indicates that pharmaceutical companies use license agreements, acquisitions or collaboration to access patented technologies or drug compounds. The third sub research question (2.4) nvestigates the influence of possession of strategic resources on the realisation of the goals regarding to the disease areas targeted drugs as mentioned in 2000. Therefore, the following questions investigate which method to obtain patented strategic resources was most important for the realisation of the projected R&D programme.

7.4.1 Analysis f the interview questions

The first question, T, investigates the influence of licensing patents on the ability of a company to realise the goals regarding to the disease areas and diseases that were projected in initial the strategy.

The respondents indicated that the importance of licenses depends on the programme for which it is needed. Sometimes a company needs technology for its programme but does not posses this technology. If an other company has the intellectual property rights (IPR) for the technology, a license is often used to access the technology. The owner of the technology is compensated with a royalty: a percentage of the net profits of the product for which the technology is used. However, if a company needs to license-in many technologies, 'royalty stacking' may appear. This means that there are so many royalties to be paid, that the projected profits become too low to keep the project commercial attractive. In that case, the project might be stopped or not even started, even when the product works well. In order to avoid royalty stacking, there is always a paragraph in the project plan that analyses who has the needed technology.

It can be stated that every intellectual property that is essential for new drug development, is claimed by a company. Therefore, analysis of where the patents are and whether or not the final product can be protected well is essential. If the projected product can not be protected properly (with IPR) in the end, it will not be developed.

Licensing is also used to change a company. Beside licensing-in new technologies and compounds, the opposite is also an option: sometimes molecules or even complete registrations are licensed-out or sold. This happens if the company does no longer want to invest money in the project or when technologies or compounds do no longer fit within the targeted disease areas and strategy. However, other companies might be (still) interested in these compounds or disease areas. In that case, licensing-out is the best option, for the company as well as for patients.

If it appears that a future blockbuster area is a disease area where a company does not operate yet, licensing may be used by companies to rapidly change direction and catch up with the competition. By means of licensing-in several compounds, a company may develop quit rapidly a portfolio in new disease areas. However, this is only possible to realise these relatively rapid changes if the company has enough financial resources available.

The respondents also noted that licensing is often used by small companies who do not have the power, money and / or knowledge and capabilities to develop a compound further. These companies have their inventions patented and search actively for partners, large companies, to develop their inventions further. The underlying patents are essential for these small companies to generate revenues and survive. The large pharmaceutical companies note several collaborations with smaller companies where the large companies finance the R&D activities of the smaller company. For example, they finance the further development of a promising compound and pay the small company for every milestone that is reached.

Sometimes, a company wants to license a technology or compound from an other company. If the other company refuses to share its IPR, the demanding company can do a hostile bid to acquire the other company. However, this option is not possible if the

other company is not publicly quoted.
Question U investigated the influence of acquisition of patents (or patented strategic resources) on the ability of a company to realise the goals regarding to the disease areas and diseases that were projected in initial the strategy
Large pharmaceutical companies sometimes acquire patents with or without the surrounding company. An acquisition may follow after close collaboration, the external companies is sometimes almost part of the company. In that case, acquisition is a small step. Other rationales for acquisition are to get specific technologies or compounds intramural because it is important to have a stable or exclusive access to that technology. An acquisition leads to exclusive use of the patents, which may lead to a strategic position and frustrate competitors. Frustrating patents might be an incentive to acquire patents instead of licensing.

The last question about the possession of strategic resources, V, investigated the role of collaboration. This question is already answered during the previous questions about licensing and acquisition. Many licenses are in fact a (kind of) collaboration.
The most important remark about 'pure' collaboration with other companies is that they are not very common. However, there are strategic alliances or joint ventures. These collaboration forms are often used at the end of the development process. In that case, companies share the very high costs and share the revenues and divide the markets. This is also a method to avoid too much royalties. Instead of licensing and paying royalties, a company can ask the other party whether or not they are interested in participation and partnership in the project. In the end, the profits of the project will be divided equal to the efforts during the projects.
A final remark of one of the respondents is that *every* company has to contact other companies to obtain access to technology because there is no R&D department that is able to continuously provide the best technologies and the most promising compounds for the own R&D programme. However, the way of accessing external technology depends on the philosophy of the involved parties. Some companies are aggressive and always buy what they need. Other companies are charmed by good collaborations with other companies and share the profits, but also the risks.

7.4.2 Conclusion

Licenses are used very often, mostly to obtain all the technologies that are needed during a R&D programme. However, if too much licenses are needed to develop the projected drugs, the projects will be cancelled because they become commercially unattractive. In other words, the own knowledge base and capabilities must be already on a high level. Beside licensing-in, licensing-out of compounds is also used to determine the course of the company regarding to the disease areas and drug that are developed or stopped. Licenses can be used for relatively rapid changes by means of attracting or rejecting technology, knowledge and compounds.
Acquisition is used if certain compounds or technology must be secured for the company. These are technologies or compounds that have strategic value for the company (e.g. a certain platform technology to develop vaccines). Acquisition implies exclusive use of the IPR which can be the basis for a strategic position and gives a company unique possibilities regarding to the development of certain compounds. The disadvantage is that risks can not be shared. The advantage is that the profits don't have to be shared.
Pure collaboration, without an underlying license agreement, is not common. The most important rationale for this type of collaboration is to share risks and costs.

7.4.3 Answer on sub research question 2.4

The third sub research question (2.4) investigates the influence of possession of strategic resources on the realisation of the goals regarding to the disease areas targeted drugs as mentioned in 2000. This question can be answered by stating that strategic resources are very important for the success of the new drug R&D programme.

As already indicated by the theory, IPR and accessing strategic resources of other companies are very common to all of interviewed companies. The widely use of license agreements, acquisitions and collaboration is also indicated by the results of the first part of this research. The use of licenses, acquisitions and collaborations that access patented strategic resources shows that companies attach value to these resources because they need them to develop the innovative and competitive new drugs and serve disease areas that they projected. Therefore, the fourth hypothesis in the conceptual framework: possession of strategic resources has a positive influence on the success of the new drug R&D programme is approved.
The most common type of accessing strategic resources appears to be licensing. However, this does not mean that licensing is the most important. The use of licenses, acquisitions or collaboration in order to access and use strategic resources depends on several factors: the strategic / competitive importance or the technology or compound; the risk of a project; the costs of a project; the resources and knowledge a company has to fulfil the project; and the philosophy of a company.

7.5 Influence of others factors

The interview investigated only the factors that have an important influence of the success of the new drug R&D programmes according to the innovation literature. Therefore, the last two sub research questions investigate which other factors (2.5) played an important role and what the influence (2.6) these factors had on the realisation of the goals regarding to the disease areas targeted drugs as mentioned in 2000.

7.5.1 Analysis of the interview questions

The last interview question, W, investigates which other factors, not questioned in this interview, have significant influence on the ability to of companies to realise the goals regarding to the disease areas and diseases that were projected in initial the strategy.
A first remark of the respondents is that companies are path dependant. Their history determines their knowledge and capabilities to develop certain drugs and serve certain disease areas. The history of a company determines its unique capabilities. A company must apply these unique capabilities to develop unique innovative products. One respondent indicated that every company has access to more or less the same technology. So, the difference is made by the application of unique knowledge, original thinking and capabilities must make the difference. For example a chemist who invents new compounds that no one else ever thought of, or biologists who have unique insights in how certain diseases should be treated.
A second remark is that the markets that are targeted might influence the success of an R&D programme. Differences in patient populations determine potential sales and competition in disease areas. Furthermore, the patient population determines possible difficulties to organize clinical trials. Sometimes a niche market is more attractive than popular markets with high competition. A good example is Organon in the field of Women's Health. Many other companies left that disease area and Organon is nowadays one of the few companies that still conducts research in that area and market leader.
Beside these remarks, the respondents underline the importance of the following points that are important for successful R&D programmes: Collaboration with other parties, good structures, good team working, flexibility and a clear medical need. Furthermore, clear communication with the marketing department during the R&D projects is essential to ensure that they are updated about the specifications of the drug they have to sell. Good collaboration with external parties like registration authorities, health insurance companies and the government is needed.
Above all, a good development plan is essential: What is the target profile / the label of what a company wants to develop, how they want to develop it and who develops it. The results must be verified constantly with the initial plan in order to ensure that the final product is still meeting the minimum criteria and competitive enough to sell it on the market.

7.5.2 Answer on sub research question 2.5 and 2.6

The last two sub research questions investigate which other factors (2.5) played an important role and what the influence (2.6) these factors had on the realisation of the goals regarding to the disease areas targeted drugs as mentioned in 2000. The respondents indicated that the factors that are investigated during the interview more or less elaborate all the important factors that influence the success of new drug R&D programmes. Therefore, no additional blocks will be added in the conceptual model.

7.6 Answer on main research question 2

The central research question of thesecond part of the research was:

What was the influence of the 'ability to provide resources effectively', 'the ability to implement technology', 'dynamic capabilities', and 'possession of strategic resources' on the success of new drug R&D programmes?

Based on the analysis of the answers of the three conducted interviews it can be stated that each of the factors that are named in the second main research question contribute positively to the success of new drug R&D programmes at the investigated large pharmaceutical companies. In other words, all the four hypotheses and the conceptual framework as constructed by means of the innovation literature are confirmed. However, the analysis of the answers on the interview questions indicate that on a more detailed level, some small refinements in the conceptual framework have to be made. These are elaborated here.

Regarding to the ability to provide resources effectively, the incorporated abilities to: build and maintain a network of technology sources; select technologies; to transfer technology; and implement the technology were all important. However, the respondents stated that (mainstream) technology in general had only minor importance for success. Beside these factors, speed and skilled management forward as decisive factors for success.

The ability to implement technology the incorporated factors: Learning before doing; working with a stage-gate model; team working; and appropriate project structures all had an important influence. More specific, learning before doing can be refined as: the advice of experts. Working with the stage gate model can be refined by: use of stage-gate models to structure new drug projects; and use of stage gate models to examine the performance of new drug projects. Team working can be specified by means of: balanced communication between project members; commitment of employees; focussed employees. Furthermore, regarding to appropriate projects structures: skilled management (decisions); and killing projects in time can be used as refinement.

Dynamic capabilities and the factors it incorporated: having the ability to anticipate quickly on the changing environment and adapt projects if necessary: and having the ability to develop practical innovations rapidly. All these factors had an important influence and could be decisive for the success of a R&D programme. The factors can be refined by stating that the anticipation had to be pro-active and management skills and speed were crucial during both factors.

The possession of strategic resources, the incorporated factors: **l**icensing of patents (or patented IPR); acquisition of patents (or patented IPR); collaboration induced by patents all enabled companies to realise their R&D programme.
The most common type of accessing strategic resources appears to be licensing. However, this does not mean that licensing is the most important. The use of licenses, acquisitions or collaboration in order to access and use strategic resources can not be further specified in the model. However, the chosen type of interaction depends on several factors as can be seen in the conclusion.

The last two sub research questions investigated whether or not main factors that influence the success of new drug R&D programmes were forgotten. The answers on these questions indicated that this was not the case. Therefore, no additional main block will be added to the refined conceptual model.

8.0 Refined conceptual model

The following conceptual model is a refinement of the conceptual framework. The model shows which elements of the four main factors had influence on the success of new drug R&D programmes were important and which factors appeared to be decisive. As mentioned in the previous section, almost all the elements that were considered in the theory had indeed influence on the success and are therefore summed up in the model. The aim of the model is that is used as a framework to further investigate the influence of the factor on the success of new drug R&D programmes in larger research populations.

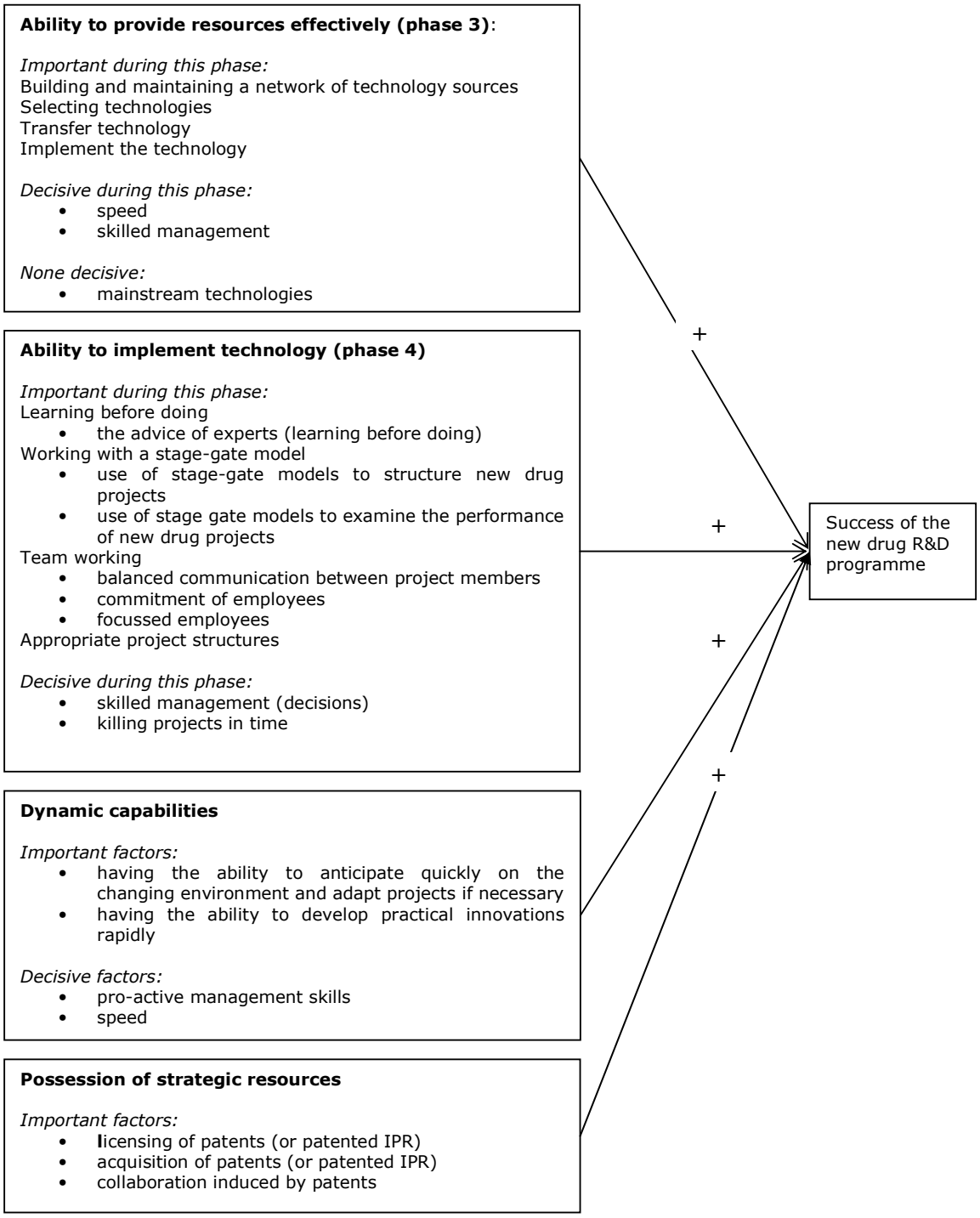

Figure 3: The refined conceptual framework

9.0 Discussion

The following paragraph discusses the used method, theory and results of this study. This discussion is used to evaluate the outcomes of this study before the final conclusions are drawn.

The method as described in the methodology section could be conducted without notable obstructions. For the first part of this research, archival analysis was used as main method. The annual reports; archival records from ClinicalTrials.gov and the newspaper articles from the Times (LexisNexis databank) were retrieved without problems. One thing must be remarked here. The Times was the only useful newspaper that had archives in the LexisNexis database. More newspapers would have lead to more diverse references. As expected, these sources appeared to be sufficient to reconstruct very detailed strategies and plans for the year 2000 and the pipeline for the years 2006, 2007 and 2008 for the six large pharmaceutical companies. This was a solid base to answer the question for the first part of this research.
Interviewing was chosen as a method because the method is very useful to explore, in this case the conceptual framework. During the interviews, additional questions could be asked to explore the topic in further detail. Furthermore, the respondents had more opportunities to speak about the rationale of their answers and underline what is important and what is not. The chosen method worked very well and led to three interviews that delivered an extensive amount of information about the influence of the factors which were very useful to refine the conceptual framework.
The first part was only used to determine the problem of being not able to develop all the projected drugs as mentioned in the initial strategy. For this purpose, the small research population was appropriate.
The second part was a first exploration of the theoretical factors in order to develop and refine a theoretical framework that could be used in to investigate more extensive research populations, the number of respondents (three) was rather low. As mentioned in the method, this was caused by the summer recess of pharmaceutical companies. More respondents would have been better, in order to be able to verify more answers and create more external validity of the model.

The theory that is used to construct the conceptual framework, formulate hypotheses and interview questions appeared to be robust and worked out very well. All factors in the model had indeed influence on the success of new drug R&D programmes and all the hypotheses were confirmed. The final interview question gave the respondents the possibility to suggest additional factors that had a significant influence of the success, both they answers indicated that no additional main factor was needed. However, some refinements in the model had to be made.

The introduction of this report indicated that the pharmaceutical industry had a problem. According to the literature, R&D investments in the pharmaceutical industry do not corresponds equally to the number of developed new drugs. The literature indicated that companies did large acquisitions or merged in order to maintain their positions in the top of the industry and compensate the lack of innovative drugs in their pipeline. Until now, it The goal of the first part of this research was to discover to what extent the pharmaceutical companies are in control over their R&D programmes. That was not investigated until know. A lack of control over their R&D programmes could be a cause of the lack of new drugs in their pipeline. If the companies appeared to have full control over their pipelines, the cause of the problem must be searched somewhere else.
The conclusion of the first main research question was that none of these companies was able to realise all its ambitions regarding to new drug development and served disease areas. In other words, the companies did not have full control over their pipelines. As a result, not only the first part of the research was relevant, the development of a

conceptual framework for further research regarding to the factor that influence the success of new drug R&D programmes was relevant too.

The respondents indicated that there is no company that is able to develop the best technologies and the most promising drug compounds every time. Companies who work in isolation will have a short life. In other words, interaction with other companies and transactions of technologies and compounds are needed in order to survive. The interview questions indicate that transactions of knowledge and technologies are sometimes needed in order to remain competitive. This can be considered as compensating the own R&D performance, but also as part of daily routines. The extent to which companies are dependant on their environment differs. As can be seen in the database with the pipeline, the relative number of new drugs that come from the own R&D department is very different. The question is: When is it part of the daily routines to maintain the own competitive position, and when is it an attempt to compensate inefficiency and failures at the own R&D department? This must be investigated in the future.
Nevertheless, the results of the first part correspond with the expectation from the introduction and the literature that pharmaceutical companies do not have full control over their pipeline.

A framework to understand the success of the programmes and which factors influence success was not available. The final goal of the second part of this research was to develop and refine such a framework. The initial conceptual framework, based on the innovation literature, appeared to include already all the major factors that influence the success of the R&D programmes. However, some refinements were necessary. The outcome of the interviews indicated that sometimes, a factor did not have a specific influence on the success. However, if this factor was absent, the company could not be successful. For example, a company can not develop new drugs without mainstream technology, but everyone has the same mainstream technology. In other words, the technology does not make the difference in the success but every company needs it.
Though, the interviews revealed that especially speed and managerial skills are decisive factors for success. These two factors came forward during the elaboration of all the main factors except for 'the possession of strategic resources'. It is very important to develop compounds that are competitive and innovative, which means that they must be able to be 'first on the market' or 'first in class'. If a compound is no longer competitive, it might be rejected from the programme. Therefore, speed and managerial skills are crucial for the realisation of the R&D programme.
In the end, the model with all the refinements is presented. Which means that also the second goal of the study was achieved. A first framework to study the factors that influence the success of new drug R&D programmes is developed.

All in all, the methodology and the chosen theory worked out well. The main goals are achieved and the main research question are answered. The main remark is that the research population is rather small. A larger population would lead to more external validation and a more robust conceptual framework.

10.0 Conclusions and recommendations

This research consists out of two parts. The first part investigated the control that large pharmaceutical companies have of their own R&D activities and the drugs and disease areas that are present in their pipeline. Therefore, six large pharmaceutical companies are investigated. The main research question was:
What are the differences between the initial new drug R&D strategies and plans and the new drugs that appeared in the pipeline of large pharmaceutical companies in the period 2000 until 2009?
The analysis of the strategies and reconstruction of their pipelines showed that none of the investigated companies was able to realise *all* its ambitions regarding to new drug development. Furthermore, each company changed at least one of the disease areas that were projected for the future.

The second part of this research investigated which factors influenced the success of the R&D programmes. Therefore, interviews with very experienced employees at three of the six investigated companies were conducted. The central research question was:
What was the influence of the 'ability to provide resources effectively', 'the ability to implement technology', 'dynamic capabilities', and 'possession of strategic resources' on the success of new drug R&D programmes?
Based on the analysis of the answers of the three conducted interviews it can be stated that each of the factors that are named in the second main research question contribute positively to the success of new drug R&D programmes at the investigated large pharmaceutical companies. However, the analysis of the answers on the interview questions indicate that on a more detailed level, some small refinements in the conceptual framework had to be made. The most important were that speed and managerial skills are decisive for the success of the R&D programme.

The main recommendation to improve this research is to investigate a larger research h population, especially for the second part of the research. Furthermore, future research needs to be done because the loose relation between R&D investments and R&D outcomes is a real problem. Future research needs also to investigate the border between transactions of technology and compounds as normal routines and as attempt to compensate the own R&D. If there is more insight in the factors that influence the success of new drug R&D programmes, more patients can be helped.

Dankwoord

Bij dezen wil ik graag een aantal mensen bedanken die mij hebben geholpen bij het realiseren van deze thesis. Allereerst wil ik graag de drie heren bedanken die de tijd en moeite hebben genomen om mij te woord te staan (in volgorde van interviewen):

Wiebe Olijve – voormalig Vice President Research - Schering-Plough

Joep Rijnierse – Medical Director – Amgen

Rudolf van Olden – Director Medical & Regulatory - GlaxoSmithKline

Ik vond de interviews erg interessant en leuk om te doen.

Daarnaast wil ik ook mijn begeleiders Huub Schellekens en Ellen Moors bedanken voor hun adviezen over de opbouw en aanpak van dit onderzoek en de suggesties voor het contact leggen met mensen in de farmaceutische industrie.

References

The newspaper articles are sorted on author and date.

Amgen, 2000, "Annual report", Amgen Inc., Thousand Oaks, California

Amgen, 2001, "Annual report", Amgen Inc., Thousand Oaks, California

Amgen, 2002, "Annual report", Amgen Inc., Thousand Oaks, California

Amgen, 2003a, "Amgen Announces Plans for Epratuzumab", retrieved on 5/4/2010 from: http://www.amgen.com/media/media_pr_detail.jsp?year=2003&releaseID=468964).

Amgen, 2005, "Annual report", Amgen Inc., Thousand Oaks, California

Amgen, 2006, "Annual report", Amgen Inc., Thousand Oaks, California

Amgen, 2007, "Annual report", Amgen Inc., Thousand Oaks, California

AstraZeneca, 2000, "Annual Report & Form 20-F 2000", AstraZeneca PLC, London

AstraZeneca, 2005, "Annual Report & Form 20-F 2000", AstraZeneca PLC, London

AstraZeneca, 2007, "Annual Report & Form 20-F 2000", AstraZeneca PLC, London

Attridge, J., 2007, "Innovation Models and Their Application to the Pharmaceuticals Sector", International Journal of Innovation Management, Vol. 11, Iss. 2, pp. 215-243

Attridge, J., 2008, "Innovation and regulation in the biopharmaceuticals sector", Eurohealth, Vol. 14, Iss. 2

Barney, J.B., 1991, "Firm resources and sustained competitive adcantage", Journal of Management, Vol. 1`7, Iss. 1, pp. 99-120

Benoit, B., 2000, "North Rhine-Westphalia: In search of a partner. Profile: Bayer", Financial Times, March 13, 2000, p. 6, London

Boschma, R. A., Frenken, K., Lambooy, J. G., 2002, "Evolutionaire economie – een inleiding", Coutinho, Bussum

Brown, M.G., Svenson, R.A., 1998, "Measuring R&D productivity", Research-Technology Management, Vol. 41, Iss. 6, pp. 30-35

Budden, R., 2000, "They're all into genes now: Robert Budden reports on the resurgence in biotechnology stocks", Financial Times, January 22, 2000, p. 18, London

Buurma, H., Beudeker, H.J., de Jong-van den berg, L.T.W., Leufkens, H.G.M., 2001, "Het geneesmiddel", Elsevier gezondheidszorg

Cardinal, L.B., 2001, "Technological Innovation in the Pharmaceutical Industry: The Use of Organizational Control in Managing Research and Development", Organization Science, Vol. 12, Iss. 1, pp. 19-36

Cohen, W.M., Nelson, R.R., Walsh, J.P., 2000, "Protecting their intellectual assets: Appropriability conditions and why U.S. manufacturing firms patent (or not)", NBER Working Paper Series, Cambridge, Massachusetts

Column, L., 2000, "A rich mixture", Financial Times, January 18, 2000, p. 20, London

Column, L., 2000, "AstraZeneca", Financial Times, February 25, 2000, p. 20, London

Column, L., 2000, "US pharmaceuticals", Financial Times, May 24, 2000, p. 26, London

Column, L., 2000, "SmithKline Beecham", Financial Times, July 26, 2000, p. 20, London

Column, L., 2000, "Medicinal compound", Financial Times, August 2, 2000, p. 20, London

Column, L., 2000, "Pharmaceuticals", Financial Times, August 21, 2000, p.16, London

Column, L., 2000, "Aventis", Financial Times, November 16, 2000, p. 28, London

Cookson, C., 2000, "The birth of Glaxo Smithkline", Financial Times, January 18, 2000, p. 23, London

Cookson, C., 2000, "Survey – Life science & Pharmaceuticals: Double size, double complexity: Research and Development: Recent mergers have been prompted by the cost of getting new drugs through the pipeline - the average price tag for a new drug launched successfully this year will be above Dollars 600m", Financial Times, April 6, 2000, p. 2, London

Cooper, R.G., 1984, "How new product strategies impact on performance", Journal of product innovation management", Vol. 1, pp. 5-18

Crucell, 2009, "Over Crucell: Voortgaande groei", retrieved on 8-12-2009 retrieved from: http://www.crucell.nl/about_crucell 8-12-2009, Crucell, Leiden

Day, S. G., Schoemaker, P.J.H., 2000, "Mastering management: Don't hesitate to innovate", Financial Times, October 9, 2000, p. 6, London

De Morgen, 2009, "Bijna 16.000 banen weg na overname Schering-Plough", De Morgen, march 9, 2009, Brussel, retrieved on 22-05-2010 from: http://www.demorgen.be/dm/nl/3324/Economie/article/detail/754485/2009/03/09/Bijna-16-000-banen-weg-na-overname-Schering-Plough.dhtml

De Tijd, 2009, "Merck biedt 41 miljard op Schering-Plough", De Tijd, March 9, 2009, Brussel, retrieved on 22-5-2010 from: http://www.tijd.be/nieuws/ondernemingen_chemie_farma/Merck_neemt_Schering-Plough_over.8154101-429.art

Devi, S., John, P., 2000, "Drug duo hit by US setback", Financial Times, December 19, 2000, p. 56, London

DiMasi, J. A., Hansen, R. W., Grabowski, H. G., 2003, "The price of innovation: new estimates of drug development costs", Journal of Health Economics, Vol. 22, pp. 151–185

Drews, J., 2003, "Strategic trends in the drug industry", Drug Discovery Today, Vol. 8, No. 9, pp. 411-420

Edwards, N.V., 2008, "Pharmaceutical New Product Development: The Increasing Role of In-Licensing", Anesthesiology Clinics, Vol. 26, Iss 4, pp. 627-636

EP Vantage, 2008, "Big Pharma Pipelines Failing to Meet Expectations", retrieved on 7-9-2009 from: http://seekingalpha.com/article/79447-big-pharma-pipelines-failing-to-meet-expectations

Edquist, C., Hommen, L., 1999, "Systems of innovation: theory and policy for the demand side", Technology in society, Vol. 21, pp. 63-79

Firn, D., 2000, "Launch of Glaxo diabetes drug delayed pharmaceuticals side-effects setback is 'worrying reflection on R&D', but clears way for Pounds 120BN merger", Financial Times, July 6, 2000, p. 26, London

Firn, D., 2000, "British Biotech details plan to reinvent itself: Pharmaceuticals fallen star to refocus on six enzymes after failure of leading cancer drug", Financial Times, July 6, 2000, p. 29, London

Firn, D., 2000, "AstraZeneca asthma inhaler cleared", Financial Times, August 30, 2000, p. 23, London

Firn, D., 2000, "EU gives approval for Roche cancer treatment", Financial Times, August 31, 2000, p. 31, London

Firn, D., 2000, "Vernalis dips deeper into the red", Financial Times, September 27, 2000, p. 27, London

Firn, D., 2000, "AstraZeneca's Swedish setback" Financial Times, November 15, 2000, p. 36, London

Firn, D., Guerrera, F., 2000, "Stahel believes his Shire horse will keep on running: The share price is down, but spirits stay high after the takeover of BioChem, write Francesco Guerrera and David Firn", Financial Times, December 12, 2000, p. 32, London

Fleming, E., Ma, P., 2002, "Drug life-cycle technologies", Nature reviews drug discovery, Vol. 1, Iss. 10, pp. 751-752

Frank, R.G., 2003, "New estimates of drug development costs", Journal of Health Economics, Vol. 22, pp. 325–330

Galapagos, 2009, "Galapagos gaat alliantie aan met Merck & Co., Inc. in ontstekingsziekten", On 14-10-2009 retrieved from: http://www.glpg.com/press/2009/13'.htm, Galapagos NV, Mechelen

Gambardella, A., Orsenigo, L., Pammolli, F., 2001, "Global competitiveness in pharmaceuticals, an European perspective", Office for Official Publications of the European Communities, Luxembourg

GAO, 2006, "New drug development: Science, Business, Regulatory, and Intellectual Property Issues Cited as Hampering Drug Development Efforts", U.S. Government Accountability Office, Washington, D.C.

Gassmann, O., Reepmeyer, G., Von Zedtwitz, M., 2004, "Leading pharmaceutical innovations: Trends and drivers for growth in the pharmaceutical industry", Springer, Heidelberg

Genentech, 2000, "Annual report: Once upon a Genentech", Genentech Inc. South San Francisco, California

Genentech, 2004, "Annual Report: We See Things Differently", Genentech Inc. South San Francisco, California

Genentech, 2005, "Annual report: 30 years of transforming science into medicine", Genentech Inc. South San Francisco, California

Genentech, 2006, "Annual report: Where science meets life", Genentech Inc. South San Francisco, California

Genentech, 2007, "Annual report: In Business for Life", Genentech Inc. South San Francisco, California

Genentech, 2008, "Annual report: We Are Genentech", Genentech Inc. South San Francisco, California

Genentech, 2010, "Corporate Overview", retrieved on 5/2/2010 from: http://www.gene.com/gene/about/corporate/, Genentech Inc. South San Francisco, California

Godin, B., 2005, "The linear model of innovation: The historical construction of an analytical framework", Project on the history and sociology of S&T statistics, Working paper No. 30, Institute National de la Recherché Scientifique (INRS), Montreal

Grabowski, H., 2002, "Patents, innovation and access to new pharmaceuticals", Journal of International Economic Law, Vol. 5, Iss. 4, pp. 849-860

Graul, A.I. et al., 2008, "Overcoming Further Challenges in the Pharma/Biotech Industry: 2007 Update", Drug News Perspectives, Vol. 21, Iss. 1, p. 44

Griffith, V., 2000, "Biotech stocks find enthusiastic market", Financial Times, February 14, 2000, p. 28, London

Griffith, V., 2000, "Prostate cancer drug tests show positive results", Financial Times, March 24, 2000, p. 34, London

Griffith, V., 2000, "Sales forecast boosts Amgen" Financial Times, November 9, 2000, p. 28, London

GSK, 2000, "Annual report: it's about you", GlaxoSmithKline plc, Brentford, UK

GSK, 2001, "Annual report: Connecting… ", GlaxoSmithKline plc, Brentford, UK

GSK, 2002, "Annual report: The Impact of Medicines", GlaxoSmithKline plc, Brentford, UK

GSK, 2004, "Annual report: New challenges New thinking", GlaxoSmithKline plc, Brentford, UK

GSK, 2005, "Annual report: human being", GlaxoSmithKline plc, Brentford, UK

GSK, 2006, "Annual report: "A human race", GlaxoSmithKline plc, Brentford, UK

GSK, 2007, "Annual report: Answering the Questions that mAtter", GlaxoSmithKline plc, Brentford, UK

GSK, 2008, "Annual report: Do more, feel better, live longer", GlaxoSmithKline plc, Brentford, UK

Guerrera, F., Pilling, D., 2000, "Drugs giant plans radical research move: GlaxoSmithKline to separate R&D into eight competing centres to encourage innovation", Financial Times, November 11, 2000., p. 1, London

Hall, W., 2000, "Biotech newcomer Actelion plans IPO" Financial Times, March 24, 2000, p. 38, London

Hashimoto, A., Haneda, S., 2008, "Measuring the change in R&D efficiency of the Japanese pharmaceutical industry", Research Policy Vol. 37, pp. 1829–1836

John, P., Kibazo, J., 2000, "Sell-off tonic for S&N", Financial Times, June 29, 2000, p. 58, London

John, P., Kibazo, J., 2000, "Bull-bear tussle hits BOC", Financial Times, 16 November 2000, p. 62, London

John, P., 2000, "Negative sentiment hits GSK", Financial Times, December 28, 2000, p. 38, London

Khilji, S.E., Mroczkowski, T., Bernstein, B., 2006, "From Invention to Innovation: Toward Developing an Integrated Innovation Model for Biotech Firms", Journal of product innovation management, Vol. 23, pp.528–540

Kline, S.J., Rosenberg, N., 1986, "An overview of innovation", In: Landau, R., Rosenberg, N., (eds.), „The positive sum of strategy: Harnessing technology for economic growth", pp. 275-306, National Academic press, Washington DC

Levin et al. 1987, "Appropriating the return from industrial research and development", Brookings papers on economic activity, Vol. 3

Lundvall, B-A (ed.), 1992, "National Systems of Innovation - Towards a Theory of Innovation and Interactive Learning" London, Pinter Publishers

MacInnes, R., Lumley, C. E., Walker, S. R., 1994, "New chemical entity output of the international pharmaceutical industry from 1970 to 1992", Clinical Pharmacology and therapeutics, Vol. 56, Iss. 3, pp. 339-349

Merck, 2009, "Annual Report", Whitehouse Station, New Jersey

Michaels, A., 2000, "US drugs companies team up to boost competitiveness", Financial Times, May 24, 2000, p.27, London

Michaels, A., Pilling, D., 2000, "The gene rush: Biotechnology companies are competing to own genetic material but the truly valuable intellectual property may continue to be medicines, write David Pilling and Adrian Michaels", Financial Times, March 18, 2000, p. 12, London

Michaels, A., Pilling, D., 2000, "Pfizer gives new shape to research & development", Financial Times, November 20, 2000, p. 36, London

Michaels, A., Pilling, D., 2000, "Pounds 130bn Glaxo-SmithKline merger clears crucial US antitrust hurdle", December 18, 2000, p. 1, London

Mitchell, P., 2009, "Credit crisis dries up pharma pipeline", On 11-9-2009 retrieved from: http://www.icis.com/Articles/2009/01/23/9186421/credit-crisis-dries-up-pharma-pipeline.html, Reed Business Information Limited, Sutton, England

NIHCM, 2002, "Changing Patterns of Pharmaceutical Innovation", NIHCM Foundation, Washington, retrieved on 9 July 2009 from: http://nihcm.org/~nihcmor/pdf/innovations.pdf

NRC, 2007, "Akzo Nobel verkoopt Organon", NRC, March 12, 2007, Amsterdam, retrieved on 22-5-2010 from: http://www.nrc.nl/economie/article1777943.ece/Akzo_Nobel_verkoopt_Organon

Pfizer, 2009, "Pfizer Completes Acquisition Of Wyeth", On 23-11-2009, retrieved from: http://mediaroom.pfizer.com/news/pfizer/20091015005867/en, Pfizer, New York

Pharma Online, 2008, "Patent Expiries, Empty Pipelines, And Safety Concerns Spell Woe For Pharma Industry", Retrieved on 11-9-2009 from: http://www.pharmaceuticalonline.com/article.mvc/Patent-Expiries-Empty-Pipeline-Safety-Concern-0001?VNETCOOKIE=NO, Pharma Online, Erie, Pennsylvania

Pilling, D., 2000, "Tonic for the troops: Man in the news Jean-Pierre Garnier: Respected by both sides in the Glaxo SmithKline merger talks, the new chief executive is deceptively easy-going, says David Pilling", Financial Times, January 22, 2000, p. 15, London

Pilling, D., 2000, "British Biotech shares tumble 40%: Blow as trial results show cancer "Wonder drug" had no effect on patients' survival rates", Financial Times, January 26, 2000, p. 25, London

Pilling, D., 2000, "BioMedica in AstraZeneca deal", Financial Times, February 15, 2000, p. 30, London

Pilling, D., 2000, "Brain versus brawn in the battle for sales: With their international salesforces and advertising clout, the goliaths of the pharmaceutical industry promise pulverise the opposition. But some analysts say the industry has it wrong and that it's skill, not size, that counts", Financial Times, April 6, 2000, p. 2, London

Pilling, D., 2000, "Growing the power to extract every last dollar from their own medicines: As they head towards a merger, executives of Glaxo and SB will be relieved to see their shares recovering, writes David Pilling", Financial Times, April 20, 2000, p. 28, London

Pilling, D., 2000, "AstraZeneca serves investors a dose of its own medicine: David Pilling explains how the pharmaceuticals group has tried to change its image", Financial Times, may 3, 2000, p. 32, London

Pilling, D., 2000, "FTC probe slows SB-Glaxo link: US scrutiny thought to centre on specific therapeutic areas", Financial Times, June 16, 2000, p. 23, London

Pilling, D., 2000, The human genome: Stand by for a gene-rush commercial exploitation, Financial Times, June 27, 2000, p.15, London

Pilling, D., 2000, "Putting man through the genetic mincer: Mapping the genome is a breakthrough that's likely to make some companies very rich", Financial Times, July 1 2000, p.1, London

Pilling, D., 2000, "SB and Glaxo take stock of drugs' cabinet gaps in the product line could have consequences for the two groups as they prepare to merge", Financial Times, 25 July 2000, p. 26, London

Pilling, D., 2000, "AstraZeneca profits rise 16% despite Losec blow Anti-ulcer drug's dip offset by improved cost-savings" Financial Times, August 2, 2000, p. 21, London

Pilling, D. Financial Times, 2000, "Genentech to develop small-molecule drugs", August 28, 2000, p. 20, London

Pilling, D., 2000, "Revolutionary remedies: Business culture: Genentech gained fame as a radical biotech company, a subverter of business methods. Now a multinational, can it stand by its rebellious credo, asks David Pilling", Financial Times, October 10, 2000, p. 12, London

Pilling, D., 2000, "Success' gives AstraZeneca indigestion", Financial Times, October 18, 2000, p. 32, London

Pilling, D., 2000, "Muddled plot confuses group's simple story: AstraZeneca's fortunes depend on it making a smooth transition", Financial Times, October 26, 2000, p. 24, London

Pilling, D., 2000, "Oxford GlycoSciences in protein alliance with Glaxo", Financial Times, December 4, 2000, p. 28, London

Pilling, D., 2000, "FDA fails SB drug", Financial Times, December 18, 2000, p.24, London

Pilling, D., 2000, "Long-awaited union comes into being pharmaceuticals merger of Glaxo Wellcome and Smithkline Beecham creates group rivalling Pfizer as world's biggest", Financial Times, December 27, 2000, p. 17, London

Poole, M.S., Van de Ven, A. H. (eds.), 2004, "Handbook of organizational change and Innovation", Oxford University Press, New York

Rasmussen, B., 2002, "Implications of the Business Strategies of Pharmaceutical Companies for Industry Developments in Australia", Centre for Strategic Economic Studies Victoria University of Technology, Melbourne

Roche, 2000, "Annual Report", F. Hoffmann-La Roche Ltd., Basel, Switerland

Roche, 2006, "Annual report", F. Hoffmann-La Roche Ltd., Basel, Switerland

Roche, 2007, "Annual report", F. Hoffmann-La Roche Ltd., Basel, Switerland

Roche, 2008, "Annual report", F. Hoffmann-La Roche Ltd., Basel, Switerland

Saxena, S. K., 2006, "A review of marketing strategies work by different pharmaceutical companies", Department of Management, Rakshpal Bahadur Management Institute, Bareilly

Schering-Plough, 2000, "Annual report", Schering-Plough Corporation, Kenilworth, New Jersey

Schering-Plough, 2001, "Annual report", Schering-Plough Corporation, Kenilworth, New Jersey

Schering-Plough, 2002, "Annual report", Schering-Plough Corporation, Kenilworth, New Jersey

Schering-Plough, 2006, "Financial Report", Schering-Plough Corporation, Kenilworth, New Jersey

Schmid, E., Smith, D. A., 2004, "Is pharmaceutical R&D just a game of chance or can strategy make a difference?", Drug Discovery Today, Vol. 9, No. 1, pp. 18-26

Singer, N., 2009, "In Wyeth, Pfizer sees a new drug pipeline", retrieved on 7-9-2009 from: http://www.nytimes.com/2009/01/27/business/wyeth.html?_r=2&ref=business, New York Times, New York

Smith, A., 2008, "Big Pharma's leaky pipeline", Retrieved on 7-9-2009 from: http://money.cnn.com/2008/02/01/news/companies/drug_wrap/index.htm, CNNMoney.com, Atlanta

Surowickie, J. 2004, "The pipeline problem", Retrieved on 11=9-2009 from: http://www.accessmylibrary.com/coms2/summary_0286-20443683_ITM, The New Yorker, New York

Tidd, J., Bessant, J., Pavitt, K., 2001, "Managing Innovation: integrating technological, market and organizational change (2nd edition)", Chichester: Wiley.

Top Employers Nederland, 2009, "Schering-Plough", CRF International Holding BV, Amsterdam, retrieved on 22-05-2010 from: http://www.organon.nl/binaries/Bedrijfsprofiel-ScheringPlough-Top%20NL%202009_tcm169-189984.pdf

Volkskrant, 2007, "Akzo Nobel verkoopt Organon", Volkskrant, March 12, 2007, Amsterdam, retrieved on 22-05-2010 from: http://www.volkskrant.nl/economie/article405377.ece/Akzo_Nobel_verkoopt_Organon

Yin, R.K., 2003, "Case study research: Design and methods", third edition, Sage publications, Thousand Oaks, California

Annex 1 – annual patent registrations

The following tables show how many (worldwide) patents the six pharmaceutical companies in the population published in 2006, 2007 and 2008 according to the worldwide database of Espacenet. The number of employees is retrieved from the annual reports of corresponding years.

2006

Company	Employees 2006 (Annual report 2006)	Patents 2006 (esp@cenet worldwide)	**Patents/ Employees**	Rank
Amgen	> 20000 p.3	621	0,03105	4
AstraZeneca	> 66000 p.8	2323	0,03520	2
Genentech	10533 p.20	1135	0,10776	1
GlaxoSmithKline *	100000 p.46	1247	0,01247	5
Hoffmann La Roche	> 74000 p.2	2462	0,03327	3
Schering-Plough	33500**	100	0,00299	6

(* Total of SmithKline Beecham, Glaxo Wellcome and GlaxoSmithKline)
(** Source: NRC, 2007; Volkskrant, 2007)

2007

Company	Employees 2007 (Annual report 2007)	Patents 2007 (esp@cenet worldwide)	**Patents/Employees**	Rank
Amgen	17700 p.36	687	0,03881	2 (+2)
AstraZeneca	> 67000 p.8	2529	0,03775	3 (-1)
Genentech	11174 p.20	1109	0,09925	1 (-)
GlaxoSmithKline*	103000 p.53	1240	0,01204	5 (-)
Hoffmann La Roche	> 78000 p.2	2730	0,03500	4 (-1)
Schering-Plough	52000**	366***	0,00704	6 (-)

(* Total of SmithKline Beecham, Glaxo Wellcome and GlaxoSmithKline)
(** Source: NRC, 2007)
(*** Total of Schering Plough and Organon (acquired))

2008

Company	Employees 2008 (Annual report 2008)	Patents 2008 (esp@cenet worldwide)	**Patents/ Employees**	Rank
Amgen	16900 p.36	682	0,04036	3 (-1)
AstraZeneca	> 65000 p.28	2701	0,04155	2 (+1)
Genentech	> 11168 p. 12	984	0,08811	1 (-)
GlaxoSmithKline*	> 97000 p. 26	1201	0,01238	5 (-)
Hoffmann La Roche	80000 p. 1	2803	0,03504	4 (-)
Schering-Plough	51000**	486***	0,00953	6 (-)

(* Total of SmithKline Beecham, Glaxo Wellcome and GlaxoSmithKline)
(** Source: De Morgen, 2009; De Tijd, 2009; Top Employers Nederland, 2009)
(*** Total of Schering Plough and Organon (acquired))

Annex 2 – Interview questions

A. What was the influence of a network with contacts who posses technologies that might be useful for your company on the diseases and disease areas in the pipeline?
B. What did maintenance of this network of contacts mean for the diseases and disease areas in the pipeline of your company?
C. What did having a wide range of choice in technology from the contacts in your network mean for the diseases and disease areas your company targeted?
D. What did the availability of technology at the contacts in your network mean for the diseases and disease areas your company targeted?
E. How did a good fit between internal demands and external offers regarding to technology influence the ability to develop the projected disease and disease areas?
F. What was the influence of the competence to negotiate that intangible parts of the technology are included when new technology is transferred from outside the company on the diseases and disease areas that could be developed?
G. What was the influence of the ability to manage technology transfer efficiently on the realisation of the projected diseases and disease areas in the pipeline?
H. What was the influence of the ability to internalize technology from outside the company efficiently on the realisation of the announced diseases and disease areas in the pipeline?
I. Which role played the ability to develop technology from outside the company further during the realisation of the announced diseases and disease areas in the pipeline?
J. Did your company consult experts for feedback about new drugs before manufacturing started? (This question will be asked first).
K. What were the consequences of the feedback from these experts for the disease areas and targeted disease in the pipeline?
L. Did your company cut new project development projects in parts with clear goals and criteria that must be achieved? (This question will be asked first.)
M. What was the influence of cutting the projects into several parts on the success of the new drug development projects in your company?
N. What was the influence of making hard go no-go decisions after each part of the project on the realisation of the goals regarding to the projected drugs and disease areas in the pipeline?
O. What was the role of active interaction between people and different disciplines about problems and conflicts that appeared during new drug development projects?
P. What was the influence of project managers with deep understanding of the requirements during new drug development projects on the success of the R&D programme?
Q. What did it mean for the success of new drug development projects to have manager who were able to adapt the project to changing situation when needed?
R. How important was it for the fulfilment of the goals regarding to the diseases and disease areas as projected by the initial strategy to have the ability to anticipate quickly on the changing environment and adapt projects if necessary?
S. How important was it for the fulfilment of the goals regarding to the disease and disease areas as projected by the initial strategy to have the ability to develop practical innovations rapidly?
T. What was the influence of licensing patents on the ability of your company to realise the goals regarding to the disease areas and diseases that were projected in initial the strategy?
U. What was the influence of acquisition of patents (or patented IPR) on the ability of your company to realise the goals regarding to the disease areas and diseases that were projected in initial the strategy?
V. What was the influence of collaboration induced by patents (to obtain access to these patents) on the ability of your company to realise the goals regarding to the disease areas and diseases that were projected in initial the strategy?
W. Which other factors, not questioned in this interview, have significant influence on the ability to of companies to realise the goals regarding to the disease areas and diseases that were projected in initial the strategy?

Database

The following pages show the database that is used to answer the second sub research question. It shows a very detailed pipeline for each investigated company for the year 2006, 2007 and 2008.

The second sub research question investigates which drugs passed through the pipeline in the year 2006, 2007 and 2008. Therefore, an extensive overview of these pipeline if made for each of the six companies.

The database was made in excel but is now converted to PDF for this archival version because PDF is the requested format for Igitur. A excel version is available at the author (see front page).

The database shows the pipelines in pages that must be read in the order of a "Z". The blue lines with the company name and year indicate which year is shown. For example, the first pages show the first drug of a company in 2006 in lines. The coloured columns are the last in a row. After these rows, a new series of rows starts.

The companies are presented in alphabetical order.

- Amgen
- AstraZeneca
- Genentech
- GSK
- Roche
- Schering-Plough

Year	Year of the pipeline
Drug ID	Code used by the company to identify the drug
Drug name	Name or brandname used by the company to identify the drug
(Description)	Technical/ more detailed description of the drug
Indication	Diseases targeted by the drug
Disease area	Area where the drug is included according to the pipeline year
Co-sponsor	Co-sponsor of the clinical trials in Phase I, II or III
Own R&D	Is the drug developed at the own R&D department?
Acquired	Is the drug acquired from toher companies? Or is the (company) completely acquired?
Licensed-in	Is the drug licensed-in? From which company?
Partnered/collaboration	Is the drug developed together with one of the contacts of the company? Who is it?
Objected area?	What would be the projected area in the year 2000? (red = not projected) (orange = projected, the name for the area has changed) (green = projec
General remark / is partner announced in 2000?	Is the contact announced in advance? (Green = yes) (Red = no)
Remark about area	Referring to the difference between the disease area as described in 2000 and the disease area as in the current pipeline
Area projected in advance	**Does the drug fit within the disease areas as projected in advance in the year 2000? (green=yes) (red=no)**

Amgen

Amgen	Drug name	(Description)	Indication	Disease area	Co-sponsor	Own R&D	Acquired	Licensed-in
2006	Amgen	2006	Amgen	2006	Amgen	2006	Amgen	2006
	AMG 317		Asthma	Inflammation		yes		
	AMG 557		Systemic lupus erythematosus	Inflammation		yes		
	AMG 623		Systemic lupus erythematosus	Inflammation		yes		
	AMG 714		Psoriasis	Inflammation		yes		
	AMG 108		Rheumatoid arthritis	Inflammation		yes		
	Enbrel® (etanercept)		Ankylosing spondylitis (arthritis	Inflammation	Immunex Corporation		yes (Immunex company)	
	ENBREL		Moderate-to-severe juvenile rh	Inflammation			yes (Immunex company)	
	ENBREL		Moderate-to-severe rheumatoid	Inflammation			yes (Immunex company)	
	ENBREL		Psoriatic arthritis	Inflammation			yes (Immunex company)	
	Kineret® (anakinra)		Moderate-to-severe rheumatoid	Inflammation		yes		
	Denosumab		Postmenopausal osteoporosis	Metabolic disorders			yes (Abgenix company)	
	Cinacalcet HCl		Cardiovascular disease in patie	Metabolic disorders		yes		
	Darbepoetin alfa		Anemia in heart failure	General medicine		yes		
	Darbepoetin alfa		Cardiovascular disease in patie	General medicine		yes		
	Aranesp® (darbepoetin alfa)		Anemia of chronic renal diseas	General medicine		yes		
	AMG 531		Immune thrombocytopenic purp	Oncology		yes		
	Denosumab		Bone loss induced by hormone	Oncology			yes (Abgenix company)	
	Denosumab		Prevention of bone metastases	Oncology	Daiichi Sankyo Inc.		yes (Abgenix company)	
	Denosumab		Prevention of cancer-related bo	Oncology			yes (Abgenix company)	
	Panitumumab		First- and second-line colorecta	Oncology			yes (Abgenix company)	
	Vectibix™ (panitumumab)		Metastatic colorectal cancer wi	Oncology			yes (Abgenix company)	
Amgen								
2007	Amgen	2007	Amgen	2007	Amgen	2007	Amgen	2007
		Bone						
	Denosumab		Postmenopausal osteoporosis	Bone			yes (Abgenix company)	
		General medicine						
	AMG 223		Hyperphosphatemia	General medicine		yes		
	Darbepoetin alfa		Anemia in heart failure	General medicine		yes		
	Darbepoetin alfa		Patients with chronic kidney dis	General medicine		yes		
	Aranesp® (darbepoetin alfa)		Anemia of chronic kidney failur	General medicine		yes		
		Inflammation						
	AMG 557		Systemic lupus erythematosus	Inflammation		yes		
	AMG 714		Psoriasis	Inflammation		yes		
	AMG 827		Rheumatoid arthritis	Inflammation		yes		
	AMG 108		Rheumatoid arthritis	Inflammation		yes		
	AMG 317		Asthma	Inflammation		yes		
	Enbrel® (etanercept)		Ankylosing spondylitis (arthritis	Inflammation	Immunex Corporation		yes (Immunex company)	
	ENBREL		Moderate-to-severe juvenile rh	Inflammation			yes (Immunex company)	
	ENBREL		Moderate-to-severe rheumatoid	Inflammation			yes (Immunex company)	
	ENBREL		Psoriatic arthritis	Inflammation			yes (Immunex company)	
	Kineret® (anakinra)		Moderate-to-severe rheumatoid	Inflammation				
	Cinacalcet HCl		Cardiovascular disease in patie	Metabolic disorders		yes		
	AMG 102		Various cancer types	Oncology		yes		
	AMG 386		Various cancer types	Oncology		yes		

Partnered/collaboration	Objected area (2000)	General remark / is partner annou	Remark about area	Area projected in advance
Amgen	2006	Amgen	2006	Amgen
	Inflammation			yes
	Inflammation			yes
	Inflammation			yes
	Inflammation			yes
	Inflammation			yes
	Inflammation	Immunex is not named in AR 2000		yes
	Inflammation	Immunex is not named in AR 2000		yes
	Inflammation	Immunex is not named in AR 2000		yes
	Inflammation	Immunex is not named in AR 2000		yes
	Inflammation			yes
	metabolism	Abgenix is not named in AR 2000		yes
	metabolism			yes
			name is unknown but wanted to be world leader in anemia	yes
			name is unknown, cardiovascular is not projected in advance	no (but "others" are projected)
			name is unknown but wanted to be world leader in anemia	yes
	cancer			yes
	cancer	Abgenix is not named in AR 2000		yes
	cancer	Abgenix is not named in AR 2000		yes
	cancer	Abgenix is not named in AR 2000		yes
	cancer	Abgenix is not named in AR 2000		yes
	cancer	Abgenix is not named in AR 2000		yes
Amgen	2007	Amgen	2007	Amgen
		Abgenix is not named in AR 2000	name is unknown, but osteoporose was projected as "other"	yes
			name is unknown, Hyperphosphatemia is not projected in advanc	no (but "others" are projected)
			name is unknown but wanted to be world leader in anemia	yes
			name is unknown but diseases are projected	yes
			name is unknown but wanted to be world leader in anemia	yes
	Inflammation			yes
	Inflammation			yes
	Inflammation			yes
	Inflammation			yes
	Inflammation			yes
	Inflammation	Immunex is not named in AR 2000		yes
	Inflammation	Immunex is not named in AR 2000		yes
	Inflammation	Immunex is not named in AR 2000		yes
	Inflammation	Immunex is not named in AR 2000		yes
	Inflammation			yes
	metabolism			yes
	cancer			yes
	cancer			yes

	AMG 479		Various cancer types	Oncology		yes		
	AMG 655		Various cancer types	Oncology		yes		
	Denosumab		Multiple myeloma	Oncology			yes (Abgenix company)	
	Panitumumab		Locally advanced head and ne	Oncology			yes (Abgenix company)	
	Romiplostim (formerly AMG 531)		Chemotherapy-induced thromb	Oncology		yes		
	Romiplostim		Myelodysplastic syndromes	Oncology		yes		
	Denosumab		Bone loss induced by hormone	Oncology			yes (Abgenix company)	
	Denosumab		Prevention of bone metastases	Oncology	Daiichi Sankyo Inc.		yes (Abgenix company)	
	Panitumumab		First- and second-line colorecta	Oncology			yes (Abgenix company)	
	Panitumumab		Head and neck cancer	Oncology			yes (Abgenix company)	
	Romiplostim		Immune thrombocytopenic purp	Oncology		yes		
	Vectibix™ (panitumumab)		Metastatic colorectal cancer wi	Oncology			yes (Abgenix company)	
Amgen								
2008	**Amgen**	**2008**	**Amgen**	**2008**	**Amgen**	**2008**	**Amgen**	**2008**
	AMG 557	Antibody	Systemic lupus erythematosus	Inflammation		yes		
	AMG 827	Antibody	Infl ammatory diseases	Inflammation		yes		
	AMG 102	Antibody	Various cancer types	Oncology		yes		
	AMG 108	Antibody	Rheumatoid arthritis	Inflammation		yes		
	AMG 223	Oral/Small Molecule	Hyperphosphatemia	General medicine		yes		
	AMG 317	Antibody	Asthma	Inflammation		yes		
	AMG 386	Protein/ Peptibody	Various cancer types	Oncology		yes		
	AMG 479	Antibody	Various cancer types	Oncology		yes		
	AMG 655	Antibody	Various cancer types	Oncology		yes		
	Panitumumab	Antibody	Locally advanced head and ne	Oncology			yes (Abgenix company)	
	Romiplostim (AMG 531)	Protein/ Peptibody	Chemotherapy-induced thromb	Oncology		yes		
	Cinacalcet	Oral/Small Molecule	Cardiovascular disease in patie	Metabolic disorders		yes		
	Darbepoetin alfa	Protein/ Peptibody	Anemia in heart failure	General medicine		yes		
	Darbepoetin alfa	Protein/ Peptibody	Patients with chronic kidney dis	General medicine		yes		
	Denosumab	Antibody	Bone loss induced by hormone	Oncology			yes (Abgenix company)	
	Denosumab	Antibody	Postmenopausal osteoporosis	metabolic disorder			yes (Abgenix company)	
	Denosumab	Antibody	Prevention of bone metastases	Oncology			yes (Abgenix company)	
	Panitumumab	Antibody	First- and second-line colorecta	Oncology			yes (Abgenix company)	
	Panitumumab	Antibody	Metastatic and/or recurrent hea	Oncology			yes (Abgenix company)	
	Aranesp® (darbepoetin alfa)	Protein/ Peptibody	Anemia caused by concomitan	Oncology		yes		
	Enbrel® (etanercept)	Protein/ Peptibody	Ankylosing spondylitis (arthritis	Inflammation	Immunex Corporation		yes (Immunex company)	
	ENBREL	Protein/ Peptibody	Moderate-to-severe polyarticula	Inflammation			yes (Immunex company)	
	ENBREL	Protein/ Peptibody	Moderate-to-severe rheumatoid	Inflammation			yes (Immunex company)	
	ENBREL	Protein/ Peptibody	Psoriatic arthritis	Inflammation			yes (Immunex company)	
	Nplate® (romiplostim)	Protein/ Peptibody	Adult chronic immune thrombo	Inflammation		yes		
	Vectibix® (panitumumab)	Antibody	Metastatic colorectal cancer wi	Oncology			yes (Abgenix company)	

	cancer			yes
	cancer			yes
	cancer	Abgenix is not named in AR 2000		yes
	cancer	Abgenix is not named in AR 2000		yes
	cancer			yes
	cancer			yes
	cancer	Abgenix is not named in AR 2000		yes
	cancer	Abgenix is not named in AR 2000		yes
	cancer	Abgenix is not named in AR 2000		yes
	cancer	Abgenix is not named in AR 2000		yes
	cancer			yes
	cancer	Abgenix is not named in AR 2000		yes
Amgen	**2008**	**Amgen**	**2008**	**Amgen**
	Inflammation			yes
	Inflammation			yes
	Cancer			yes
	Inflammation			yes
			name is unknown, Hyperphosphatemia is not projected in advanc	no (but "others" are projected)
	Inflammation			yes
	Cancer			yes
	Cancer			yes
	Cancer			yes
	Cancer	Abgenix is not named in AR 2000		yes
	Cancer			yes
	metabolism			yes
			name is unknown but wanted to be world leader in anemia	yes
			name is unknown but diseases are projected	yes
	Cancer	Abgenix is not named in AR 2000		yes
	Metabolism	Abgenix is not named in AR 2000		yes
	Cancer	Abgenix is not named in AR 2000		yes
	Cancer	Abgenix is not named in AR 2000		yes
	Cancer	Abgenix is not named in AR 2000		yes
	Cancer			yes
	Inflammation	Immunex is not named in AR 2000		yes
	Inflammation	Immunex is not named in AR 2000		yes
	Inflammation	Immunex is not named in AR 2000		yes
	Inflammation	Immunex is not named in AR 2000		yes
	Inflammation			
	Cancer	Immunex is not named in AR 2000		yes

AstraZeneca

AstraZene	Drug name	(Description)	Indication	Disease area	Co-sponsor	Own R&D
2006	AstraZeneca	2006	AstraZeneca	2006	AstraZeneca	2006
	AZD6370		diabetes	Cardiovascular		yes
	AZD1656		diabetes/obesity	Cardiovascular		yes
	AZD2066		GERD	Gastrointestinal		yes
	AZD1940		nociceptive and neuropathic pa	Neuroscience		yes
	AZD3241		Parkinson's disease	Neuroscience		yes
	AZD2066		analgesia	Neuroscience		yes
	AZD6280		anxiety	Neuroscience		yes
	AZD1386		analgesia	Neuroscience		yes
	AZD2624		schizophrenia	Neuroscience		yes
	AZD0328		Alzheimer's disease	Neuroscience		yes
	AZD6918		solid tumours	Oncology		yes
	AZD1236		COPD	Respiratory and Inflammation		yes
	AZD9668		COPD	Respiratory and Inflammation		yes
	AZD8848		asthma	Respiratory and Inflammation		yes
	AZD8075		asthma	Respiratory and Inflammation		yes
	AZD3199		asthma/COPD	Respiratory and Inflammation		yes
	AZD1305	antiarrhythmic	arrhythmias	Cardiovascular		yes
	AZD0530	SRC kinase inhibitor	solid tumours and haematologi	Oncology		yes
	AZD1152	aurora kinase inhibitor	solid tumours and haematologi	Oncology		yes
	AZD2281	PARP inhibitor	breast cancer	Oncology	KuDOS Pharmaceuticals Limited	
	AZD4877		solid tumours	Oncology		yes
	AZD8931		solid tumours	Oncology		yes
	AZD5672		rheumatoid arthritis	Respiratory and Inflammation		yes
	AZD4818		COPD	Respiratory and Inflammation		yes
Het genees	**Crestor**/ABT-335 (Abbott)	statin + fibrate fixed combin	dyslipidaemia	Cardiovascular		
	AZD0837	thrombin inhibitor	thrombosis	Cardiovascular		yes
	dapagliflozin (BMS)	sodium-glucose cotransport	diabetes	Cardiovascular	Bristol-Meyers Squibb	
	AZD9056	ion channel blocker (P2X7)	inflammatory bowel disease	Gastrointestinal		yes
	AZD3355	inhibitor of transient lower o	GERD	Gastrointestinal		yes
	PN-400 (Pozen)	naproxen + esomeprazole	signs and symptoms of OA and	Neuroscience		
	AZD3480	neuronal nicotinic receptor a	cognitive disorders in schizoph	Neuroscience	Targacept Inc.	
	AZD3480	neuronal nicotinic receptor a	Alzheimer's disease	Neuroscience	Targacept Inc.	
	Zactima	VEGF/EGF TKI inhibitor with	medullary thyroid cancer	Oncology		yes
	ZD4054	endothelin A receptor antag	prostate cancer	Oncology	PRA International	yes
	AZD6244 (ARRY-142886)	MEK inhibitor	solid tumours	Oncology		yes
	AZD9056	ion channel blocker (P2X7)	rheumatoid arthritis	Respiratory and Inflammation		yes
	AZD1981		asthma	Respiratory and Inflammation		yes
	CytoFab™	anti-TNF-alpha polyclonal a	severe sepsis	Infection		
Line extens	**Nexium**	proton pump inhibitor	extra-oesophageal reflux disea	Gastrointestinal		yes
Line extens	**Iressa**	EGFR-TK inhibitor	breast cancer	Oncology		yes
	AGI-1067	anti-atherogenic	atherosclerosis	Cardiovascular		
	AZD6140	ADP receptor antagonist	arterial thrombosis	Cardiovascular		
	saxagliptin (BMS)	dipeptidyl peptidase-4 (DPP	diabetes	Cardiovascular	Bristol-Meyers Squibb	
	Zactima	VEGF/EGF TKI inhibitor with	NSCLC	Oncology		yes
	Recentin (AZD2171)2	VEGF signalling inhibitor (V	NSCLC and CRC	Oncology		yes

Acquired	Licensed-in	Partnered/collaboration	Objected area?	General remark / is partner announced in 200	Remark about area	Area projected in advance
AstraZeneca	2006	AstraZeneca	2006	AstraZeneca	2006	AstraZeneca
			Cardiovascular			yes
			Cardiovascular			yes
			Gastrointestinal			yes
			pain		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Oncology			yes
			Respiratory		new name matches disease	yes
			Respiratory		new name matches disease	yes
			Respiratory		new name matches disease	yes
			Respiratory		new name matches disease	yes
			Respiratory		new name matches disease	yes
			Cardiovasular			yes
			oncology			yes
			oncology			yes
yes (KuDos company)			oncology	kudos is not named in AR 2000		yes
			oncology			yes
			oncology			yes
			Inflammation		new name matches disease	yes
			Respiratory		new name matches disease	yes
	Crestor from Shionogi & Co., Ltd.		Cardiovasular	chionogi & Co is not named in AR 2000		yes
			Cardiovasular			yes
		Collaboration for development a	Cardiovasular	BMS is not named in AR 2000		yes
			Gastrointestinal			yes
			Gastrointestinal			yes
		Co-development with Pozen Inc	Central nervous system		new name matches disease	yes
	yes		Central nervous system	Targacept is not named in AR 2000	new name matches disease	yes
	yes		Central nervous system	Targacept is not named in AR 2000	new name matches disease	yes
			oncology			yes
			oncology			yes
			oncology			yes
			inflammation		new name matches disease	yes
			respiratory		new name matches disease	yes
	Protherics Inc.		Infection	Protherics is not named in AR 2000		yes
			Gastrointestinal			yes
			Oncology			yes
		With AtheroGenics we entered i	Cardiovascular			yes
			Cardiovascular			yes
		with Bristol-Myers Squibb Comp	Cardiovascular	BMS is not named in AR 2000		yes
			Oncology			yes
			Oncology			yes

Line extens	**Crestor**	statin	atherosclerosis	Cardiovascular		
Line extens	**Crestor**	statin	outcomes CHF	Cardiovascular		
Line extens	**Crestor**	statin	outcomes End Stage Renal Dis	Cardiovascular		
Line extens	**Nexium**	proton pump inhibitor	NSAID GI side effects – sympt	Gastrointestinal		yes
Line extens	**Nexium**	proton pump inhibitor	NSAID GI side effects – ulcer h	Gastrointestinal		yes
Line extens	**Nexium**	proton pump inhibitor	peptic ulcer bleeding	Gastrointestinal		yes
Line extens	**Nexium low dose aspirin combinati**	proton pump inhibitor	low dose aspirin associated pe	Gastrointestinal		only the nexium
Line extens	**Seroquel SR**	D2/5HT2 antagonist	schizophrenia	Neuroscience		yes
Line extens	**Seroquel**	D2/5HT2 antagonist	bipolar maintenance	Neuroscience		yes
Line extens	**Seroquel**	D2/5HT2 antagonist	bipolar depression	Neuroscience		yes
Line extens	**Seroquel SR**	D2/5HT2 antagonist	generalised anxiety disorder	Neuroscience		yes
Line extens	**Seroquel SR**	D2/5HT2 antagonist	major depressive disorder	Neuroscience		yes
Line extens	**Seroquel SR**	D2/5HT2 antagonist	bipolar mania	Neuroscience		yes
Line extens	**Seroquel SR**	D2/5HT2 antagonist	bipolar depression	Neuroscience		yes
Line extens	**Faslodex**	oestrogen receptor antagon	first-line advanced breast canc	Oncology		yes
Line extens	**Faslodex**	oestrogen receptor antagon	adjuvant	Oncology		yes
Line extens	**Symbicort Turbuhaler**	inhaled steroid/fast onset, lo	Symbicort Maintenance and Re	Respiratory and Inflammation		yes
Line extens	**Symbicort pMDI**	inhaled steroid/fast onset, lo	asthma	Respiratory and Inflammation		yes
Line extens	**Symbicort pMDI**	inhaled steroid/fast onset, lo	COPD	Respiratory and Inflammation		yes
2007	**AstraZeneca**	**2007**	**AstraZeneca**	**2007**	**AstraZeneca**	**2007**
2007						
	AZD1305	anti-arrhythmic	arrhythmias	Cardiovascular		yes
	AZD6370	GLK activator	diabetes	Cardiovascular		yes
	AZD2066	metabotropic glutamate rec	GERD	Gastrointestinal		yes
	AZD1386	vanilloid receptor 1 antagon	GERD	Gastrointestinal		yes
	AZD3241	inhibitor of myeloperoxidase	Parkinson's disease	Neuroscience		yes
	AZD0328	selective neuronal nicotinic	Alzheimer's disease	Neuroscience		yes
	AZD1940	CB receptor agonist	nociceptive and neuropathic pa	Neuroscience		yes
	AZD2624	NK receptor antagonist	schizophrenia	Neuroscience		yes
	AZD1386	vanilloid receptor antagonist	chronic nociceptive pain	Neuroscience		yes
	AZD2066	metabotropic glutamate rec	chronic nociceptive pain	Neuroscience		yes
	AZD7325	GABA receptor subtype part	anxiety	Neuroscience		yes
	AZD6280	GABA receptor subtype part	anxiety	Neuroscience		yes
	AZD1152	aurora kinase inhibitor	solid tumours and haematologi	Oncology		yes
	AZD4877	cell cycle agent	solid tumours and haematologi	Oncology		yes
	AZD8931	erbB kinase inhibitor	solid tumours	Oncology		yes
	AZD4818	CCR1 antagonist	COPD	Respiratory & Inflammation		yes
	AZD1236	matrix metalloproteinase inh	COPD	Respiratory & Inflammation		yes
	AZD9668	neutrophil elastase inhibitor	COPD	Respiratory & Inflammation		yes
	AZD3199	iLABA	asthma/COPD	Respiratory & Inflammation		yes
	AZD0837	thrombin inhibitor	thrombosis	Cardiovascular		yes
	AZD3355	inhibitor of transient lower o	GERD	Gastrointestinal		yes
	AZD3480	neuronal nicotinic receptor a	cognitive disorders in schizoph	Neuroscience	Targacept Inc.	
	AZD3480	neuronal nicotinic receptor a	Alzheimer's disease	Neuroscience	Targacept Inc.	
	AZD6765	NMDA receptor antagonist	depression	Neuroscience		yes
	Zactima	VEGF/EGF TK inhibitor with	medullary thyroid cancer	Oncology		yes
	AZD6244 (ARRY-142886)	MEK inhibitor	solid tumours	Oncology		

	Crestor from Shionogi & Co., Ltd.		Cardiovascular	chionogi & Co is not named in AR 2000		yes
	Crestor from Shionogi & Co., Ltd.		Cardiovascular	chionogi & Co is not named in AR 2000		yes
	Crestor from Shionogi & Co., Ltd.		Cardiovascular	chionogi & Co is not named in AR 2000		yes
			Gastrointestinal			yes
			Gastrointestinal			yes
			Gastrointestinal			yes
			Gastrointestinal			yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Oncology			yes
			Oncology			yes
			Respiratory		new name matches disease	yes
			Respiratory		new name matches disease	yes
			Respiratory		new name matches disease	yes
AstraZeneca	2007	AstraZeneca	2007	AstraZeneca	2007	AstraZeneca
			Cardiovascular			yes
			Cardiovascular			yes
			Cardiovascular			yes
			Cardiovascular			yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			pain		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			pain		new name matches disease	yes
			pain		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Oncology			yes
			Oncology			yes
			Oncology			yes
			Respiratory		new name matches disease	yes
			Respiratory		new name matches disease	yes
			Respiratory		new name matches disease	yes
			Respiratory		new name matches disease	yes
			Cardiovascular			yes
			Gastrointestinal			yes
	licensed from Targacept		Central nervous system	targacept is not named in AR 2000	new name matches disease	yes
	licensed from Targacept		Central nervous system	targacept is not named in AR 2000	new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Oncology			yes
	licensed from Array BioPharma Inc.		Oncology	Array BioPharma is nit named in 2000		yes

	AZD2281	PARP inhibitor	breast cancer	Oncology	KuDOS Pharmaceuticals Limited	yes
	AZD0530	SRC kinase inhibitor	solid tumours and haematologi	Oncology		yes
	AZD9056	ion channel blocker (P2X7)	rheumatoid arthritis	Respiratory & Inflammation		yes
	AZD1981	prostaglandin receptor anta	asthma	Respiratory & Inflammation		yes
	AZD5672	chemokine antagonist (CCR	rheumatoid arthritis	Respiratory & Inflammation		yes
	CytoFab™	anti-TNF-alpha polyclonal a	severe sepsis	Infection		
Line extens	**Nexium**	proton pump inhibitor	extra-oesophageal refl ux disea	Gastrointestinal		yes
	AZD6140	ADP receptor antagonist	arterial thrombosis	Cardiovascular		yes
	Saxagliptin	dipeptidyl peptidase-4 (DPP	diabetes	Cardiovascular	Bristol-Myers Squibb	
Het genees	**Crestor/ABT-335**	statin + fi brate fi xed combi	dyslipidaemia	Cardiovascular		
	PN400	naproxen + esomeprazole	signs and symptoms of OA, RA	Neuroscience		
	Zactima	VEGF/EGF TK inhibitor with	NSCLC	Oncology		yes
	Recentin3	VEGF signalling inhibitor (V	NSCLC and CRC	Oncology		yes
	Recentin	VEGF signalling inhibitor (V	recurrent glioblastoma	Oncology		yes
	ZD4054	endothelin A receptor antag	hormone-resistant prostate car	Oncology	PRA International	yes
Line extens	**Crestor**	statin	atherosclerosis	Cardiovascular		
Line extens	**Crestor**	statin	outcomes end stage renal dise	Cardiovascular		
Line extens	**Crestor**	statin	outcomes in subjects with elev	Cardiovascular		
Line extens	**Saxagliptin/metformin FDC**	DPP-4 + biguanide FDC	diabetes	Cardiovascular	Bristol-Myers Squibb	metformin
Line extens	**Dapaglifl ozin/metformin FDC**	SGLT2 + biguanide FDC	diabetes	Cardiovascular	Bristol-Myers Squibb	metformin
Line extens	**Nexium**	proton pump inhibitor	peptic ulcer bleeding	Gastrointestinal		yes
Line extens	**Nexium low dose aspirin combinati**	proton pump inhibitor	low dose aspirin associated pe	Gastrointestinal		only the nexium
Line extens	**Seroquel XR**	D2/5HT2 antagonist	schizophrenia	Neuroscience		yes
Line extens	**Seroquel**	D2/5HT2 antagonist	bipolar maintenance	Neuroscience		yes
Line extens	**Seroquel**	D2/5HT2 antagonist	bipolar depression	Neuroscience		yes
Line extens	**Seroquel XR**	D2/5HT2 antagonist	generalised anxiety disorder	Neuroscience		yes
Line extens	**Seroquel XR**	D2/5HT2 antagonist	major depressive disorder	Neuroscience		yes
Line extens	**Seroquel XR**	D2/5HT2 antagonist	bipolar mania	Neuroscience		yes
Line extens	**Seroquel XR**	D2/5HT2 antagonist	bipolar depression	Neuroscience		yes
Line extens	**Faslodex**	oestrogen receptor antagon	fi rst-line advanced breast can	Oncology		yes
Line extens	**Faslodex**	oestrogen receptor antagon	adjuvant	Oncology		yes
Line extens	**Iressa**	EGFR-TK inhibitor	NSCLC	Oncology		yes
Line extens	**Symbicort pMDI**	inhaled steroid/fast-onset, lo	Asthma	Respiratory & Inflammation		yes
Line extens	**Symbicort pMDI**	inhaled steroid/fast-onset, lo	COPD	Respiratory & Inflammation		yes
AstraZene	**2008**	**AstraZeneca**	**2008**	**AstraZeneca**	**2008**	**AstraZeneca**
2008	**AZD6482**	PI3K-beta inhibitor	thrombosis	Cardiovascular		yes
	AZD4017	11BHSD inhibitor	diabetes/obesity	Cardiovascular		yes
	AZD2066	metabotropic glutamate rece	GERD	Gastrointestinal		yes
	AZD1386	vanilloid receptor antagonist	GERD	Gastrointestinal		yes
	AZD3241	myeloperoxidase (MPO) inh	Parkinson's disease	Neuroscience		yes
	AZD2066	metabotropic glutamate rece	chronic neuropathic pain	Neuroscience		yes
	AZD6280	GABA receptor subtype part	anxiety	Neuroscience		yes
	AZD8529	glutamatergic modulator	schizophrenia	Neuroscience		yes
	AZD2516	metabotropic glutamate rece	chronic neuropathic pain	Neuroscience		yes
	AZD1446	neuronal nicotinic receptor a	Alzheimer's disease	Neuroscience		yes
	AZD7268	enkephalinergic receptor mo	depression/anxiety	Neuroscience		yes

yes (KuDos company) (2005/2006)			Oncology	kudos is not named in AR 2000		yes
			Oncology			yes
			Inflammation		new name matches disease	yes
			Respiratory		new name matches disease	yes
			Inflammation		new name matches disease	yes
	Protherics Inc.		Infection	Protherics is not named in AR 2000		yes
			Gastrointestinal			yes
			Cardiovascular			yes
		with Bristol-Myers Squibb Comp	Cardiovascular	BMS is not named in AR 2000		yes
	Crestor from Shionogi & Co., Ltd.		Cardiovascular	Shionogi is not named in AR 2000		yes
		Collaboration with POZEN Inc. t	pain	Pozen is not named in the AR 2000	new name matches disease	yes
			Oncology			yes
			Oncology			yes
			Oncology			yes
			Oncology			yes
	Crestor from Shionogi & Co., Ltd.		Cardiovascular	Shionogi is not named in AR 2000		yes
	Crestor from Shionogi & Co., Ltd.		Cardiovascular	Shionogi is not named in AR 2000		yes
	Crestor from Shionogi & Co., Ltd.		Cardiovascular	Shionogi is not named in AR 2000		yes
		with Bristol-Myers Squibb Comp	Cardiovascular	BMS is not named in AR 1999		yes
		with Bristol-Myers Squibb Comp	Cardiovascular	BMS is not named in AR 2000		yes
			Gastrointestinal			yes
			Gastrointestinal			yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
						yes
			Oncology			yes
			Oncology			yes
			Oncology			yes
						yes
			Respiratory			yes
			Respiratory			yes
						yes
2008	AstraZeneca	2008	AstraZeneca	2008	AstraZeneca	2008
			Cardiovascular			yes
			Cardiovascular			yes
						yes
			Cardiovascular			yes
			Cardiovascular			yes
			Central nervous system		new name matches disease	yes
			pain		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			pain		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes

	AZD8931	erbB kinase inhibitor	solid tumours	Oncology		yes
	AZD6918	TRK inhibitor	solid tumours	Oncology		yes
	AZD8848	-	asthma	Respiratory & Inflammation		yes
	AZD8566	CCR5	rheumatoid arthritis	Respiratory & Inflammation		yes
	AZD8075	CRTh2 antagonist	asthma/COPD	Respiratory & Inflammation		yes
	AZD5985	CRTh2 antagonist	asthma/COPD	Respiratory & Inflammation		yes
line extens	**Crestor**	statin	outcomes in subjects with elev	Cardiovascular		
line extens	**Onglyza™/Metformin FDC2**	DPP-4 inhibitor + biguanide	diabetes	Cardiovascular	Bristol Meyers Squibb	metformin
line extens	**Dapagliflozin/Metformin FDC2**	DPP-4 inhibitor + biguanide	diabetes	Cardiovascular	Bristol Meyers Squibb	metformin
line extens	**Nexium**	proton pump inhibitor	peptic ulcer bleeding	Gastrointestinal		yes
line extens	**Nexium**	proton pump inhibitor	extra-oesophageal reflux disea	Gastrointestinal		yes
line extens	**Seroquel**	D2/5HT2 antagonist	bipolar maintenance	Neuroscience		yes
line extens	**Seroquel**	D2/5HT2 antagonist	bipolar depression	Neuroscience		yes
line extens	**Seroquel XR**	D2/5HT2 antagonist	major depressive disorder	Neuroscience		yes
line extens	**Seroquel XR**	D2/5HT2 antagonist	bipolar mania	Neuroscience		yes
line extens	**Seroquel XR**	D2/5HT2 antagonist	bipolar depression	Neuroscience		yes
line extens	**Seroquel XR**	D2/5HT2 antagonist	generalised anxiety disorder	Neuroscience		yes
line extens	**Iressa**	EGFR tyrosine kinase inhibi	NSCLC	Oncology		yes
line extens	**Zactima**	VEGFR/EGFR tyrosine kina	medullary thyroid cancer	Oncology		yes
line extens	**Faslodex**	oestrogen receptor antagon	first line advanced breast canc	Oncology		yes
line extens	**Faslodex**	oestrogen receptor antagon	adjuvant	Oncology		yes
line extens	**Symbicort pMDI**	inhaled steroid/fast onset, lo	asthma	Respiratory & Inflammation		yes
line extens	**Symbicort pMDI**	inhaled steroid/fast onset, lo	COPD	Respiratory & Inflammation		yes
line extens	**Unit Dose Budesonide2,4**	inhaled steroid	asthma	Respiratory & Inflammation		

						yes
			Oncology			yes
			Oncology			yes
			Respiratory		new name matches disease	yes
			Inflammation		new name matches disease	yes
			Respiratory		new name matches disease	yes
			Respiratory		new name matches disease	yes
						yes
	Crestor from Shionogi & Co., Ltd.		Cardiovascular	Shionogi is not named in the AR 20000		yes
		with Bristol-Myers Squibb Comp	Cardiovascular	BMS is not named in AR 2000		yes
		with Bristol-Myers Squibb Comp	Cardiovascular	BMS is not named in AR 2000		yes
						yes
			Gastrointestinal			yes
			Gastrointestinal			yes
						yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
			Central nervous system		new name matches disease	yes
						yes
			Oncology			yes
			Oncology			yes
			Oncology			yes
			Oncology			yes
						yes
			Respiratory		new name matches disease	yes
			Respiratory		new name matches disease	yes
	exclusive worldwide agreement with MAP Pharmac		Respiratory	MAP is not named in the AR 2000	new name matches disease	yes

Genentech

Genentech	Drug name	(Description)	Indication	Disease area	Co-sponsor	Own R&D	Acquired
Genentech	2006	Genentech	2006	Genentech	2006	Genentech	2006
2006	**Dacetuzumab**	Anti-CD40	Chronic Lymphocytic Leukemia	Oncology			
		Trastuzumab-DM1	HER2-Positive Metastatic Breast Cancer	Oncology		Trastuzumab	
	Avastin®		Glioblastoma Multiforme	Oncology		yes	
		HAE1	Moderate-to-Severe Allergic Asthma	Immunology		yes	
	Ranibizumab	Lucentis	Diabetic Macular Edema	Tissue Growth & Repair		yes	
		Topical VEGF	Diabetic Foot Ulcers	Tissue Growth & Repair		yes	
	Avastin®	bevacizumab	Adjuvant Colon Cancer	Oncology		yes	
	Avastin®		Adjuvant Non-Small Cell Lung Cancer1	Oncology		yes	
	Avastin®		Adjuvant Rectal Cancer	Oncology		yes	
	Avastin®		First-Line Metastatic Breast Cancer4	Oncology		yes	
	Avastin®		First-Line Metastatic Renal Cell Carcinoma	Oncology		yes	
	Avastin®		Gastrointestinal Stromal Tumors1	Oncology		yes	
	Avastin®		Second-Line Metastatic Breast Cancer4	Oncology		yes	
	Avastin® +/- Tarceva®		First-Line Metastatic Non-Squamous, Non-Small C	Oncology		avastin	
	Herceptin® +/- Avastin®		First-Line HER2-Positive Metastatic Breast Cancer	Oncology		both	
	Rituxan®	rituximab	First-Line Follicular Non-Hodgkin's Lymphoma4	Oncology			
	Tarceva®		Adjuvant Non-Small Cell Lung Cancer	Oncology			
	Tarceva® +/- Avastin®		First-Line Metastatic Non-Small Cell Lung Cancer	Oncology		avastin	
	Tarceva® +/- Avastin®		First-Line Metastatic Pancreatic Cancer4	Oncology		avastin	
	Tarceva® +/- Avastin®		Second-Line Metastatic Non-Small Cell Lung Canc	Oncology		avastin	
	Rituxan®		Lupus Nephritis	Immunology			
	Rituxan®		Systemic Lupus Erythematosus	Immunology			
	Xolair®	omalizumab	Pediatric Asthma	Immunology			yes (Tanox comp
	Lucentis®	ranibizumab	Diabetic Macular Edema1	Tissue Growth & Repair		yes	
	Lucentis®	ranibizumab	Retinal Vein Occlusion1	Tissue Growth & Repair		yes	
	TNKase®		Catheter Clearance	Tissue Growth & Repair		yes	
	Avastin®		First-Line Metastatic Breast Cancer5	Oncology		yes	
	Avastin®		First-Line Metastatic Renal Cell Carcinoma	Oncology		yes	
	Herceptin®	trastuzumab	Adjuvant HER2-Positive Breast Cancer—Based on	Oncology		yes	
	Rituxan®		Rheumatoid Arthritis—Based on REFLEX Radiogra	Immunology	Hoffmann-La Roche + Biogen Idec		
	Herceptin®	trastuzumab	Adjuvant HER2-Positive Breast Cancer—Based on	Oncology		yes	
Genentech	2007	Genentech	2007	Genentech	2007	Genentech	2007
2007	**Rituxan® + Anti-CD40**		Non-Hodgkin's Lymphoma	Oncology			
		Anti-IFNalpha	Systemic Lupus Erythematosus	Immunology		yes	
	PRO95780	Apomab	Chondrosarcoma	Oncology		yes	
	Avastin®		Extensive Small Cell Lung Cancer	Oncology		yes	
	Avastin®		Non-Squamous, Non-Small Cell Lung Cancer with	Oncology		yes	
	Avastin®		Relapsed Multiple Myeloma	Oncology		yes	
	Avastin® +/- Apomab		Non-Small Cell Lung Cancer	Oncology		both	
	Apo2L/TRAIL +/- Avastin®	Dulanermin (recombinant human	Non-Small Cell Lung Cancer	Oncology		avastin	
	Rituxan® +/- Apo2L/TRAIL	Dulanermin (recombinant human	Non-Hodgkin's Lymphoma	Oncology	Amgen	partly	
	Rituxan® +/- Apomab		Non-Hodgkin's Lymphoma1	Oncology		Apomab	
		Trastuzumab-DM1	HER2-Positive Metastatic Breast Cancer	Oncology			
	Raptiva®	Efalizumab	Renal Transplantation1	Immunology			

Licensed-in	Partnered/collaboration	Objected area?	General remark / is partner announce	Remark about area	Area projected in advance
Genentech	2006	Genentech	2006	Genentech	2006
	Collaboration with Seattle Genetics Inc.	Oncology	Seattle is namend in AR 2000		yes
the DM1 part from Immunogen		Oncology	Immunogen is named in AR 2000		yes
		Oncology			yes
		Immunology			yes
				Disease areas was not proj	no
				Disease areas was not proj	no
		Oncology			yes
		Oncology			yes
		Oncology			yes
		Oncology			yes
		Oncology			yes
		Oncology			yes
		Oncology			yes
	Tarceva is commercialized in collaboration with (	Oncology	OSI Pharma is named in AR 2000		yes
		Oncology			yes
	Rituxan jointly developed with IDEC Pharmaceut	Oncology	IDEC is named in AR 2000		yes
	Tarceva is commercialized in collaboration with (	Oncology	OSI Pharma is named in AR 2000		yes
	Tarceva is commercialized in collaboration with (	Oncology	OSI Pharma is named in AR 2000		yes
	Tarceva is commercialized in collaboration with (	Oncology	OSI Pharma is named in AR 2000		yes
	Tarceva is commercialized in collaboration with (	Oncology	OSI Pharma is named in AR 2000		yes
	Rituxan jointly developed with IDEC Pharmaceut	Immunology	IDEC is namend in AR 2000		yes
	Rituxan jointly developed with IDEC Pharmaceut	Immunology	IDEC is namend in AR 2000		yes
)any)		Immunology	Tanox was partner in AR 2000		yes
				Disease areas was not proj	no
				Disease areas was not proj	no
				Disease areas was not proj	no
		Oncology			yes
		Oncology			yes
		Oncology			yes
	Rituxan jointly developed with IDEC Pharmaceut	Immunology	IDEC is named in AR 2000		yes
		Oncology			yes
Genentech	2007	Genentech	2007	Genentech	2007
	Rituxan jointly developed with IDEC Pharmaceut	Oncology	Seattle + IDEC are named in AR 2000		yes
		Immunology			yes
		Oncology			yes
		Oncology			yes
		Oncology			yes
		Oncology			yes
		Oncology			yes
	Dulanermin (recombinant human Apo2L/TRAIL)	Oncology	Idec is named in AR 2000 as partner, Amgen not as partner		yes
	Rituxan jointly developed with IDEC Pharmaceut	Oncology	Idec is named in AR 2000 as partner, Amgen not as partner		yes
	Rituxan jointly developed with IDEC Pharmaceut	Oncology	IDEC is named in AR 2000		yes
the DM1 part from Immunogen		Oncology	Immunogen is named in AR 2000		yes
	Xoma	Immunology	Xoma is named in AR 2000		yes

	Lucentis®	ranibizumab	Diabetic Macular Edema	Tissue Growth & Repair		yes	
	Avastin®	bevacizumab	Adjuvant Colon Cancer	Oncology		yes	
	Avastin®	bevacizumab	Adjuvant Non-Small Cell Lung Cancer	Oncology		yes	
	Avastin®	bevacizumab	First-Line Metastatic Breast Cancer	Oncology		yes	
	Avastin®	bevacizumab	First-Line Metastatic Glioblastoma Multiforme1	Oncology		yes	
	Avastin®	bevacizumab	Gastrointestinal Stromal Tumors1	Oncology		yes	
	Avastin®	bevacizumab	Second-Line Metastatic Breast Cancer	Oncology		yes	
	Avastin®	bevacizumab	Second-Line Metastatic Colorectal Cancer	Oncology		yes	
	Avastin® +/- Tarceva®		First-Line Metastatic Non-Squamous, Non-Small C	Oncology		Avastin	
	Herceptin®		Adjuvant HER2-Positive Breast Cancer (HERA Tria	Oncology		yes	
	Herceptin® +/- Avastin®		Adjuvant HER2-Positive Breast Cancer1	Oncology		both	
	Herceptin® +/- Avastin®		First-Line HER2-Positive Metastatic Breast Cancer	Oncology		both	
	Herceptin® +/- Pertuzumab		HER2-Positive Metastatic Breast Cancer1	Oncology		both	
	Rituxan® (Hematology/Oncology)		Follicular Non-Hodgkin's Lymphoma	Oncology			
	Tarceva®		Adjuvant Non-Small Cell Lung Cancer	Oncology			
	Tarceva®		First-Line Metastatic Non-Small Cell Lung Cancer	Oncology			
	Tarceva® +/- Avastin®		Second-Line Metastatic Non-Small Cell Lung Canc	Oncology		avastin	
	Rituxan® (Immunology)		Active Rheumatoid Arthritis	Immunology	Hoffmann-La Roche		
			Lupus Nephritis	Immunology	Roche Pharma AG		
	Rituxan® (Immunology)		Systemic Lupus Erythematosus	Immunology			
	Xolair®	omalizumab	Pediatric Asthma	Immunology			yes (Tanox comp
	Lucentis®	ranibizumab	Diabetic Macular Edema	Tissue Growth & Repair		yes	
	Lucentis®	ranibizumab	Retinal Vein Occlusion	Tissue Growth & Repair		yes	
	TNKase®		Catheter Clearance	Tissue Growth & Repair		yes	
	Avastin®		First-Line Metastatic Renal Cell Carcinoma	Oncology		yes	
	Avastin®		Relapsed Glioblastoma Multiforme	Oncology		yes	
	Herceptin®		Adjuvant HER2-Positive Breast Cancer – Based on	Oncology		yes	
Genentech	**2008**	**Genentech**	**2008**	**Genentech**	**2008**	**Genentech**	**2008**
2008		Trastuzumab-DM1 + Pertuzumal	HER2-Positive Metastatic Breast Cancer1	Oncology		both (without DM-1)	
		Anti-Abeta	Alzheimer's Disease	NEUROSCIENCE			
	Avastin®		Extensive Small Cell Lung Cancer	Oncology		yes	
	Avastin®		Non-Squamous, Non-Small Cell Lung Cancer With	Oncology		yes	
	Avastin®		Relapsed Multiple Myeloma	Oncology		yes	
		Hedgehog Pathway Inhibitor	Ovarian Cancer Maintenance Therapy	Oncology			
		Trastuzumab-DM1	First-Line HER2-Positive Metastatic Breast Cancer	Oncology		Trastuzumab	
		Trastuzumab-DM1	Second-Line HER2-Positive Metastatic Breast Can	Oncology		Trastuzumab	
		Trastuzumab-DM1	Third-Line HER2-Positive Metastatic Breast Cance	Oncology		Trastuzumab	
		Anti-IFNalpha	Systemic Lupus Erythematosus1	IMMUNOLOGY			
		Ocrelizumab1	Relapsing Remitting Multiple Sclerosis	IMMUNOLOGY	Roche Pharma AG		
	Avastin®		Adjuvant Colon Cancer	Oncology		yes	
	Avastin®		Adjuvant Non-Small Cell Lung Cancer	Oncology		yes	
	Avastin®		First-Line Advanced Gastric Cancer	Oncology		yes	
	Avastin®		First-Line HER2-Negative Metastatic Breast Cance	Oncology		yes	
	Avastin®		First-Line HER2-Positive Metastatic Breast Cancer	Oncology		yes	

				Disease areas was not proj	no
		Oncology			yes
		Oncology			yes
		Oncology			yes
		Oncology			yes
		Oncology			yes
		Oncology			yes
		Oncology			yes
	Tarceva is commercialized in collaboration with (	Oncology	OSI Pharma is named in AR 2000		yes
		Oncology			yes
		Oncology			yes
		Oncology			yes
		Oncology			yes
	Rituxan jointly developed with IDEC Pharmaceut	Oncology	IDEC is named in AR 2000		yes
	Tarceva is commercialized in collaboration with (	Oncology	OSI Pharma is named in AR 2000		yes
	Tarceva is commercialized in collaboration with (	Oncology	OSI Pharma is named in AR 2000		yes
	Tarceva is commercialized in collaboration with (	Oncology	OSI Pharma is named in AR 2000		yes
	Rituxan jointly developed with IDEC Pharmaceut	Immunology	IDEC is named in AR 2000		yes
	In collaboration with Biogen Idec	Immunology	IDEC is named in AR 2000		yes
		Immunology			yes
)any)		Immunology	Tanox is named in AR 2000		yes
				Disease areas was not proj	no
				Disease areas was not proj	no
				Disease areas was not proj	no
		Oncology			yes
		Oncology			yes
		Oncology			yes
Genentech	**2008**	**Genentech**	**2008**	**Genentech**	**2008**
the DM1 part from Immunogen		Oncology	Immunogen is named in AR 2000		yes
				Disease areas was not proj	no
		Oncology			yes
		Oncology			yes
		Oncology			yes
		Oncology			yes
the DM1 part from Immunogen		Oncology	Immunogen is named in AR 2000		yes
the DM1 part from Immunogen		Oncology	Immunogen is named in AR 2000		yes
the DM1 part from Immunogen		Oncology	Immunogen is named in AR 2000		yes
		Immunology			yes
In collaboration with Biogen Idec		Immunology	IDEC is named in AR 2000		yes
		Oncology			yes
		Oncology			yes
		Oncology			yes
		Oncology			yes
		Oncology			yes

	Avastin®		Gastrointestinal Stromal Tumors	Oncology		yes	
	Avastin®		Newly Diagnosed Glioblastoma Multiforme1	Oncology		yes	
	Avastin®		Second-Line HER2-Negative Metastatic Breast Ca	Oncology		yes	
	Avastin® +/- Tarceva®		First-Line Metastatic Non-Squamous, Non-Small C	Oncology		Avastin	
	Herceptin®		Adjuvant HER2-Positive Breast Cancer (HERA 2-Y	Oncology		yes	
	Rituxan®		Follicular Non-Hodgkin's Lymphoma	Oncology			
	Tarceva®		Adjuvant Non-Small Cell Lung Cancer	Oncology			
		Trastuzumab-DM1	Second-Line HER2-Positive Metastatic Breast Can	Oncology		trastuzumab	
		Ocrelizumab2	Lupus Nephritis	IMMUNOLOGY	Roche Pharma AG		
		Ocrelizumab2	Rheumatoid Arthritis	IMMUNOLOGY	Roche Pharma AG		
	Rituxan®		Lupus Nephritis	IMMUNOLOGY			
	Xolair®	omalizumab	Asthma	IMMUNOLOGY			yes (Tanox comp
	Lucentis®	ranibizumab	Diabetic Macular Edema	TISSUE GROWTH & REPAIR		yes	
	Lucentis®	ranibizumab	Retinal Vein Occlusion	TISSUE GROWTH & REPAIR		yes	
		TNKase	Central Venous Catheter Clearance	TISSUE GROWTH & REPAIR		yes	
		TNKase	Hemodialysis Catheter Clearance	TISSUE GROWTH & REPAIR		yes	
	Avastin®		First-Line HER2-Negative Metastatic Breast Cance	ONCOLOGY		yes	
	Tarceva®		Non-Small Cell Lung Cancer	ONCOLOGY			
	Rituxan®		Rheumatoid Arthritis (Radiographic Data)	IMMUNOLOGY	Hoffmann-La Roche + Biogen Idec		
	Avastin®		First-Line Metastatic Renal Cell Carcinoma	ONCOLOGY		yes	
	Avastin®		Previously Treated Glioblastoma	ONCOLOGY		yes	
	Xolair®	omalizumab	Pediatric Asthma	IMMUNOLOGY			yes (Tanox comp

		Oncology			yes
		Oncology			yes
		Oncology			yes
	Tarceva is commercialized in collaboration with	Oncology	OSI Pharma is named in AR 2000		yes
		Oncology			yes
	Rituxan jointly developed with IDEC Pharmaceut	Oncology	IDEC is named in AR 2000		yes
	Tarceva is commercialized in collaboration with	Oncology	OSI Pharma is named in AR 2000		yes
the DM1 part from Immunogen		Oncology	Immunogen is named in AR 2000		yes
	In collaboration with Biogen Idec	Immunology	IDEC is named in AR 2000		yes
	In collaboration with Biogen Idec	Immunology	IDEC is named in AR 2000		yes
	Rituxan jointly developed with IDEC Pharmaceut	Immunology	OSI Pharma is named in AR 2000		yes
pany)		Immunology	Tanox is named in AR 2000		yes
				Disease areas was not proj	no
				Disease areas was not proj	no
				Disease areas was not proj	no
				Disease areas was not proj	no
		Oncology			yes
	Tarceva is commercialized in collaboration with	Oncology	OSI Pharma is named in AR 2000		yes
	Rituxan jointly developed with IDEC Pharmaceut	Immunology	IDEC is named in AR 2000		yes
		Oncology			yes
		Oncology			yes
pany)		Immunology	Tanox is named in AR 2000		yes

GlaxoSmithKline

GSK	Drug name	(Description)	Indication	Disease area	Co-sponsor	Own R&D	Acquired
2006	GlaxoSmithKline	2006	GlaxoSmithKline	2006	GlaxoSmithKline	2006	GlaxoSmithKline
AR	256073	high affinity nicotinic acid rec	dyslipidaemia	*Cardiovascular* & Metabolic		yes	
	568859	lipoprotein-associated phospholipase A2 (Lp-PLA2) inhibitor	atherosclerosis	Cardiovascular & Metabolic			
	813893	factor Xa inhibitor	prevention of stroke in atrial fibrill	Cardiovascular & Metabolic		yes	
	856553	p38 kinase inhibitor	atherosclerosis (also rheumatoid	Cardiovascular & Metabolic		yes	
	rilapladib	Lp-PLA2 inhibitor	atherosclerosis	Cardiovascular & Metabolic			
	501516	peroxisome proliferator-activ	dyslipidaemia	Cardiovascular & Metabolic			
	681323	p38 kinase inhibitor	atherosclerosis (also COPD, neur	Cardiovascular & Metabolic		yes	
	darapladib	Lp-PLA2 inhibitor	atherosclerosis	Cardiovascular & Metabolic			
	Coreg CR† + ACE inhibitor	beta blocker + angiotensin c	hypertension – fixed dose combin	Cardiovascular & Metabolic		Ace-inhibitor	
	Arixtra	synthetic factor Xa inhibitor	treatment of acute coronary syndr	Cardiovascular & Metabolic		yes	
	Coreg CR	beta blocker	hypertension & congestive heart f	Cardiovascular & Metabolic			
	189075	sodium dependent glucose t	obesity	Cardiovascular & Metabolic - *Metabolic projects*			
	376501	PPAR gamma partial agonis	type 2 diabetes	Cardiovascular & Metabolic - Metabolic projects		yes	
	189075	SGLT2 inhibitor	type 2 diabetes	Cardiovascular & Metabolic - Metabolic projects			
	677954	PPAR pan agonist	type 2 diabetes, metabolic syndro	Cardiovascular & Metabolic - Metabolic projects		yes	
	869682	SGLT2 inhibitor	obesity	Cardiovascular & Metabolic - Metabolic projects			
	albiglutide (716155)	glucagon-like peptide 1 agor	type 2 diabetes	Cardiovascular & Metabolic - Metabolic projects			
	Avandia	PPAR gamma agonist	atherosclerosis in type 2 diabetes	Cardiovascular & Metabolic - Metabolic projects		yes	
	Avandamet XR	PPAR gamma agonist + met	type 2 diabetes – extended releas	Cardiovascular & Metabolic - Metabolic projects		yes	
	Avandia	PPAR gamma agonist	prevention of diabetes	Cardiovascular & Metabolic - Metabolic projects		yes	
	Avandia + simvastatin	PPAR gamma agonist + stat	type 2 diabetes	Cardiovascular & Metabolic - Metabolic projects		yes	
	Avandaryl/Avaglim	PPAR gamma agonist + sulp	type 2 diabetes – fixed dose comb	Cardiovascular & Metabolic - Metabolic projects		Avandary	
	189075	sodium dependent glucose t	obesity	Cardiovascular & Metabolic - Metabolic projects			
	376501	PPAR gamma partial agonis	type 2 diabetes	Cardiovascular & Metabolic - Metabolic projects		yes	
	189075	SGLT2 inhibitor	type 2 diabetes	Cardiovascular & Metabolic - Metabolic projects			
	677954	PPAR pan agonist	type 2 diabetes, metabolic syndro	Cardiovascular & Metabolic - Metabolic projects		yes	
	869682	SGLT2 inhibitor	obesity	Cardiovascular & Metabolic - Metabolic projects			
	albiglutide (716155)†	glucagon-like peptide 1 agor	type 2 diabetes	Cardiovascular & Metabolic - Metabolic projects			
	Avandia	PPAR gamma agonist	atherosclerosis in type 2 diabetes	Cardiovascular & Metabolic - Metabolic projects		yes	
	Avandamet XR	PPAR gamma agonist + met	type 2 diabetes – extended releas	Cardiovascular & Metabolic - Metabolic projects		yes	
	Avandia	PPAR gamma agonist	prevention of diabetes	Cardiovascular & Metabolic - Metabolic projects		yes	
	Avandia + simvastatin	PPAR gamma agonist + stat	type 2 diabetes	Cardiovascular & Metabolic - Metabolic projects		yes	
	Avandaryl/Avaglim	PPAR gamma agonist + sulp	type 2 diabetes – fixed dose comb	Cardiovascular & Metabolic - Metabolic projects		Avandaryl	
	sitamaquine	8-aminoquinoline	treatment of visceral leishmaniasi	Infectious Diseases		yes	
	chlorproguanil, dapsone + artesu	antifolate + artemisinin	treatment of uncomplicated malar	Infectious Diseases		yes	
	625433	polymerase inhibitor	hepatitis C	Infectious diseases - Antivirals		yes	
	364735	integrase inhibitor	HIV infection	Infectious diseases - Antivirals			
	221149	oxytocin antagonist	threatened pre-term labour	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	232802	3G-selective oestrogen rece	treatment of menopausal symptor	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	751689	calcium antagonist	osteoporosis	Musculoskeletal, Inflammation, Gastrointestinal & Urology			
	relacatib	cathepsin K inhibitor	osteoporosis & osteoarthritis (also	Musculoskeletal, Inflammation, Gastrointestinal & Urology			
	274150	selective iNOS inhibitor	rheumatoid arthritis (also migrain	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	681323	p38 kinase inhibitor (oral)	rheumatoid arthritis (also atheros	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	856553	p38 kinase inhibitor (oral)	rheumatoid arthritis (also atheros	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	876008†	corticotrophin releasing facto	irritable bowel syndrome (also de	Musculoskeletal, Inflammation, Gastrointestinal & Urology			
	casopitant	NK1 antagonist	overactive bladder (also depressi	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	dutasteride + testosterone	5-alpha reductase inhibitor +	hypogonadism – fixed dose comb	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	HuMax-CD20 (ofatumumab)†	human monoclonal antibody	rheumatoid arthritis (chronic lymp	Musculoskeletal, Inflammation, Gastrointestinal & Urology			
	mepolizumab	anti-IL5 monoclonal antibody	eosinophilic esophagitis (also sev	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	rosiglitazone XR	PPAR gamma agonist	rheumatoid arthritis (also Alzheim	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	solabegron	beta3 adrenergic agonist	irritable bowel syndrome	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	solabegron	beta3 adrenergic agonist	overactive bladder	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	Avodart + alpha blocker	5-alpha reductase inhibitor +	benign prostatic hyperplasia – fixe	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	Avodart	5-alpha reductase inhibitor	reduction in the risk of prostate ca	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	

Licensed-in	Objected area? (2000)	General remark / is partner announc	Remark about area	Area projected in advance
2006	2006	GlaxoSmithKline	2006	GlaxoSmithKline
	Metabolic & Musculoskeletal		new name matches disease	yes
possible	Cardiovascular & Urogenital	partners were actively attracted accordi	new name matches disease	yes
	Cardiovascular & Urogenital		new name matches disease	yes
	Cardiovascular & Urogenital		new name matches disease	yes
possible	Cardiovascular & Urogenital	partners were actively attracted accordi	new name matches disease	yes
possible	Metabolic & Musculoskeletal	partners were actively attracted accordi	new name matches disease	yes
	Cardiovascular & Urogenital		new name matches disease	yes
possible	Cardiovascular & Urogenital	partners were actively attracted accordi	new name matches disease	yes
possible	Cardiovascular & Urogenital	partners were actively attracted accordi	new name matches disease	yes
	Cardiovascular & Urogenital		new name matches disease	yes
possible	Cardiovascular & Urogenital	partners were actively attracted accordi	new name matches disease	yes
possible	Metabolic & Musculoskeletal	partners were actively attracted accordi	new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
possible	Metabolic & Musculoskeletal	partners were actively attracted accordi	new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
possible	Metabolic & Musculoskeletal	partners were actively attracted accordi	new name matches disease	yes
possible	Metabolic & Musculoskeletal	partners were actively attracted accordi	new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
Avaglim	Metabolic & Musculoskeletal	partners were actively attracted accordi	new name matches disease	yes
possible	Metabolic & Musculoskeletal	partners were actively attracted accordi	new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
possible	Metabolic & Musculoskeletal	partners were actively attracted accordi	new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
possible	Metabolic & Musculoskeletal	partners were actively attracted accordi	new name matches disease	yes
possible	Metabolic & Musculoskeletal	partners were actively attracted accordi	new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
Avaglim	Metabolic & Musculoskeletal	partners were actively attracted accordi	new name matches disease	yes
	Anti-microbials & Host Defence(parasite)		new name matches disease	yes
	Anti-microbials & Host Defence(parasite)		new name matches disease	yes
	Anti-virals		new name matches disease	yes
possible	Anti-virals	partners were actively attracted accordi	new name matches disease	yes
	Cardiovascular & Urogenital (Urogenital)		new name matches disease	yes
	Cardiovascular & Urogenital (Urogenital)		new name matches disease	yes
possible	Metabolic & Musculoskeletal (Muscoloskeletal)	partners were actively attracted accordi	new name matches disease	yes
possible	Metabolic & Musculoskeletal and Respiratory & Inflamma	partners were actively attracted accordi	new name matches disease	yes
	Respiratory & Inflammation (inflammation)		new name matches disease	yes
	Respiratory & Inflammation (inflammation)		new name matches disease	yes
	Respiratory & Inflammation (inflammation)		new name matches disease	yes
possible	Neurology & Gastro-intestinal	partners were actively attracted accordi	new name matches disease	yes
	Cardiovascular & Urogenital		new name matches disease	yes
	Cardiovascular & Urogenital (Urogenital)		new name matches disease	yes
possible	Respiratory & Inflammation (inflammation)	partners were actively attracted accordi	new name matches disease	yes
	Respiratory & Inflammation (inflammation)		new name matches disease	yes
	Respiratory & Inflammation (inflammation)		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Cardiovascular & Urogenital (Urogenital)		new name matches disease	yes
	Cardiovascular & Urogenital (Urogenital)		new name matches disease	yes
	Cardiovascular & Urogenital (Urogenital)		new name matches disease	yes

	mepolizumab	anti-IL5 monoclonal antibody	hypereosinophilic syndrome (also	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	163090	5HT1 antagonist	depression & anxiety	Neurosciences		yes	
	189254	histamine H3 antagonist	dementia	Neurosciences		yes	
	239512	histamine H3 antagonist	dementia	Neurosciences		yes	
	561679	CRF1 antagonist	depression & anxiety	Neurosciences			
	598809	dopamine D3 antagonist	drug dependency	Neurosciences		yes	
	729327	AMPA receptor modulator	schizophrenia	Neurosciences		yes	
	823296	NK1 antagonist	depression & anxiety	Neurosciences		yes	
	274150	selective iNOS inhibitor	migraine (also rheumatoid arthritis	Neurosciences		yes	
	372475†	triple (5HT/noradrenaline/do	depression	Neurosciences			
	649868†	orexin antagonist	sleep disorders	Neurosciences			
	681323	p38 kinase inhibitor	neuropathic pain (also atheroscle	Neurosciences		yes	
	683699†	dual alpha4 integrin antagon	multiple sclerosis	Neurosciences			
	742457	5HT6 antagonist	dementia	Neurosciences		yes	
	773812	mixed 5HT/dopaminergic ant	schizophrenia	Neurosciences		yes	
	842166	non-cannabinoid CB2 agonis	inflammatory pain	Neurosciences		yes	
	876008†	CRF1 antagonist	depression & anxiety (also irritabl	Neurosciences			
	casopitant	NK1 antagonist	depression & anxiety (also overac	Neurosciences		yes	
	talnetant	NK3 antagonist	schizophrenia	Neurosciences		yes	
	Lamictal XR	sodium channel inhibitor	epilepsy – partial generalised toni	Neurosciences		yes	
	rosiglitazone XR	PPAR gamma agonist	Alzheimer's disease (also rheuma	Neurosciences		yes	
	Lamictal XR	sodium channel inhibitor	epilepsy – partial seizures, once-d	Neurosciences		yes	
	Requip Modutab/XL 24 hour†	non-ergot dopamine agonist	Parkinson's disease – once-daily	Neurosciences		yes	
	Trexima†	5HT1 agonist + naproxen	migraine – fixed dose combinatio	Neurosciences			
	Wellbutrin XL†	noradrenaline/dopamine re-u	seasonal affective disorder	Neurosciences			
	Wellbutrin XL/XR†	noradrenaline/dopamine re-u	depression	Neurosciences			
	626616†	human kinase inhibitor	chemoprotection	Oncology			
	pazopanib	vascular endothelial growth f	non-small cell lung cancer & colo	Oncology		yes	
	relacatib†	cathepsin K inhibitor	bone metastases (also osteoporo	Oncology			
	pazopanib + Tykerb	VEGF tyrosine kinase inhibit	breast cancer	Oncology		yes	
	pazopanib + Tykerb	VEGF tyrosine kinase inhibit	other cancers	Oncology		yes	
	Promacta (eltrombopag)†	thrombopoietin agonist	chemotherapy induced thrombocy	Oncology			
	Promacta (eltrombopag)†	thrombopoietin agonist	hepatitis C	Oncology			
	casopitant	NK1 antagonist	chemotherapy induced & postope	Oncology		yes	
	HuMax-CD20 (ofatumumab)†	human monoclonal antibody	chronic lymphocytic leukaemia &	Oncology			
	pazopanib	VEGF tyrosine kinase inhibit	renal cell cancer	Oncology		yes	
	Promacta (eltrombopag)†	thrombopoietin agonist	long-term idiopathic thrombocytop	Oncology			
	Promacta (eltrombopag)†	thrombopoietin agonist	short-term idiopathic thrombocyto	Oncology			
	Tykerb	ErbB-2 and EGFR dual kinas	breast cancer, adjuvant therapy	Oncology		yes	
	Tykerb	ErbB-2 and EGFR dual kinas	breast cancer, first-line therapy	Oncology		yes	
	Tykerb	ErbB-2 and EGFR dual kinas	head & neck squamous cell carci	Oncology		yes	
	Tykerb	ErbB-2 and EGFR dual kinas	refractory breast cancer	Oncology		yes	
	256066	PDE IV inhibitor (inhaled)	COPD	Respiratory		yes	
	573719	muscarinic acetylcholine ant	COPD	Respiratory		yes	
	679586	monoclonal antibody	severe asthma	Respiratory		yes	
	961081†	muscarinic antagonist, beta2	COPD	Respiratory			
	159797†	long-acting beta2 agonist	COPD, also COPD & asthma in c	Respiratory			
	159802†	long-acting beta2 agonist	COPD, also COPD & asthma in c	Respiratory			
	233705	muscarinic acetylcholine ant	COPD	Respiratory		yes	
	256066	PDE IV inhibitor (inhaled)	asthma	Respiratory		yes	
	256066	PDE IV inhibitor (intranasal)	allergic rhinitis	Respiratory		yes	
	597901†	long-acting beta2 agonist	COPD, also COPD & asthma in c	Respiratory			
	642444†	long-acting beta2 agonist	COPD, also COPD & asthma in c	Respiratory	Shionogi		
	681323	p38 kinase inhibitor (oral)	COPD (also atherosclerosis, neur	Respiratory		yes	
	685698	glucocorticoid agonist	asthma & COPD in combination w	Respiratory		yes	
	784568	glucocorticoid agonist (intran	allergic rhinitis	Respiratory		yes	

	Cardiovascular & Urogenital		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
possible	Neurology & Gastro-intestinal	partners were actively attracted accordi	new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
possible	Neurology & Gastro-intestinal	partners were actively attracted accordi	new name matches disease	yes
possible	Neurology & Gastro-intestinal	partners were actively attracted accordi	new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
possible	Neurology & Gastro-intestinal	partners were actively attracted accordi	new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
possible	Neurology & Gastro-intestinal	partners were actively attracted accordi	new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
possible	Neurology & Gastro-intestinal	partners were actively attracted accordi	new name matches disease	yes
possible	Neurology & Gastro-intestinal	partners were actively attracted accordi	new name matches disease	yes
possible	Neurology & Gastro-intestinal	partners were actively attracted accordi	new name matches disease	yes
possible	Oncology	partners were actively attracted according to AR 2000		yes
	Oncology			yes
possible	Oncology	partners were actively attracted according to AR 2000		yes
	Oncology			yes
	Oncology			yes
possible	Oncology	partners were actively attracted according to AR 2000		yes
possible	Oncology	partners were actively attracted according to AR 2000		yes
	Oncology			yes
possible	Oncology	partners were actively attracted according to AR 2000		yes
	Oncology			yes
possible	Oncology	partners were actively attracted according to AR 2000		yes
possible	Oncology	partners were actively attracted according to AR 2000		yes
	Oncology			yes
	Oncology			yes
	Oncology			yes
	Oncology			yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
possible	Respiratory & Inflammation (respiratory)	partners were actively attracted accordi	new name matches disease	yes
possible	Respiratory & Inflammation (respiratory)	partners were actively attracted accordi	new name matches disease	yes
possible	Respiratory & Inflammation (respiratory)	partners were actively attracted accordi	new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
possible	Respiratory & Inflammation (respiratory)	partners were actively attracted accordi	new name matches disease	yes
possible	Respiratory & Inflammation (respiratory)	partners were actively attracted accordi	new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes

	856553	p38 kinase inhibitor (oral)	COPD (also atherosclerosis & rhe	Respiratory		yes	
	870086	novel glucocorticoid agonist	asthma	Respiratory		yes	
	mepolizumab	anti-IL5 monoclonal antibody	severe asthma & nasal polyposis	Respiratory		yes	
	Seretide/Advair	beta2 agonist/inhaled cortico	COPD – mortality claim	Respiratory		both	
	Seretide	beta2 agonist/inhaled cortico	asthma – initial maintenance ther	Respiratory		yes	
	Seretide/Advair	beta2 agonist/inhaled cortico	asthma – non-CFC inhaler	Respiratory		both	
	MenACWY-TT	conjugated	Neisseria meningitis groups A, C,	Paediatric Vaccines		yes	
	Globorix	conjugated	diptheria, tetanus, pertussis, hepa	Paediatric Vaccines		yes	
	Hib-MenCY-TT	conjugated	Neisseria meningitis groups C & Y	Paediatric Vaccines		yes	
	Infanrix-IPV	subunit – inactivated	diptheria, tetanus, pertussis + pol	Paediatric Vaccines		yes	
	Synflorix	conjugated	Streptococcus pneumoniae disea	Paediatric Vaccines		yes	
	Priorix-Tetra	live attenuated	measles, mumps, rubella & varice	Paediatric Vaccines		yes	
	Rotarix†	live attenuated – oral	rotavirus induced gastroenteritis p	Paediatric Vaccines			
	Varicella Zoster virus	recombinant	Varicella Zoster prevention	Other Vaccines		yes	
	New generation 'flu vaccine	inactivated split-trivalent	seasonal influenza prophylaxis fo	Other Vaccines		yes	
	Daronrix	inactivated whole-aluminium	pandemic influenza prophylaxis	Other Vaccines		yes	
	'Flu pre-pandemic	H5N1 inactivated split- mono	pandemic influenza prophylaxis	Other Vaccines		yes	
	Cervarix†	recombinant	human papilloma virus infection p	Other Vaccines	MedImmune LLC		
	FluLaval	inactivated split	influenza prophylaxis	Other Vaccines		yes	
GSK							
2007	**GlaxoSmithKline**	**2007**	**GlaxoSmithKline**	**2007**	**GlaxoSmithKline**	**2007**	**GlaxoSmithKline**
	256073	high affinity nicotinic acid rec	dyslipidaemia	Cardiovascular & Metabolic		yes	
	rilapladib†	Lp-PLA2 inhibitor	atherosclerosis	Cardiovascular & Metabolic			
	681323	p38 kinase inhibitor	atherosclerosis (also chronic obst	Cardiovascular & Metabolic		yes	
	856553	p38 kinase inhibitor	atherosclerosis (also COPD, depr	Cardiovascular & Metabolic		yes	
	darapladib†	Lp-PLA2 inhibitor	atherosclerosis	Cardiovascular & Metabolic			
	Coreg CR† + ACE inhibitor	beta blocker + angiotensin c	hypertension – fixed dose combin	Cardiovascular & Metabolic		Ace-hibitor	
	Arixtra	synthetic factor Xa inhibitor	treatment of acute coronary syndr	Cardiovascular & Metabolic		yes	
	remoglifozin etabonate (189075)†	sodium dependent glucose t	obesity	Cardiovascular & Metabolic - Metabolic projects			
	376501	PPAR gamma partial agonis	type 2 diabetes	Cardiovascular & Metabolic - Metabolic projects		yes	
	756050	bile acid receptor agonist	type 2 diabetes	Cardiovascular & Metabolic - Metabolic projects		yes	
	remoglifozin etabonate (189075)†	SGLT2 inhibitor	type 2 diabetes	Cardiovascular & Metabolic - Metabolic projects			
	Avandamet XR	PPAR gamma agonist + met	type 2 diabetes – extended releas	Cardiovascular & Metabolic - Metabolic projects		yes	
	Avandia	PPAR gamma agonist	atherosclerosis in type 2 diabetes	Cardiovascular & Metabolic - Metabolic projects		yes	
	Avandia + simvastatin	PPAR gamma agonist + stat	type 2 diabetes	Cardiovascular & Metabolic - Metabolic projects		yes	
	580416	ribosome inhibitor	treatment of bacterial infections	Infectious Diseases		yes	
	1349572†	HIV integrase inhibitor	HIV infections	Infectious Diseases			
	sitamaquine	8-aminoquinoline	treatment of visceral leishmaniasi	Infectious Diseases		yes	
	962040	motilin receptor agonist	delayed gastric emptying	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	971086	androgen modulator	sarcopaenia	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	1827771	interleukin 1 antagonist	rheumatoid arthritis	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	pazopanib	multi-kinase angiogenesis in	age-related macular degeneration	Musculoskeletal, Inflammation, Gastrointestinal & Urology			yes
	221149	oxytocin antagonist	threatened pre-term labour	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	232802	3G-selective oestrogen rece	treatment of menopausal sympto	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	274150	selective iNOS inhibitor	rheumatoid arthritis	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	681323	p38 kinase inhibitor (oral)	rheumatoid arthritis (also atheros	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	856553	p38 kinase inhibitor (oral)	rheumatoid arthritis (also atheros	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	876008†	corticotrophin releasing facto	irritable bowel syndrome (also de	Musculoskeletal, Inflammation, Gastrointestinal & Urology			
	ronacaleret†	calcium antagonist	osteoporosis & fracture healing	Musculoskeletal, Inflammation, Gastrointestinal & Urology			
	solabegron	beta3 adrenergic agonist	irritable bowel syndrome	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	solabegron	beta3 adrenergic agonist	overactive bladder	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	Avodart	5-alpha reductase inhibitor	reduction in the risk of prostate ca	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	Avodart + alpha blocker	5-alpha reductase inhibitor +	benign prostatic hyperplasia – fixe	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	Bosatria (mepolizumab)	anti-IL5 monoclonal antibody	hypereosinophilic syndrome (also	Musculoskeletal, Inflammation, Gastrointestinal & Urology		yes	
	ofatumumab†	anti-CD20 human monoclona	rheumatoid arthritis (also cancer i	Musculoskeletal, Inflammation, Gastrointestinal & Urology			
	163090	5HT1 antagonist	depression & anxiety	Neurosciences		yes	
	239512	histamine H3 antagonist	dementia	Neurosciences		yes	

	Respiratory & Inflammation (respiratory)		new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
	Paediatric Vaccines			yes
	Paediatric Vaccines			yes
	Paediatric Vaccines			yes
	Paediatric Vaccines			yes
	Paediatric Vaccines			yes
	Paediatric Vaccines			yes
possible	Paediatric Vaccines	partners were actively attracted according to AR 2000		yes
	Other Vaccines			yes
	Other Vaccines			yes
	Other Vaccines			yes
	Other Vaccines			yes
possible	Other Vaccines	partners were actively attracted according to AR 2000		yes
	Other Vaccines			yes
2007	2007	GlaxoSmithKline	2007	GlaxoSmithKline
	Metabolic & Musculoskeletal		new name matches disease	yes
possible	Cardiovascular & Urogenital (cardiovascular)	partners were actively attracted accordi	new name matches disease	yes
	Cardiovascular & Urogenital (cardiovascular)		new name matches disease	yes
	Cardiovascular & Urogenital (cardiovascular)		new name matches disease	yes
possible	Cardiovascular & Urogenital (cardiovascular)	partners were actively attracted accordi	new name matches disease	yes
Roche	Cardiovascular & Urogenital (cardiovascular)	partners were actively attracted accordi	new name matches disease	yes
	Cardiovascular & Urogenital (cardiovascular)		new name matches disease	yes
possible	Metabolic & Musculoskeletal	partners were actively attracted accordi	new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
possible	Metabolic & Musculoskeletal	partners were actively attracted accordi	new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
	Anti-microbials & Host Defence (anti-bacterials)		new name matches disease	yes
possible	anti-virals	partners were actively attracted accordi	new name matches disease	yes
	Anti-microbials & Host Defence (parasite)		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
	Respiratory & Inflammation (inflammation)		new name matches disease	yes
	Metabolic & Musculoskeletal			
	Cardiovascular & Urogenital (Urogenital)		new name matches disease	yes
	Cardiovascular & Urogenital (Urogenital)		new name matches disease	yes
	Respiratory & Inflammation (inflammation)		new name matches disease	yes
	Respiratory & Inflammation (inflammation)		new name matches disease	yes
	Respiratory & Inflammation (inflammation)		new name matches disease	yes
possible	Neurology & Gastro-intestinal	partners were actively attracted accordi	new name matches disease	yes
possible	Metabolic & Musculoskeletal (Muscoloskeletal)	partners were actively attracted accordi	new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Cardiovascular & Urogenital (Urogenital)		new name matches disease	yes
	Cardiovascular & Urogenital (Urogenital)		new name matches disease	yes
	Cardiovascular & Urogenital (Urogenital)		new name matches disease	yes
	Cardiovascular & Urogenital		new name matches disease	yes
possible	Respiratory & Inflammation (inflammation)	partners were actively attracted accordi	new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes

	249320	monoclonal antibody	neuronal injury	Neurosciences		yes	
	561679†	CRF1 antagonist	depression & anxiety	Neurosciences			
	586529†	CRF1 antagonist	depression & anxiety	Neurosciences			
	598809	dopamine D3 antagonist	drug dependency	Neurosciences		yes	
	618334	dopamine D3 antagonist	drug dependency	Neurosciences		yes	
	729327	AMPA receptor modulator	schizophrenia	Neurosciences		yes	
	1018921	type 1 glycine transport inhib	schizophrenia	Neurosciences		yes	
	orvepitant	NK1 antagonist	depression & anxiety	Neurosciences		yes	
	189254	histamine H3 antagonist	narcolepsy	Neurosciences		yes	
	372475†	triple (5HT/noradrenaline/do	depression	Neurosciences			
	649868†	orexin antagonist	sleep disorders	Neurosciences			
	681323	p38 kinase inhibitor	neuropathic pain (also atheroscle	Neurosciences		yes	
	742457	5HT6 antagonist	dementia	Neurosciences		yes	
	773812	mixed 5HT/dopaminergic ant	schizophrenia	Neurosciences		yes	
	842166	non-cannabinoid CB2 agonis	inflammatory pain	Neurosciences		yes	
	856553	p38 kinase inhibitor	depression (also atherosclerosis,	Neurosciences		yes	
	876008†	CRF1 antagonist	depression & anxiety (also irritabl	Neurosciences			
	1838262 (XP13512)†	voltage-gated calcium chann	migraine prophylaxis	Neurosciences			
	1838262 (XP13512)†	voltage-gated calcium chann	neuropathic pain	Neurosciences			
	casopitant	NK1 antagonist	depression & anxiety (also as Zur	Neurosciences		yes	
	firategrast†	dual alpha4 integrin antagon	multiple sclerosis	Neurosciences			
	1838262 (XP13512)†	voltage-gated calcium chann	restless legs syndrome	Neurosciences			
	Lamictal XR	sodium channel inhibitor	epilepsy – partial generalised toni	Neurosciences		yes	
	rosiglitazone XR	PPAR gamma agonist	Alzheimer's disease	Neurosciences		yes	
	Lamictal XR	sodium channel inhibitor	epilepsy – partial seizures, once-d	Neurosciences		yes	
	Treximet†	5HT1 agonist + naproxen	migraine – fixed dose combinatio	Neurosciences			
	Requip Modutab/XL†	non-ergot dopamine agonist	Parkinson's disease – once-daily	Neurosciences		yes	
	461364	polo-like kinase inhibitor	cancer	Oncology		yes	
	690693	AKT kinase inhibitor	cancer	Oncology		yes	
	923295†	centromere-associated prote	cancer	Oncology			
	Armala (pazopanib)	multi-kinase angiogenesis in	colorectal cancer	Oncology		yes	
	1363089 (XL-880)†	C-met kinase inhibitor	papillary renal cell carcinoma, gas	Oncology			
	Armala (pazopanib)	multi-kinase angiogenesis in	non-small cell lung cancer	Oncology		yes	
	Armala (pazopanib)	multi-kinase angiogenesis in	ovarian cancer	Oncology		yes	
	Armala (pazopanib)	multi-kinase angiogenesis in	sarcoma	Oncology		yes	
	Armala (pazopanib) + Tyverb/Tyk	multi-kinase angiogenesis in	metastatic breast cancer	Oncology		all	
	Armala (pazopanib) + Tyverb/Tyk	multi-kinase angiogenesis in	other cancers	Oncology		all	
	Tyverb/Tykerb	ErbB-2 and EGFR dual kinas	refractory inflammatory breast can	Oncology		yes	
	Armala (pazopanib)	multi-kinase angiogenesis in	renal cell cancer	Oncology		yes	
	Armala (pazopanib) + Tyverb/Tyk	multi-kinase angiogenesis in	inflammatory breast cancer	Oncology		all	
	ofatumumab†	anti-CD20 human monoclona	refractory chronic lymphocytic leu	Oncology			
	ofatumumab†	anti-CD20 human monoclona	refractory follicular lymphoma (als	Oncology			
	Tyverb/Tykerb	ErbB-2 and EGFR dual kinas	breast cancer, adjuvant therapy	Oncology		yes	
	Tyverb/Tykerb	ErbB-2 and EGFR dual kinas	breast cancer, brain metastases	Oncology		yes	
	Tyverb/Tykerb	ErbB-2 and EGFR dual kinas	breast cancer, first-line therapy	Oncology		yes	
	Tyverb/Tykerb	ErbB-2 and EGFR dual kinas	refractory breast cancer	Oncology		yes	
	656933	interleukin 8 antagonist	cystic fibrosis	Respiratory		yes	
	835726	histamine H1/H3 dual antago	allergic rhinitis	Respiratory		yes	
	1004723	histamine H1/H3 dual antago	allergic rhinitis	Respiratory		yes	
	159797†	long-acting beta2 agonist	COPD, also COPD & asthma in c	Respiratory			
	159802†	long-acting beta2 agonist	COPD, also COPD & asthma in c	Respiratory			
	256066	PDE IV inhibitor (inhaled)	COPD	Respiratory		yes	
	256066	PDE IV inhibitor (inhaled)	asthma	Respiratory		yes	
	256066	PDE IV inhibitor (intranasal)	allergic rhinitis	Respiratory		yes	
	573719	muscarinic acetylcholine ant	COPD	Respiratory		yes	
	642444†	long-acting beta2 agonist	COPD, also COPD & asthma in c	Respiratory	Shionogi		
	679586	monoclonal antibody	severe asthma	Respiratory		yes	

	Neurology & Gastro-intestinal		new name matches disease	yes
possible	Neurology & Gastro-intestinal	partners were actively attracted accordi	new name matches disease	yes
possible	Neurology & Gastro-intestinal	partners were actively attracted accordi	new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
possible	Neurology & Gastro-intestinal	partners were actively attracted accordi	new name matches disease	yes
possible	Neurology & Gastro-intestinal	partners were actively attracted accordi	new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
possible	Neurology & Gastro-intestinal	partners were actively attracted accordi	new name matches disease	yes
possible	Neurology & Gastro-intestinal	partners were actively attracted accordi	new name matches disease	yes
possible	Neurology & Gastro-intestinal	partners were actively attracted accordi	new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
possible	Neurology & Gastro-intestinal	partners were actively attracted accordi	new name matches disease	yes
possible	Neurology & Gastro-intestinal	partners were actively attracted accordi	new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
possible	Neurology & Gastro-intestinal	partners were actively attracted accordi	new name matches disease	yes
	Neurology & Gastro-intestinal		new name matches disease	yes
	Oncology			yes
	Oncology			yes
possible	Oncology	partners were actively attracted according to AR 2000		yes
	Oncology			yes
possible	Oncology	partners were actively attracted according to AR 2000		yes
	Oncology			yes
	Oncology			yes
	Oncology			yes
	Oncology			yes
	Oncology			yes
	Oncology			yes
	Oncology			yes
	Oncology			yes
possible	Oncology	partners were actively attracted according to AR 2000		yes
possible	Oncology	partners were actively attracted according to AR 2000		yes
	Oncology			yes
	Oncology			yes
	Oncology			yes
	Oncology			yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
possible	Respiratory & Inflammation (respiratory)	partners were actively attracted accordi	new name matches disease	yes
possible	Respiratory & Inflammation (respiratory)	partners were actively attracted accordi	new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
possible	Respiratory & Inflammation (respiratory)	partners were actively attracted accordi	new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes

	681323	p38 kinase inhibitor (oral)	COPD (also atherosclerosis, neur	Respiratory		yes	
	685698	glucocorticoid agonist	asthma, also COPD & asthma in	Respiratory		yes	
	856553	p38 kinase inhibitor (oral)	COPD (also atherosclerosis, depr	Respiratory		yes	
	870086	novel glucocorticoid agonist	asthma	Respiratory		yes	
	961081†	muscarinic antagonist, beta2	COPD	Respiratory			
	darotropium (233705)	muscarinic acetylcholine ant	COPD	Respiratory		yes	
	mepolizumab	anti-IL5 monoclonal antibody	severe asthma & nasal polyposis	Respiratory		yes	
	Hib-MenCY-TT	conjugated	Neisseria meningitis groups C & Y	Paediatric Vaccines		yes	
	MenACWY-TT	conjugated	Neisseria meningitis groups A, C,	Paediatric Vaccines		yes	
	Infanrix-IPV/Kinrix	subunit – inactivated	diptheria, tetanus, pertussis + pol	Paediatric Vaccines		yes	
	Synflorix	conjugated	Streptococcus pneumoniae disea	Paediatric Vaccines		yes	
	Rotarix†	live attenuated (oral)	rotavirus-induced gastroenteritis p	Paediatric Vaccines			
	Varicella Zoster virus	recombinant	Varicella Zoster prevention	Other Vaccines		yes	
	Flu pandemic†	H5N1 inactivated split – mon	pandemic influenza prophylaxis	Other Vaccines			
	Flu pre-pandemic†	H5N1 inactivated split – mon	pandemic influenza prophylaxis	Other Vaccines			
	New generation flu vaccine	inactivated split – trivalent	seasonal influenza prophylaxis fo	Other Vaccines		yes	
	Boostrix	subunit	adult booster for diphtheria, tetan	Other Vaccines		yes	
	Flu pandemic†	H5N1 inactivated split – mon	pandemic influenza prophylaxis	Other Vaccines			
	Flu pre-pandemic†	H5N1 inactivated split – mon	pandemic influenza prophylaxis	Other Vaccines			
	Cervarix†	recombinant	human papilloma virus infection p	Other Vaccines	MedImmune LLC		
GSK	**2008**						
2008	**GlaxoSmithKline**	**2008**	**GlaxoSmithKline**	**2008**	**GlaxoSmithKline**	**2008**	**GlaxoSmithKline**
	249320	monoclonal antibody	stroke	Biopharmaceuticals		yes	
	679586	monoclonal antibody	severe asthma	Biopharmaceuticals		yes	
	mepolizumab	anti-IL5 monoclonal antibody	severe asthma & nasal polyposis	Biopharmaceuticals		yes	
	ofatumumab†	anti-CD20 human monoclona	follicular lymphoma	Biopharmaceuticals			
	ofatumumab†	anti-CD20 human monoclona	rheumatoid arthritis	Biopharmaceuticals			
	Bosatria (mepolizumab)	anti-IL5 monoclonal antibody	hypereosinophilic syndrome	Biopharmaceuticals		yes	
	ofatumumab†	anti-CD20 human monoclona	refractory chronic lymphocytic leu	Biopharmaceuticals			
	256073	high affinity nicotinic acid rec	dyslipidaemia	Cardiovascular & Metabolic		yes	
	1278863	prolyl hydroxylase inhibitor	anaemia	Cardiovascular & Metabolic		yes	
	1292263	gastrin-releasing peptide (GF	type 2 diabetes	Cardiovascular & Metabolic		yes	
	221149	oxytocin antagonist	threatened pre-term labour	Cardiovascular & Metabolic		yes	
	756050	bile acid receptor agonist	type 2 diabetes	Cardiovascular & Metabolic		yes	
	losmapimod (856553)	p38 kinase inhibitor	cardiovascular disease (also COF	Cardiovascular & Metabolic		yes	
	pazopanib	multi-kinase angiogenesis in	age-related macular degeneration	Cardiovascular & Metabolic		yes	
	rilapladib†	Lp-PLA2 inhibitor	atherosclerosis	Cardiovascular & Metabolic			
	ronacaleret†	calcium antagonist	osteoporosis & fracture healing	Cardiovascular & Metabolic			
	Avandamet XR	PPAR gamma agonist + met	type 2 diabetes – extended releas	Cardiovascular & Metabolic		yes	
	Avandia + simvastatin	PPAR gamma agonist + stat	type 2 diabetes	Cardiovascular & Metabolic		yes	
	darapladib†	Lp-PLA2 inhibitor	atherosclerosis	Cardiovascular & Metabolic			
	Arixtra	synthetic factor Xa inhibitor	treatment of acute coronary syndr	Cardiovascular & Metabolic		yes	
	932121	plasmodium electron transpo	malaria	Infectious Diseases		yes	
	1265744†	HIV integrase inhibitor	HIV infections	Infectious Diseases			
	1349572†	HIV integrase inhibitor	HIV infections	Infectious Diseases			
	sitamaquine	8-aminoquinoline	treatment of visceral leishmaniasi	Infectious Diseases		yes	
	163090	5HT1 antagonist	depression & anxiety	Neurosciences		yes	
	586529†	CRF1 antagonist	depression & anxiety	Neurosciences			
	598809	dopamine D3 antagonist	drug dependency	Neurosciences		yes	
	618334	dopamine D3 antagonist	drug dependency	Neurosciences		yes	
	729327	AMPA receptor modulator	schizophrenia	Neurosciences		yes	
	1018921	type 1 glycine transport inhib	schizophrenia	Neurosciences		yes	
	1034702	muscarinic acetylcholine ago	dementia	Neurosciences		yes	

	Respiratory & Inflammation (respiratory)		new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
possible	Respiratory & Inflammation (respiratory)	partners were actively attracted accordi	new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
	Respiratory & Inflammation (respiratory)		new name matches disease	yes
	Paediatric Vaccines			yes
	Paediatric Vaccines			yes
	Paediatric Vaccines			yes
	Paediatric Vaccines			yes
possible	Paediatric Vaccines	partners were actively attracted according to AR 2000		yes
	Other Vaccines			yes
possible	Other Vaccines	partners were actively attracted according to AR 2000		yes
possible	Other Vaccines	partners were actively attracted according to AR 2000		yes
	Other Vaccines			yes
	Other Vaccines			yes
possible	Other Vaccines	partners were actively attracted according to AR 2000		yes
possible	Other Vaccines	partners were actively attracted according to AR 2000		yes
possible	Other Vaccines	partners were actively attracted according to AR 2000		yes
2008	2008	GlaxoSmithKline	2008	GlaxoSmithKline
	(cardiovascular diseases)		name is unknown, but category is proj	yes
	(respiratory)		name is unknown, but category is proj	yes
	(respiratory)		name is unknown, but category is proj	yes
possible	(oncology)	partners were actively attracted accordi	name is unknown, but category is proj	yes
possible	(inflammation)	partners were actively attracted accordi	name is unknown, but category is proj	yes
	(gastrointestinal)		name is unknown, but category is proj	yes
possible	(oncology)	partners were actively attracted accordi	name is unknown, but category is proj	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
	Cardiovascular & Urogenital		new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
possible	Cardiovascular & Urogenital	partners were actively attracted accordi	new name matches disease	yes
possible	Metabolic & Musculoskeletal	partners were actively attracted accordi	new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
	Metabolic & Musculoskeletal		new name matches disease	yes
possible	Cardiovascular & Urogenital	partners were actively attracted accordi	new name matches disease	yes
	Cardiovascular & Urogenital		new name matches disease	yes
	Anti-microbials & Host Defence (parasite)		new name matches disease	yes
possible	Anti-virals	partners were actively attracted accordi	new name matches disease	yes
possible	Anti-virals	partners were actively attracted accordi	new name matches disease	yes
	Anti-microbials & Host Defence (parasite)		new name matches disease	yes
	Neurology & Gastro-intestinal (Neurology)		new name matches disease	yes
possible	Neurology & Gastro-intestinal (Neurology)	partners were actively attracted accordi	new name matches disease	yes
	Neurology & Gastro-intestinal (Neurology)		new name matches disease	yes
	Neurology & Gastro-intestinal (Neurology)		new name matches disease	yes
	Neurology & Gastro-intestinal (Neurology)		new name matches disease	yes
	Neurology & Gastro-intestinal (Neurology)		new name matches disease	yes
	Neurology & Gastro-intestinal (Neurology)		new name matches disease	yes

	orvepitant	NK1 antagonist	depression & anxiety	Neurosciences		yes	
	239512	histamine H3 antagonist	dementia	Neurosciences		yes	
	561679†	CRF1 antagonist	depression & anxiety	Neurosciences			
	649868†	orexin antagonist	sleep disorders	Neurosciences			
	681323	p38 kinase inhibitor	neuropathic pain	Neurosciences		yes	
	742457	5HT6 antagonist	dementia	Neurosciences		yes	
	firategrast†	dual alpha4 integrin antagon	multiple sclerosis	Neurosciences			
	losmapimod (856553)	p38 kinase inhibitor	depression (also cardiovascular d	Neurosciences		yes	
	Solzira (1838262)†	voltage-gated calcium chann	migraine prophylaxis	Neurosciences			
	Solzira (1838262)†	voltage-gated calcium chann	neuropathic pain	Neurosciences			
	Lamictal XR	sodium channel inhibitor	epilepsy – partial generalised toni	Neurosciences		yes	
	rosiglitazone XR	PPAR gamma agonist	Alzheimer's disease	Neurosciences		yes	
	Solzira (1838262)†	voltage-gated calcium chann	restless legs syndrome	Neurosciences			
	Lamictal XR	sodium channel inhibitor	epilepsy – partial seizures, once-d	Neurosciences		yes	
	Requip Modutab/XL†	non-ergot dopamine agonist	Parkinson's disease – once-daily	Neurosciences		yes	
	Treximet†	5HT1 agonist + naproxen	migraine – fixed dose combinatio	Neurosciences			
	461364	polo-like kinase inhibitor	cancer	Oncology		yes	
	923295†	centromere-associated prote	cancer	Oncology			
	1363089†	mesenchymal-epithelial trans	papillary renal cell carcinoma, gas	Oncology			
	pazopanib	multi-kinase angiogenesis in	non-small cell lung cancer	Oncology		yes	
	pazopanib	multi-kinase angiogenesis in	ovarian cancer	Oncology		yes	
				Oncology			
	pazopanib + Tyverb/Tykerb	multi-kinase angiogenesis in	metastatic breast cancer	Oncology		all	
	Tyverb/Tykerb	Her2 and EGFR dual kinase	refractory inflammatory breast can	Oncology		all	
	Avodart	5-alpha reductase inhibitor	reduction in the risk of prostate ca	Oncology		yes	
	pazopanib	multi-kinase angiogenesis in	sarcoma	Oncology		yes	
	pazopanib + Tyverb/Tykerb	multi-kinase angiogenesis in	inflammatory breast cancer	Oncology		all	
	Tyverb/Tykerb	Her2 and EGFR dual kinase	breast cancer, adjuvant therapy	Oncology		yes	
	Tyverb/Tykerb	Her2 and EGFR dual kinase	breast cancer, first line therapy	Oncology		yes	
	Duodart (Avodart + alpha blocke	5-alpha reductase inhibitor +	benign prostatic hyperplasia - fixe	Oncology		yes	
	pazopanib	multi-kinase angiogenesis in	renal cell cancer (also age-related	Oncology		yes	
	Tyverb/Tykerb	Her2 and EGFR dual kinase	refractory breast cancer	Oncology		yes	
	610677	p38 kinase inhibitor (inhaled)	COPD	Respiratory & Immuno-inflammation		yes	
	656933	Chemokine receptor (CXCR2	cystic fibrosis & COPD	Respiratory & Immuno-inflammation		yes	
	962040	motilin receptor agonist	delayed gastric emptying	Respiratory & Immuno-inflammation		yes	
	1399686	anti-inflammatory macrolide (	inflammatory bowel disease	Respiratory & Immuno-inflammation		yes	
	159797†	long-acting beta2 agonist	COPD, also COPD & asthma in c	Respiratory & Immuno-inflammation			
	159802†	long-acting beta2 agonist	COPD, also COPD & asthma in c	Respiratory & Immuno-inflammation			
	256066	PDE IV inhibitor (inhaled)	asthma & COPD	Respiratory & Immuno-inflammation		yes	
	573719	muscarinic acetylcholine ant	COPD	Respiratory & Immuno-inflammation		yes	
	685698	glucocorticoid agonist	asthma, also COPD & asthma in	Respiratory & Immuno-inflammation		yes	
	835726	histamine H1/H3 dual antago	allergic rhinitis	Respiratory & Immuno-inflammation		yes	
	870086	novel glucocorticoid agonist	asthma	Respiratory & Immuno-inflammation		yes	
	642444†	long-acting beta2 agonist	COPD, also COPD & asthma in c	Respiratory & Immuno-inflammation	Shionogi		
	961081†	muscarinic antagonist, beta2	COPD	Respiratory & Immuno-inflammation			
	1004723	histamine H1/H3 dual antago	allergic rhinitis	Respiratory & Immuno-inflammation		yes	
	2190915†	5-lipoxygenase-activating pro	asthma	Respiratory & Immuno-inflammation			
	darotropium + 642444†	muscarinic acetylcholine ant	COPD	Respiratory & Immuno-inflammation	Shionogi	daratropium	
	losmapimod (856553)	p38 kinase inhibitor (oral)	COPD (also cardiovascular disea	Respiratory & Immuno-inflammation		yes	
	Hib-MenCY-TT	conjugated	Neisseria meningitis groups C & Y	Paediatric Vaccines		yes	
	MenACWY-TT	conjugated	Neisseria meningitis groups A, C,	Paediatric Vaccines		yes	
	Synflorix	conjugated	Streptococcus pneumoniae disea	Paediatric Vaccines		yes	
	Kinrix	subunit – inactivated	diphtheria, tetanus, pertussis and	Paediatric Vaccines		yes	
	Rotarix†	live attenuated (oral)	rotavirus-induced gastroenteritis p	Paediatric Vaccines			
	Zoster	recombinant	Herpes Zoster prevention	Other Vaccines		yes	

	Neurology & Gastro-intestinal (Neurology)		new name matches disease	yes
	Neurology & Gastro-intestinal (Neurology)		new name matches disease	yes
possible	Neurology & Gastro-intestinal (Neurology)	partners were actively attracted accordi	new name matches disease	yes
possible	Neurology & Gastro-intestinal (Neurology)	partners were actively attracted accordi	new name matches disease	yes
	Neurology & Gastro-intestinal (Neurology)		new name matches disease	yes
	Neurology & Gastro-intestinal (Neurology)		new name matches disease	yes
possible	Neurology & Gastro-intestinal (Neurology)	partners were actively attracted accordi	new name matches disease	yes
	Neurology & Gastro-intestinal (Neurology)		new name matches disease	yes
possible	Neurology & Gastro-intestinal (Neurology)	partners were actively attracted accordi	new name matches disease	yes
possible	Neurology & Gastro-intestinal (Neurology)	partners were actively attracted accordi	new name matches disease	yes
	Neurology & Gastro-intestinal (Neurology)		new name matches disease	yes
	Neurology & Gastro-intestinal (Neurology)		new name matches disease	yes
possible	Neurology & Gastro-intestinal (Neurology)	partners were actively attracted accordi	new name matches disease	yes
	Neurology & Gastro-intestinal (Neurology)		new name matches disease	yes
	Neurology & Gastro-intestinal (Neurology)		new name matches disease	yes
possible	Neurology & Gastro-intestinal (Neurology)	partners were actively attracted accordi	new name matches disease	yes
	Oncology			yes
possible	Oncology	partners were actively attracted according to AR 2000		yes
possible	Oncology	partners were actively attracted according to AR 2000		yes
	Oncology			yes
	Oncology			yes
	Oncology			yes
	Oncology			yes
	Oncology			yes
	Oncology			yes
	Oncology			yes
	Oncology			yes
	Oncology			yes
	Oncology			yes
	Oncology			yes
	Oncology			yes
	Oncology			yes
	Respiratory & Inflammation		new name matches disease	yes
	Respiratory & Inflammation		new name matches disease	yes
	Respiratory & Inflammation		new name matches disease	yes
	Respiratory & Inflammation		new name matches disease	yes
possible	Respiratory & Inflammation	partners were actively attracted accordi	new name matches disease	yes
possible	Respiratory & Inflammation	partners were actively attracted accordi	new name matches disease	yes
	Respiratory & Inflammation		new name matches disease	yes
	Respiratory & Inflammation		new name matches disease	yes
	Respiratory & Inflammation		new name matches disease	yes
	Respiratory & Inflammation		new name matches disease	yes
	Respiratory & Inflammation		new name matches disease	yes
possible	Respiratory & Inflammation	partners were actively attracted accordi	new name matches disease	yes
possible	Respiratory & Inflammation	partners were actively attracted accordi	new name matches disease	yes
	Respiratory & Inflammation		new name matches disease	yes
possible	Respiratory & Inflammation	partners were actively attracted accordi	new name matches disease	yes
possible	Respiratory & Inflammation	partners were actively attracted accordi	new name matches disease	yes
	Respiratory & Inflammation		new name matches disease	yes
	Paediatric Vaccines			yes
	Paediatric Vaccines			yes
	Paediatric Vaccines			yes
	Paediatric Vaccines			yes
possible	Paediatric Vaccines	partners were actively attracted according to AR 2000		yes
	Other Vaccines			yes

	Flu pandemic & pre-pandemic†	H5N1 inactivated split – mon	pandemic influenza prophylaxis	Other Vaccines			
	New generation flu vaccine	inactivated split - trivalent	seasonal influenza prophylaxis fo	Other Vaccines		yes	
	Boostrix	subunit	adult booster for diphtheria, tetan	Other Vaccines		yes	
	Pandemrix (Flu pandemic)†	H5N1 inactivated split – mon	pandemic influenza prophylaxis	Other Vaccines			
	Prepandrix (Flu pre-pandemic)†	H5N1 inactivated split – mon	pre-pandemic influenza prophylax	Other Vaccines			
	Cervarix†	recombinant	human papilloma virus infection p	Other Vaccines	MedImmune LLC		

both possible	Other Vaccines	partners were actively attracted according to AR 2000		yes
	Other Vaccines			yes
	Other Vaccines			yes
possible	Other Vaccines	partners were actively attracted according to AR 2000		yes
possible	Other Vaccines	partners were actively attracted according to AR 2000		yes
possible	Other Vaccines	partners were actively attracted according to AR 2000		yes

Roche

Roche	Drug ID	Drug name	(Description)	Indication	Disease area
2006	Roche	2006	Roche	2006	Roche
	R1511			type 2 diabetes	Cardiovascular and metabolic diseases
	R1583	GLP-1	GLP-1 analogue	type 2 diabetes	Cardiovascular and metabolic diseases
	R744	Mircera	continous erythropoietin receptor a	renal anemia	Hematology and nephrology
	R744	C.E.R.A.	continous erythropoietin receptor a	cancer-related anemia	Hematology and nephrology
Roche is th	R105	MabThera/Rituxan (rituximab)	anti-CD20 monoclonal antibody	rheumatoid arthritis, DMARD inadequate responders	Inflammatory, autoimmune and bone diseases
Roche is th	R1569	Actemra (tocilizumab)	humanised anti-IL-6 receptor mono	rheumatoid arthritis	Inflammatory, autoimmune and bone diseases
	R1569	Actemra (tocilizumab)	humanised anti-IL-6 receptor mono	systemic onset juvenile idiopathic arthritis	Inflammatory, autoimmune and bone diseases
	R3421		PNP inhibitor	autoimmune diseases, transplantation	Inflammatory, autoimmune and bone diseases
	R99	CellCept (mycophenolate mofetil)	IMPDH inhibitor	lupus nephritis	Inflammatory, autoimmune and bone diseases
	R99	CellCept (mycophenolate mofetil)	IMPDH inhibitor	pemphigus vulgaris	Inflammatory, autoimmune and bone diseases
	R1450		anti-amyloid β-peptide antibody	Alzheimer's disease	Central nervous system
	R105	MabThera/Rituxan (rituximab)	anti-CD20 monoclonal antibody	chronic lymphocytic leukemia, relapsed	Oncology
	R105	MabThera/Rituxan (rituximab)	anti-CD20 monoclonal antibody	chronic lymphocytic leukemia (1st line)	Oncology
	R105	MabThera/Rituxan (rituximab)	anti-CD20 monoclonal antibody	indolent non-Hodgkin's lymphoma – maintenance (1s	Oncology
	R1273	Omnitarg (pertuzumab)	HER2 dimerisation inhibitor	metastatic breast cancer	Oncology
	R1415	Tarceva (erlotinib)	EGFR inhibitor	pancreatic cancer	Oncology
	R1415	Tarceva (erlotinib)	EGFR inhibitor	NSCLC (1st line) – maintenance	Oncology
	R1415	Tarceva (erlotinib)	EGFR inhibitor	adjuvant NSCLC	Oncology
	R1415 + R435	Tarceva+Avastin (erlotinib + bevacizumab)	EGFR inhibitor + anti-VEGF monoc	NSCLC (1st line) – maintenance	Oncology
	R1415 + R435	Tarceva+Avastin (erlotinib + bevacizumab)	EGFR inhibitor + anti-VEGF monoc	NSCLC (2nd line)	Oncology
	R1492		epothilone D	solid tumours	Oncology
	R1507			solid tumours	Oncology
	R1530			solid tumours	Oncology
	R1645		epothilone D	solid tumours	Oncology
	R340	Xeloda (capecitabine)	fluoropyrimidine	gastric cancer	Oncology
	R340	Xeloda (capecitabine)	fluoropyrimidine	adjuvant colon cancer – combo oxaliplatin	Oncology
	R340	Xeloda (capecitabine)	fluoropyrimidine	metastatic colorectal cancer (1st line) – combo	Oncology
	R340	Xeloda (capecitabine)	fluoropyrimidine	metastatic colorectal cancer (2nd line) – combo	Oncology
	R340	Xeloda (capecitabine)	fluoropyrimidine	adjuvant colon cancer – combo Avastin	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	NSCLC (1st line)	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	metastatic breast cancer (1st line) – combo paclitaxe	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	NSCLC, squamous	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	adjuvant colon cancer	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	metastatic colorectal cancer (1st line) – combo exten	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	metastatic breast cancer (1st line) – combo Herceptin	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	NSCLC with previously treated CNS metastases	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	metastatic breast cancer (1st line) – combo docetaxe	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	metastatic breast cancer (1st line) – combo non-taxa	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	renal cell carcinoma	Oncology
	R547			solid tumours	Oncology
	R597	Herceptin (trastuzumab)	anti-HER2 monoclonal antibody	metastatic breast cancer – filed EU Genentech comb	Oncology
	R127	Valcyte (valganciclovir)	inhibitor of CMV replication	cytomegalovirus, extension of treatment	Viral and other infectious diseases
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	adjuvant breast cancer (HER2-negative)	Opt-in opportunities
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	adjuvant rectal cancer	Opt-in opportunities
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	metastatic breast cancer (2nd line)	Opt-in opportunities
2007	Roche	2007	Roche	2007	Roche
2007	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	metastatic breast cancer (1st line) – combo paclitaxe	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	metastatic colorectal cancer (1st line) – combo exten	Oncology
	R340	Xeloda (capecitabine)	fluoropyrimidine	metastatic colorectal cancer (1st line) – combo	Oncology
	R340	Xeloda (capecitabine)	fluoropyrimidine	metastatic colorectal cancer (2nd line) – combo	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	renal cell carcinoma	Oncology
	R435 + R597	Avastin+Herceptin (bevacizumab+trastuzuma	anti-VEGF monoclonal antibody +	metastatic breast cancer (1st line) – HER2-positive	Oncology

Co-sponsor	Own R&D	Acquired	Licensed-in	Partnered/collaboration	Objected area?
2006	Roche	2006	Roche	2006	Roche
	yes				metobolic disorders
				license, develop and market R1583 from Ipsen (BIM51	metobolic disorders
	yes				
	yes				
				Genentech & Biogen Idec	inflammation/bone dise
				Chugai	inflammation/bone dise
				Chugai	inflammation/bone dise
				BioCryst	transplantation medicir
				Aspreva	inflammation/bone dise
Aspreva Pharmaceuticals				Aspreva	inflammation/bone dise
				Aspreva	central nervous system
				Genentech and Biogen Idec	Oncology
				Genentech and Biogen Idec	Oncology
				Genentech and Biogen Idec	Oncology
					Oncology
				Genentech	Oncology
				Genentech and OSI Pharmaceuticals	Oncology
				Genentech and OSI Pharmaceuticals	Oncology
				Genentech and OSI Pharmaceuticals	Oncology
				Avastin is Developed by Genentech: Tarceva is from (	Oncology
				Avastin is Developed by Genentech: Tarceva is from (	Oncology
				Kosan Biosciences	Oncology
Sarcoma Alliance for Research through Collaboration				genmab	Oncology
	yes				Oncology
	yes			Kosan Biosciences	Oncology
	yes				Oncology
	yes				Oncology
	yes				Oncology
	yes				Oncology
	yes				Oncology
				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
Merck KGaA				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
	yes				Oncology
				Developed by Genentech	Oncology
					Oncology
	yes]				Virology
				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
2007	Roche	2007	Roche	2007	Roche
				Developed by Genentech	Oncology
Merck KGaA				Developed by Genentech	Oncology
	yes				Oncology
	yes				Oncology
				Developed by Genentech	Oncology
				Both are developed by Genentech	Oncology

General remark / is partner announced in 2000?	Remark about area	Area projected in advance
2006	Roche	2006
	only name is changed	yes
	only name is changed	yes
	name is unkown, category is unprojected	no
	name is unkown, category is unprojected	no
		yes
extra investment in Genentech named in AR 2000, Biogen Idec n	auto-immnune is not projected	no
chugai not named in AR 2000	auto-immnune is not projected	no
chugai not named in AR 2000	new name matches disease	yes
biocryst is not named in AR 2000		yes
aspreva is not named in AR 2000	new name matches disease	yes
aspreva is not named in AR 2000	auto-immnune is not projected	no
aspreva is not named in AR 2000		yes
extra investment in Genentech named in AR 2000, Biogen Idec not		yes
extra investment in Genentech named in AR 2000, Biogen Idec not		yes
extra investment in Genentech named in AR 2000, Biogen Idec not		yes
		yes
extra investment in Genentech named in AR 2000		yes
both companies and oncology named in AR 2000		yes
both companies and oncology named in AR 2000		yes
both companies and oncology named in AR 2000		yes
all companies and oncology named in AR 2000		yes
all companies and oncology named in AR 2000		yes
kosan is not named in AR 2000		yes
genmab not named in AR 2000		yes
		yes
kosan is not named in AR 2000		yes
		yes
		yes
		yes
		yes
		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000		yes
		yes
extra investment in Genentech named in AR 2000		yes
		yes
	new name matches disease	yes
extra investment in Genentech named in AR 2000	name is unknown, category = projected	yes
extra investment in Genentech named in AR 2000	name is unknown, category = projected	yes
extra investment in Genentech named in AR 2000	name is unknown, category = projected	yes
2007	Roche	2007
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000		yes
		yes
		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2001		yes

	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	metastatic breast cancer (1st line) – combo docetaxe	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	metastatic breast cancer (1st line) – combo standard	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	adjuvant colon cancer	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	adjuvant non-small cell lung cancer (NSCLC)	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	adjuvant breast cancer (HER2-negative)	Oncology
	R435 + R105	Avastin+MabThera (bevacizumab+rituximab)	anti-VEGF monoclonal antibody + a	aggressive non-Hodgkin's lymphoma	Oncology
	R105	MabThera/Rituxan (rituximab)	anti-CD20 monoclonal antibody	chronic lymphocytic leukemia (1st line)	Oncology
	R105	MabThera/Rituxan (rituximab)	anti-CD20 monoclonal antibody	chronic lymphocytic leukemia, relapsed	Oncology
	R105	MabThera/Rituxan (rituximab)	anti-CD20 monoclonal antibody	indolent non-Hodgkin's lymphoma – maintenance (1s	Oncology
	R1415	Tarceva (erlotinib)	EGFR inhibitor	NSCLC (1st line) – maintenance	Oncology
	R1415	Tarceva (erlotinib)	EGFR inhibitor	adjuvant NSCLC	Oncology
	R1415 + R435	Tarceva+Avastin (erlotinib+bevacizumab)	EGFR inhibitor + anti-VEGF monoc	NSCLC (1st line) – maintenance	Oncology
	R1415 + R435	Tarceva+Avastin (erlotinib+bevacizumab)	EGFR inhibitor + anti-VEGF monoc	NSCLC (2nd line)	Oncology
	R340	Xeloda (capecitabine)	fluoropyrimidine	adjuvant colon cancer – combo oxaliplatin	Oncology
	R340	Xeloda (capecitabine)	fluoropyrimidine	adjuvant colon cancer – combo Avastin	Oncology
	R1273	(pertuzumab)	HER2 dimerisation inhibitor	metastatic breast cancer, HER2-positive (1st line)	Oncology
	R1273	(pertuzumab)	HER2 dimerisation inhibitor	adjuvant breast cancer, HER2-positive	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	NSCLC, squamous	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	NSCLC with previously treated CNS metastases	Oncology
	R1415 + R435	Tarceva+Avastin (erlotinib+bevacizumab)	EGFR inhibitor + anti-VEGF monoc	NSCLC (1st line)	Oncology
	R1507	-	anti-IGF1R monoclonal antibody	Ewing's sarcoma	Oncology
	R1530	-	-	solid tumours	Oncology
	R547	-	-	solid tumours	Oncology
	R7112	-	-	cancer	Oncology
	R1569	Actemra (tocilizumab)	humanised anti-IL-6 receptor monc	rheumatoid arthritis	Inflammatory and autoimmune diseases
	R1569	Actemra (tocilizumab)	humanised anti-IL-6 receptor monc	systemic onset juvenile idiopathic arthritis	Inflammatory and autoimmune diseases
	R105	MabThera/Rituxan (rituximab)	anti-CD20 monoclonal antibody	rheumatoid arthritis, DMARD inadequate responders	Inflammatory and autoimmune diseases
	R99	CellCept (mycophenolate mofetil)	IMPDH inhibitor	pemphigus vulgaris	Inflammatory and autoimmune diseases
	R3421	-	PNP inhibitor	autoimmune diseases, transplantation	Inflammatory and autoimmune diseases
	R1671	-	-	asthma	Inflammatory and autoimmune diseases
	R1439	(aleglitazar)	dual PPAR agonist	type 2 diabetes	Cardiovascular and metabolic diseases
	R1579		DPP-IV inhibitor	type 2 diabetes	Cardiovascular and metabolic diseases
	R1583		GLP-1 analogue	type 2 diabetes	Cardiovascular and metabolic diseases
	R1511		glucokinase activator	type 2 diabetes	Cardiovascular and metabolic diseases
	R744	C.E.R.A. (methoxy polyethylene glycol-epoetin	continuous erythropoietin receptor	chemotherapy-induced anemia	Hematology and nephrology
	R127	Valcyte (valganciclovir)	inhibitor of CMV replication	cytomegalovirus, extension of treatment	Viral and other infectious diseases
	R1450		anti-amyloid β-peptide antibody	Alzheimer's disease	Central nervous system
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	gastrointestinal stromal tumour	Opt-in opportunities
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	adjuvant rectal cancer	Opt-in opportunities
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	extensive small-cell lung cancer	Opt-in opportunities
2008	**Roche**	2008	**Roche**	2008	**Roche**
2008	**R105**	MabThera/Rituxan (rituximab)	anti-CD20 monoclonal antibody	chronic lymphocytic leukemia (1st line)	Oncology
	R105	MabThera/Rituxan (rituximab)	anti-CD20 monoclonal antibody	chronic lymphocytic leukemia (1st line)	Oncology
	R340	Xeloda (capecitabine)	fluoropyrimidine	metastatic colorectal cancer (1st line) — combo	Oncology
	R340	Xeloda (capecitabine)	fluoropyrimidine	metastatic colorectal cancer (2nd line) — combo	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	renal cell carcinoma	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	metastatic breast cancer (1st line) — combo docetax	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	non-small cell lung cancer (NSCLC) with previously t	Oncology
	R435 + R597	Avastin+Herceptin (bevacizumab+trastuzuma	anti-VEGF monoclonal antibody + a	metastatic breast cancer (1st line) — HER2-positive	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	metastatic breast cancer (1st line) — combo standar	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	adjuvant NSCLC	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	adjuvant breast cancer, HER2-negative	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	adjuvant breast cancer, HER2-positive	Oncology
	R435 + R105	Avastin+MabThera/Rituxan (bevacizumab+ritu	anti-VEGF monoclonal antibody + a	aggressive non-Hodgkin's lymphoma	Oncology
	R105	MabThera/Rituxan (rituximab)	anti-CD20 monoclonal antibody	indolent non-Hodgkin's lymphoma — maintenance (1	Oncology
	R1415	Tarceva (erlotinib)	EGFR inhibitor	NSCLC (1st line) — maintenance	Oncology

				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
				Avastin is developed by Genentech: Rituximab from c	Oncology
				Genentech and Biogen Idec	Oncology
				Genentech and Biogen Idec	Oncology
				Genentech and Biogen Idec	Oncology
				Genentech and OSI Pharmaceuticals	Oncology
				Genentech and OSI Pharmaceuticals	Oncology
				Tarceva is from Genentech and OSI Pharmaceuticals:	Oncology
				Tarceva is from Genentech and OSI Pharmaceuticals:	Oncology
	yes				Oncology
	yes				Oncology
				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
				Avastin is Developed by Genentech: Tarceva is from C	Oncology
Sarcoma Alliance for Research through Collaboration				Genmab	Oncology
	yes				Oncology
	yes				Oncology
	yes				Oncology
				Chugai	autoimmune diseases
				Chugai	
				Genentech & Biogen Idec	
Aspreva Pharmaceuticals				Aspreva	inflammation/bone dise
				BioCryst	transplantation medicir
	yes				inflammation/bone dise
	yes				metabolic disorders
	yes				metabolic disorders
				license, develop and market R1583 from Ipsen (BIM51	metabolic disorders
					metabolic disorders
	yes				
	yes				Virology
				Aspreva	central nervous system
				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
2008	**Roche**	2008	**Roche**	2008	**Roche**
				Genentech and Biogen Idec	Oncology
				Genentech and Biogen Idec	Oncology
	yes				Oncology
	yes				Oncology
				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
				Botch are developed by Genentech	Oncology
				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
				Avastin is developed by Genentech: Rituximab from c	Oncology
				Genentech and Biogen Idec	Oncology
				Genentech and OSI Pharmaceuticals	Oncology

extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000, Biogen Idec not		yes
extra investment in Genentech named in AR 2000, Biogen Idec not		yes
extra investment in Genentech named in AR 2000, Biogen Idec not		yes
extra investment in Genentech named in AR 2000, Biogen Idec not		yes
both companies and oncology named in AR 2000		yes
both companies and oncology named in AR 2000		yes
both companies and oncology named in AR 2000		yes
both companies and oncology named in AR 2000		yes
		yes
		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000		yes
both companies and oncology named in AR 2000		yes
Genmab not named in AR 2000		yes
		yes
		yes
		yes
chugai not named in AR 2000	auto-immnune is not porjected	no
chugai not named in AR 2000	auto-immnune is not porjected	no
extra investment in Genentech named in AR 2000, Biogen Idec n	auto-immnune is not porjected	no
aspreva is not named in AR 2000	auto-immnune is not porjected	no
biocryst is not named in AR 2000		yes
eases	new name matches disease	yes
	new name matches disease	yes
	new name matches disease	yes
Ipsden is not named in AR 2000	new name matches disease	yes
	new name matches disease	yes
	category was not projected	no
		yes
	new name matches disease	yes
aspreva is not named in AR 2000		yes
extra investment in Genentech named in AR 2000	name is unknown, category = projected	yes
extra investment in Genentech named in AR 2000	name is unknown, category = projected	yes
extra investment in Genentech named in AR 2000	name is unknown, category = projected	yes
2008	**Roche**	2008
extra investment in Genentech named in AR 2000, Biogen Idec not		yes
extra investment in Genentech named in AR 2000, Biogen Idec not		yes
		yes
		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2001		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000, Biogen Idec not		yes
extra investment in Genentech named in AR 2000, Biogen Idec not		yes
both companies and oncology named in AR 2000		yes

	R1415	Tarceva (erlotinib)	EGFR inhibitor	adjuvant NSCLC	Oncology
	R435 + R1415	Avastin+Tarceva (bevacizumab+erlotinib)	Anti-VEGF monoclonal antibody +	NSCLC (1st line) — maintenance	Oncology
	R340	Xeloda (capecitabine)	fluoropyrimidine	adjuvant colon cancer — combo oxaliplatin	Oncology
	R340	Xeloda (capecitabine)	fluoropyrimidine	adjuvant colon cancer — combo Avastin	Oncology
	R1273	(pertuzumab)	HER2 dimerisation inhibitor	metastatic breast cancer, HER2-positive (1st line)	Oncology
	R1273	(pertuzumab)	HER2 dimerisation inhibitor	neoadjuvant breast cancer, HER2-positive	Oncology
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	NSCLC, squamous	Oncology
	R1415 + R435	Tarceva+Avastin (erlotinib+bevacizumab)	EGFR inhibitor + anti-VEGF monoc	NSCLC (1st line)	Oncology
	R1507		anti-IGF1R monoclonal antibody	Ewing's sarcoma	Oncology
	R1507		anti-IGF1R monoclonal antibody	metastatic breast cancer	Oncology
	R1507		anti-IGF1R monoclonal antibody	NSCLC	Oncology
	R7112		MDM2 antagonist	cancer	Oncology
	R1569	Actemra (tocilizumab)	humanised anti-IL-6 receptor monc	rheumatoid arthritis	Inflammatory and autoimmune diseases
	R1569	Actemra (tocilizumab)	humanised anti-IL-6 receptor monc	systemic onset juvenile idiopathic arthritis	Inflammatory and autoimmune diseases
	R105	MabThera/Rituxan (rituximab)	anti-CD20 monoclonal antibody	rheumatoid arthritis, DMARD inadequate responders	Inflammatory and autoimmune diseases
	R99	CellCept (mycophenolate mofetil)	IMPDH inhibitor	pemphigus vulgaris	Inflammatory and autoimmune diseases
	R1671			asthma	Inflammatory and autoimmune diseases
	R1583	(taspoglutide)	GLP-1 analogue	type 2 diabetes	Cardiovascular and metabolic diseases
	R1439	(aleglitazar)	dual PPAR agonist	cardiovascular risk reduction	Cardiovascular and metabolic diseases
	R1511		glucokinase activator	type 2 diabetes	Cardiovascular and metabolic diseases
	R127	Valcyte (valganciclovir)	inhibitor of CMV replication	cytomegalovirus, extension of treatment	Viral and other infectious diseases
	R1450		anti-amyloid β-peptide antibody	Alzheimer's disease	Central nervous system
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	metastatic breast cancer (2nd line)	Opt-in opportunities
	R435	Avastin (bevacizumab)	anti-VEGF monoclonal antibody	metastatic HER2-negative breast cancer, combo hor	Opt-in opportunities

				Genentech and OSI Pharmaceuticals	Oncology
				Avastin is developed by Genentech: Tarceva is from G	Oncology
	yes				Oncology
	yes				Oncology
				Developed by genentech	Oncology
				Developed by Genentech	Oncology
				Developed by Genentech	Oncology
				Avastin is developed by Genentech: Tarceva is from G	Oncology
Sarcoma Alliance for Research through Collaboration				Genmab	Oncology
Sarcoma Alliance for Research through Collaboration				Genmab	Oncology
Sarcoma Alliance for Research through Collaboration				Genmab	Oncology
	yes				Oncology
				Chugai	
				Chugai	
				Genentech & Biogen Idec	
Aspreva Pharmaceuticals				Aspreva	inflammation/bone dise
	yes				inflammation/bone dise
				license, develop and market R1583 from Ipsen (BIM51	metobolic disorders
	yes				vascular diseases
					metobolic disorders
	yes				Virology
				Aspreva	central nervous system
				Developed by Genentech	oncology
				Developed by Genentech	oncology

both companies and oncology named in AR 2001		yes
all companies and oncology named in AR 2000		yes
		yes
		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000		yes
extra investment in Genentech named in AR 2000		yes
all companies and oncology named in AR 2000		yes
Genmab not named in AR 2000		yes
Genmab not named in AR 2001		yes
Genmab not named in AR 2002		yes
		yes
chugai not named in AR 2000	auto-immnune is not projected	no
chugai not named in AR 2000	auto-immnune is not projected	no
extra investment in Genentech named in AR 2000, Biogen Idec n	auto-immnune is not projected	no
aspreva is not named in AR 2000	auto-immnune is not projected	no
eases	new name matches disease	yes
	new name matches disease	yes
	new name matches disease	yes
	new name matches disease	yes
	new name matches disease	yes
aspreva is not named in AR 2000		yes
extra investment in Genentech named in AR 2000	name is unknown, category = projected	yes
extra investment in Genentech named in AR 2000	name is unknown, category = projected	yes

Schering-Plough

Schering-P	Drug name	(Description)	Indication
2006	**Schering-Plough**	**2006**	**Schering-Plough**
3	**Pleconaril**	Nasal Spray	**Asthma**|Common Cold|Picornavirus Infe
4	**phenylephrine, pseudoephedrine**	tablet	Nasal Congestion in Subjects With Seas
5	**Peg interferon alpha-2b**	Peg-Intron® monotherapy (0.5 µ	Hepatitis C|Liver Cirrhosis|HIV Infections
7 check vo	**Mometasone furoate/formoterol (MF/F) combination**	mometasone furoate/formoterol	Chronic Obstructive Pulmonary Disease
8	**SCH 420814**		Dyskinesia in Parkinson's Disease
10	**Mometasone furoate/formoterol (MF/F) combination**	mometasone furoate/formoterol	Chronic Obstructive Pulmonary Disease
11	**Remicade**	Infliximab + methotrexate (IFX +	Arthritis, Psoriatic
12	**Mometasone Furoate/Formoterol**	mometasone furoate/formoterol	Asthma
13	**Temozolomide**	Temodar ®	Colorectal Neoplasm|Head and Neck Ne
14	**mometasone furoate/formoterol fumarate combination MDI 100/10 mc**	mometasone furoate/formoterol	Asthma
15	**Peg-Intron**	subcutaneous Peg-Intron (1.5 m	Hepatitis B, Chronic
20	**SCH 619734**		Chemotherapy-Induced Nausea and Vor
21	**infliximab**		Psoriasis
22	**Temozolomide**	Temozolomide Chemotherapy	Glioma|Astrocytoma|Oligodendroglioma|
23	**Vytorin**	ezetimibe with simvastatin	Hypercholesterolemia
24	**Temodal**	Temozolomide	Glioblastoma|Astrocytoma
25	**peginterferon alfa-2b (SCH 54031) + Ribavirin**	PegIntron 1.5 µg/kg subcutaneo	Hepatitis C, Chronic
27	**Mometasone Furoate/Formoterol**	Mometasone furoate/formoterol	Asthma
28	**Mometasone Furoate/Formoterol Combination + Fluticasone/Salmeterol**		Asthma
29	**Remicade®**	Infliximab	Rheumatoid Arthritis
31	**loratadine (SP) + montelukast (Merck)**		Rhinitis, Allergic, Seasonal
32	**Combination of (a) pegylated interferon alfa-2b and (b) ribavirin**	to determine the sustained virol	Liver Transplantation|Hepatitis C, Chroni
Schering-P	Schering Plough acquired Organon in 2007	Schering Plough acquired Orga	Schering Plough acquired Organon in 20
2007	**Schering-Plough**	**2007**	**Schering-Plough**
1	**Mometasone Furoate Nasal Spray and Oxymetazoline Nasal Spray**	OXY combination: mometasone	Seasonal Allergic Rhinitis
2	**ezetimibe (plus simvastatin)**	Vytorin	Atherosclerosis|Hypercholesterolemia|Hy
3	**PEG-Intron**		Melanoma
4	**Pegetron®**	Peginterferon Alfa-2b + Ribaviri	Hepatitis C, Chronic
5	**Sugammadex**	faster recovery from a neuromu	Anesthesia, General
6	**SCH 527123**		Chronic Obstructive Pulmonary Disease
7	**Mometasone furoate/formoterol (MF/F) combination + Fluticasone pr**	Inhaled Glucocorticosteroids/Lo	Asthma
8	**sugammadex**		Anesthesia, General
9	**Vicriviroc**		HIV Infections|Acquired Immunodeficienc
10	**Mometasone furoate nasal spray**		Seasonal Allergic Rhinitis
11	**Org 50081**		Insomnia
12	**SCH 717454**	Chemotherapy and SCH 71745	Colorectal Cancer
13	**Sugammadex**		Anesthesia, General
14	**Infliximab**		Ulcerative Colitis
15	**Mometasone Furoate DPI**	mometasone furoate dry powde	Asthma
16	**Sugammadex**	faster recovery from a neuromu	Anesthesia, General
17	**Sugammadex**		Anesthesia, General
18	**SCH 420814**		Parkinson Disease|Neurodegenerative D
19	**sugammadex**	Org 25969	Anesthesia, General
20	**VICRIVIROC**		HIV Infections
21	**Rolapitant**		Postoperative Nausea and Vomiting
22	**Org 50081**		Insomnia|Sleep Initiation and Maintenanc

Disease Area	Co-sponsor?	Own R&D	Acquired
2006	Schering-Plough	2006	Schering-Plough
Allergy, cold and respiratory		yes	
Allergy, cold and respiratory		yes	
Infectious diseases and Cancer	*Integrated Therapeutics Gr*	yes	
Allergy, cold and respiratory	Novartis		
Neuroscience		yes	
Allergy, cold and respiratory	Novartis		
Inflammatory diseases			
Allergy, cold and respiratory	Novartis		
Infectious diseases and Cancer			
Allergy, cold and respiratory	Novartis		
Infectious diseases and Cancer		yes	
Other		yes	
Inflammatory diseases			
Infectious diseases and Cancer			
Cardiovascular/Cholesterol	Merck		
Infectious diseases and Cancer			
Infectious diseases and Cancer	*Integrated Therapeutics Gr*	peginteferon	ribavirin from Organon
Allergy, cold and respiratory	Novartis		
Allergy, cold and respiratory			
Inflammatory diseases			
Allergy, cold and respiratory	Merck	loratadine	
Infectious diseases and Cancer	peginterferon		ribavirin from Organon
Schering Plough acquired Organon in 2007	Schering Plough acquired O	Schering Plough acquired Organon in 20	Schering Plough acquired Organon in 2007
2007	Schering-Plough	2007	Schering-Plough
Allergy, cold and respiratory	*Quintiles*		
Cardiovascular/Cholesterol	Merck	ezetimibe	
Infectious diseases and Cancer		yes	
Infectious diseases and Cancer		peginterferon	ribavirin from Organon
Neuroscience			yes (Organon company)
Allergy, cold and respiratory		yes	
Allergy, cold and respiratory			
Neuroscience			yes (Organon company)
Infectious disease and cancers		yes	
Allergy, cold and respiratory			
Neuroscience			yes(Organon company)
Infectious diseases and Cancer		yes	
Neuroscience			yes (Organon company)
Inflammatory diseases			
Allergy, cold and respiratory			
Neuroscience			yes (Organon company)
Neuroscience			yes (Organon company)
Neuroscience		yes	
Neuroscience			yes (Organon company)
Infectious disease and cancers		yes	
Other		yes	
Neuroscience			yes (Organon company)

Licensed-in	Partnered/collaboration	Objected area?	General remark / is partner announced in
2006	Schering-Plough	2006	Schering-Plough
		allergy and respiratory	
		allergy and respiratory	
		anti-infective and anticancer	
	co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
		central nervous system disorders	
	co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
agreement with Centocor for the commercialisation/distribution		dermatologicals	license is named in AR 2000
	co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
markting license from Aston university		anti-infective and anticancer	Aston University not named in AR 2000
	co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
		anti-infective and anticancer	
agreement with Centocor for the commercialisation/distribution		dermatoligicals	license is named in AR 2000
markting license from Aston university		anti-infective and anticancer	Aston University not named in AR 2000
	joint venture (ezetimibe is SP, simv	cardiovascular diseases	Merck is named in AR 2000
markting license from Aston university		anti-infective and anticancer	Aston University not named in AR 2000
		anti-infective and anticancer	SP acquired Organon
	co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
	co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
agreement with Centocor for the commercialisation/distribution			license is named in AR 2000
	joint venture loratadine (SP) + mont	allergy and respiratory	Merck is named in AR 2000
		anti-infective and anticancer	SP acquired Organon
Schering Plough acquired Orgar	Schering Plough acquired Organon in 2007		
2007	Schering-Plough	2007	Schering-Plough
	co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
	joint venture (ezetimibe is SP, simv	cardiovascular diseases	Merck is named in AR 2000
		anti-infective and anticancer	
		anti-infective and anticancer	SP acquired Organon
		central nervous system disorders	SP acquired Organon
		allergy and respiratory	
	co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
		central nervous system disorders	SP acquired Organon
		anti-infective and anticancer	
	co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
		central nervous system disorders	SP acquired Organon
		anti-infective and anticancer	
		central nervous system disorders	SP acquired Organon
agreement with Centocor for the	commercialisation/distribution		license is named in AR 2000
	co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
		central nervous system disorders	SP acquired Organon
		central nervous system disorders	SP acquired Organon
		central nervous system disorders	
		central nervous system disorders	SP acquired Organon
		anti-infective and anticancer	
		central nervous system disorders	SP acquired Organon

Remark about area	Area projected in advance
2006	Schering-Plough
new name matches disease	yes
new name matches disease	yes
	yes
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
name is unknown. Area is projected	yes
new name matches disease	yes
	yes
new name matches disease	yes
	yes
unkown	other disease
name is unknown. Area is projected	yes
	yes
new name matches disease	yes
	yes
	yes
new name matches disease	yes
new name matches disease	yes
name unknown, but license is projected	other disease
new name matches disease	yes
	yes
2007	Schering-Plough
new name matches disease	yes
new name matches disease	yes
	yes
	yes
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
	yes
new name matches disease	yes
new name matches disease	yes
	yes
new name matches disease	yes
name unknown, but license is projected	other disaeases
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
unkown	no
new name matches disease	yes

23	**Andriol**	Oral testosterone undecanoate	Hypogonadism|Androgens
24	**infliximab**		Rheumatoid Arthritis
25	**Sugammadex**		Anesthesia, General
26	**Vicriviroc**		HIV Infections|Acquired Immunodeficienc
27	**Mometasone Furoate nasal spray**		Adenoid Hypertrophy
28	**NOMAC-E2**	Estradiol and Nomegestrol Acet	Contraception
29	**Org 50081**		Menopause|Vasomotor Symptoms
30	**NOMAC-E2**	Effects on Bone Mineral Density	Contraception
31	**sugammadex (Org 25969)**		Anesthesia, General
32	**SCH 619734**		Chronic Cough
33	**Sugammadex**		Anesthesia
34	**SCH 697243**		Rhinoconjunctivitis|Rhinitis|Conjunctivitis
35	**Sugammadex + succinylcholine**		Anesthesia, General
36	**NOMAC-E2**		Contraception
37	**Tibolone**		Osteoporosis
38	**SCH 697243**		Rhinoconjunctivitis|Rhinitis|Conjunctivitis
39	**Mometasone furoate nasal spray**		Seasonal Allergic Rhinitis
40	**pegylated interferon alpha-2b**		Hepatitis B, Chronic
41	**SCH 56592**	posaconazole	Onychomycosis
42	**Posaconazole**	First Line Treatment of Coccidic	Coccidioidomycosis
43	**Sugammadex**	Org 25970	Anesthesia, General
44	**SCH 503034**	boceprevir	Chronic Hepatitis C
45	**Vicriviroc**		HIV Infections|Acquired Immunodeficienc
46 trastuzu	**doxorubicin, cyclophosphamide, paclitaxel, trastuzumab + PLD, cyclophosphamide, trastuzumab, p**		Breast Neoplasm
47	**SCH 530348**		Atherosclerosis|Ischemia|Myocardial Infa
48	**Org 50081**		Sleep Initiation and Maintenance Disorde
49	**Nasonex®**	mometasone furoate nasal spra	Sinusitis
50	**Sugammadex**		Anesthesia
51	**PegIntron (peginterferon alfa-2b) + Rebetol (ribavirin)**		Hepatitis C, Chronic
52	**Sugammadex**	Org 25969	Anesthesia
53	**SCH 486757**		Chronic Cough
54	**Ezetimibe + Simvastatin**	vytorin	Hypercholesterolemia|Diabetes Mellitus,
55	**Org 50081**		Postmenopausal Symptoms|Menopause
56	**SCH 721015**		Bladder Neoplasms
57	**ORG 50081**		Insomnia|Quality of Life
58	**sugammadex**		Anesthesia, General
59	**Loratadine/montelukast combination**		Seasonal Allergic Rhinitis
60	**sugammadex**		Anesthesia, General
61	**Sugammadex**	Org 25969	Anesthesia, General
62	**NOMAC-E2**		Contraception
Schering-I	**Schering-Plough**	**2008**	**Schering-Plough**
2008			
1	**SCH 530348**		Atherosclerosis|Ischemia|Myocardial Infa
2 Niaspan	**Vytorin + Niaspan**		Hypercholesterolemia|Hyperlipidemia
3	**SCH No. 418131**	Mometasone Furoate/Formoterc	Asthma|COPD
4	**Org 36286**		In Vitro Fertilization
5	**Boceprevir (SCH 503034) + Peginterferon alfa-2b (SCH 54031) + Ribavirin (SCH 18908)**		Hepatitis C, Chronic

Women's Health, Contraception and Fertility			yes (Organon company)
Inflammatory diseases	AESCA Pharma GmbH		
Neuroscience			yes (Organon company)
Infectious diseases and Cancer		yes	
Allergy, cold and respiratory			
Women's Health, Contraception and Fertility			yes (Organon company)
Women's Health, Contraception and Fertility			yes (Organon company)
Women's Health, Contraception and Fertility			yes (Organon company)
Neuroscience			yes (Organon company)
Allergy, cold and respiratory		yes	
Neuroscience			yes (Organon company)
Allergy, cold and respiratory		yes	
Neuroscience			Both from Organon
Women's Health, Contraception and Fertility			yes (Organon company)
Other			yes (Organon company)
Allergy, cold and respiratory		yes	
Allergy, cold and respiratory			
Infectious diseases and Cancer		yes	
Infectious diseases and Cancer		yes	
Infectious diseases and Cancer		yes	
Neuroscience			yes (Organon company)
Infectious diseases and Cancer		yes	
Infectious diseases and Cancer		yes	
Infectious diseases and Cancer			
Cardiovascular/Cholesterol	*The TIMI Study Group*	yes	
Neuroscience			yes (Organon company)
Inflammatory diseases			yes (Organon company)
Neuroscience			yes (Organon company)
Infectious diseases and Cancer	Integrated Therapeutics Gr	peginterferon	Rebetol from Organon company
Neuroscience			yes (Organon company)
Allergy, cold and respiratory		yes	
Cardiovascular/Cholesterol			
Women's Health, Contraception and Fertility			yes (Organon company)
Infectious diseases and Cancer		yes	
Neuroscience			yes (Organon company)
Neuroscience			yes (Organon company)
Allergy, cold and respiratory		loratadine	
Neuroscience			yes (Organon company)
Neuroscience			yes (Organon company)
Women's Health, Contraception and Fertility			yes (Organon company)
2008	**Schering-Plough**	**2008**	**Schering-Plough**
Cardiovascular/Cholesterol	*The TIMI Study Group* + Du	Yes	
Cardiovascular/Cholesterol	merck		
Allergy, cold and respiratory	Novartis		
Women's Health, Contraception and Fertility			yes (Organon company)
Infectious diseases and Cancer		peginterferon + boceprevir	Rebetol/ribavirin from organon company

			SP acquired Organon
agreement with Centocor for the	commercialisation/distribution	allergy and respiratory	license is named in AR 2000
		central nervous system disorders	SP acquired Organon
		anti-infective and anticancer	
	co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
			SP acquired Organon
			SP acquired Organon
			SP acquired Organon
		central nervous system disorders	SP acquired Organon
		allergy and respiratory	
		central nervous system disorders	SP acquired Organon
		allergy and respiratory	
		central nervous system disorders	SP acquired Organon
			SP acquired Organon
			SP acquired Organon
		allergy and respiratory	
	co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
		anti-infective and anticancer	
		anti-infective and anticancer	
		anti-infective and anticancer	
		central nervous system disorders	SP acquired Organon
		anti-infective and anticancer	
		anti-infective and anticancer	
Caelyx + doxorubicin, exclusive r	cyclophosphamide collaboration wi	anti-infective and anticancer	Alza is namedin AR 2000, Sonus + Sandoz a
		cardiovascular diseases	
		central nervous system disorders	SP acquired Organon
		allergy and respiratory	SP acquired Organon
		central nervous system disorders	SP acquired Organon
		anti-infective and anticancer	SP acquired Organon
		central nervous system disorders	SP acquired Organon
		allergy and respiratory	
	joint venture (ezetimibe is SP, simv	cardiovascular diseases	Merck is named in AR 2000
			SP acquired Organon
		anti-infective and anticancer	
		central nervous system disorders	SP acquired Organon
		central nervous system disorders	SP acquired Organon
	joint venture loratadine (SP) + mont	allergy and respiratory	Merck is named in AR 2000
		central nervous system disorders	SP acquired Organon
		central nervous system disorders	SP acquired Organon
			SP acquired Organon
2008	**Schering-Plough**	**2008**	**Schering-Plough**
		cardiovascular diseases	
	vytorin is joint venture with merck (e	cardiovascular diseases	Merck is named in AR 2000
	co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
			SP acquired Organon
		anti-infective and anticancer	SP acquired Organon

name is unkown, category is **not** projected	no
new name matches disease	yes
new name matches disease	yes
	yes
new name matches disease	yes
name is unkown, category is **not** projected	no
name is unkown, category is **not** projected	no
name is unkown, category is **not** projected	no
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
name is unkown, category is **not** projected	no
unkown	no
new name matches disease	yes
new name matches disease	yes
	yes
	yes
	yes
new name matches disease	yes
	yes
	yes
are not	yes
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
	yes
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
name is unkown, category is **not** projected	no
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
name is unkown, category is **not** projected	no
2008	**Schering-Plough**
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
name is unkown, category is **not** projected	no
	yes

6	**Infliximab**		Psoriasis
7	**SCH 527123**		Neutrophilic Asthma
8	**SCH 530348**		Atherosclerosis|Myocardial Ischemia|Myo
9	**Ezetimibe**		Hypercholesterolemia|Atherosclerosis
10	**Mometasone furoate nasal spray (MFNS)**		Allergic Rhinitis
11	**Org 36286 (=Corifollitropin Alfa?) + Puregon® + Orgalutran®**		Infertility|In Vitro Fertilization
12	**Zegerid® (20 mg Omeprazole/Sodium Bicarbonate)**		Gastric Acid|Human Experimentation
13	**Nomegestrol Acetate (NOMAC), Estradiol (E2)**		Healthy
14	**Org 36286 (Corifollitropin Alfa)**		Fertilization
15	**Tibolone**		Postmenopausal Women (climacteric sy
16	**Peginterferon alfa-2b (SCH 054031)**		Carcinoma, Hepatocellular
17 Pitatava	**SCH 58235 (Ezetimibe) and Pitavastatin (Study P03962)**		Hypercholesterolemia
18	**SCH 727965**		Leukemia, Myeloid, Acute|Lymphoblastic
19	**Zegerid® and Prilosec OTC®**		Gastric Acid|Human Experimentation
20	**SCH 530348**		Cerebral Infarction
21	**Mometasone furoate nasal spray (MFNS)**		Allergic Rhinitis
22	**Peginterferon alfa-2b + Ribavirin**		Hepatitis C
23	**Ezetimibe + Simvastatin**	vytorin	Hypercholesterolemia
24	**Peginterferon alfa-2b (SCH 54031) + Ribavirin (SCH 18908)**		Hepatitis C, Chronic|Liver Cirrhosis
25	**Org 50081**		Sleep Initiation and Maintenance Disorde
26	**Posaconazole**		Mycoses
27	**Ezetimibe**		Hypercholesterolemia
28	**Mometasone Furoate Nasal Spray + Fluticasone Propionate Nasal Spray**		Perennial Allergic Rhinitis
29	**Desloratadine**		Rhinitis, Allergic, Seasonal|Asthma
30	**Org 25935**		Panic Disorder
31	**Mometasone furoate nasal spray (MFNS)**		Allergic Rhinitis|Asthma
32	**Vicriviroc maleate**		HIV Infections
33	**Caelyx (Pegylated Lyposomal Doxorubicin) + Cyclophosphamide (generic)**		Breast Neoplasm
34	**Boceprevir (SCH 503034) + PegIntron (PEG) + Ribavirin (RBV)**		Hepatitis C, Chronic
35	**sugammadex (Org 25969)**		Anesthesia, General
36	**Moxifloxacin + NOMAC-E2 (Org 10486-0 + Org 2317)**		Contraception
37	**Org 36286 (corifollitropin alfa)**		Infertility
38	**Radiopaque Etonogestrel Implant**		Contraception
39	**Peginterferon alfa-2b (SCH 54031) + Ribavirin (SCH 18908)**		Hepatitis C, Chronic
40	**Pegylated Lyposomal Doxorubicin (Caelyx) + Carboplatin (generic)**		Ovarian Neoplasms
41 Docetex	**Pegylated Lyposomal Doxorubicin (Caelyx) + (Docetaxel + Trastuzumab)**		Breast Neoplasm
42	**mometasone furoate**	Mometasone Furoate Nasal Spr	Rhinitis, Allergic, Perennial
43	**ORG 26576**		Attention Deficit Hyperactivity Disorder (A
44	**Peginterferon alfa-2b (SCH 054031)**		Multiple Myeloma
45 (Rosuva	**Ezetimibe + Rosuvastatin**		Hypercholesterolemia|Atherosclerosis
46	**Org 36286 (corifollitropin alfa)**		Infertility
47	**Mometasone Furoate Nasal Spray**		Rhinitis, Allergic, Perennial
48 ritonacir	**SCH 900518 + peginterferon alfa 2b + ribavirin + ritonavir**		Hepatitis C, Chronic
49	**ORG 26576**		Depression
50	**mometasone furoate nasal spray (MFNS)**		Acute Rhinosinusitis
51	**Infliximab**		Crohn's Disease
52	**Org 36286 (corifollitropin alfa)**		In Vitro Fertilization
53	**desloratadine +** levocetirizine		Allergic Rhinitis

Inflammatory diseases	Centocor, Inc.		
Allergy. Cold and respiratory		yes	
Cardiovascular/Cholesterol		yes	
Cardiovascular/Cholesterol		yes	
Allergy, cold and respiratory			
Women's Health, Contraception and Fertility			All acquired from Organon company
Other	Santarus		
Women's Health, Contraception and Fertility	CRS Mannheim GmbH		yes (Organon company)
Women's Health, Contraception and Fertility			yes (Organon company)
Women's Health, Contraception and Fertility			yes (Organon company)
Infectious diseases and Cancer		yes	
Cardiovascular/Cholesterol		ezetimibe	
Infectious diseases and Cancer		yes	
Other	Santarus		
Cardiovascular/Cholesterol		yes	
Allergy, cold and respiratory			
Infectious diseases and Cancer	Biokos Farma srl	peginterferon	Ribavirin acquired from Organon
Cardiovascular/cholesterol	Merck		
Infectious diseases and Cancer		peginterferon	Ribavirin acquired from Organon
Neuroscience			yes (Organon company)
Infectious diseases and Cancer		yes	
Cardiovascular/Cholesterol		yes	
Allergy, cold and respiratoy			
Allergy, cold and respiratory			yes (Organon company)
Neuroscience			yes (Organon company)
Allergy, cold and respiratory			
Infectious diseases and Cancer		yes	
Infectious diseases and Cancer	Princess Margaret Hospital, Canada		
Infectious diseases and Cancer		boceprevir + peginterferon	Ribavirin acquired from Organon
Neuroscience			yes (Organon company)
Women's Health, Contraception and Fertility			both acquired from Organon
Women's Health, Contraception and Fertility			yes (Organon company)
Women's Health, Contraception and Fertility			yes (Organon company)
Infectious diseases and Cancer		peginterferon	Ribavirin acquired from Organon
Infectious diseases and Cancer	Princess Margaret Hospital, Canada		
Infectious diseases and Cancer	MDS Pharma Services		
Allergy, cold and respiratory			
Neuroscience			yes (Organon company)
Infectious diseases and Cancer		yes	
Cardiovascular/Cholesterol	Merck	ezetimibe	
Women's Health, Contraception and Fertility			yes (Organon company)
Allergy, cold and respiratory			
Infectious diseases and Cancer		SCH 900518 and peginterferon	Ribavirin acquired from Organon
Neuroscience			yes (Organon company)
Inflammatory diseases			
Inflammatory diseases			
Women's Health, Contraception and Fertility			yes (Organon company)
Allergy, cold and respiratory			desloratadine acquired from Organon

agreement with Centocor for the commercialisation/distribution		dermatologicals	license is named in AR 2000
		allergy and respiratory	
		cardiovascular diseases	
		cardiovascular diseases	
	co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
			SP acquired Organon
commercialisation license from santarus			Santarus is not named in AR 2000
			SP acquired Organon
			SP acquired Organon
			SP acquired Organon
		anti-infective and anticancer	
		cardiovascular diseases	
		anti-infective and anticancer	
both commercialisation license from santarus			Santarus is not named in AR 2000
		cardiovascular diseases	
	co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
		anti-infective and anticancer	SP acquired Organon
	joint venture (ezetimibe is SP, simv	cardiovascular diseases	Merck is named in AR 2000
		anti-infective and anticancer	SP acquired Organon
		central nervous system disorders	SP acquired Organon
		anti-infective and anticancer	
		cardiovascular diseases	
	Both co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
		allergy and respiratory	SP acquired Organon
		central nervous system disorders	SP acquired Organon
	co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
		anti-infective and anticancer	
caelyx exclusive marketing rights	cyclophsohamide with Sandoz	anti-infective and anticancer	Alza is namedin AR 2000, Sandoz is not
		anti-infective and anticancer	SP acquired Organon
		central nervous system disorders	SP acquired Organon
			SP acquired Organon
			SP acquired Organon
			SP acquired Organon
		anti-infective and anticancer	SP acquired Organon
caelyx exclusive marketing rights agreement with Alza		anti-infective and anticancer	Alza is named in AR 2000
caelyx exclusive marketing rights agreement with Alza		anti-infective and anticancer	Alza is named in AR 2000
	co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
		central nervous system disorders	SP acquired Organon
		anti-infective and anticancer	
		cardiovascular diseases	Merck is named in AR 2000
			SP acquired Organon
	co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
		anti-infective and anticancer	SP acquired Organon
		central nervous system disorders	SP acquired Organon
	co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
agreement with Centocor for the	commercialisation/distribution		license is named in AR 2000
			SP acquired Organon
		allergy and respiratory	SP acquired Organon

nane is unknown but area is projected	yes
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
name is unkown, category is **not** projected	no
unkown	no
name is unkown, category is **not** projected	no
name is unkown, category is **not** projected	no
name is unkown, category is **not** projected	no
	yes
new name matches disease	yes
	yes
unkown	no
new name matches disease	yes
new name matches disease	yes
	yes
new name matches disease	yes
	yes
new name matches disease	yes
new name matches disease	yes
	yes
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
	yes
	yes
	yes
new name matches disease	yes
name is unkown, category is **not** projected	no
name is unkown, category is **not** projected	no
name is unkown, category is **not** projected	no
	yes
	yes
	yes
new name matches disease	yes
new name matches disease	yes
	yes
new name matches disease	yes
name is unkown, category is **not** projected	no
new name matches disease	yes
	yes
new name matches disease	yes
new name matches disease	yes
name unknown, but license is projected	yes
name is unkown, category is **not** projected	no
new name matches disease	yes

54	**Org 36286 (corifollitropin alfa) and 200 IU hCG + Org 36286 (corifollitropin alfa) and 50IU/75IU recFS**		Ovulation Induction
55	**Org 50081**		Sleep Initiation and Maintenance Disorde
56	**desloratadine**		Urticaria
57	**SCH 900538**		Seasonal Allergic Rhinitis
58	**Remicade (Infliximab)**		Psoriasis
59	**desloratadine**		Chronic Idiopathic Urticaria|Atopy
60	**Radiopaque Implanon + Implanon (etonogestrel implant)**		Contraception
61	**SCH 497079**		Type 2 Diabetes Mellitus
62	**SCH 527123**		Asthma
63	**Temozolomide**		Glioblastoma
64	**PegIntron (peginterferon alfa-2b; SCH 54031) + Rebetol (ribavirin; SCH 18908)**		Hepatitis C, Chronic|Liver Cirrhosis
65	**Mometasone furoate**		Perennial Allergic Rhinitis
66	**PegIntron (peginterferon alfa-2b)**		Hepatitis C, Chronic|Hepatitis C
67	**Preladenant**		Akathisia, Drug-Induced|Antipsychotic Ag
68	**Vicriviroc**		HIV Infections
69	**Tibolone (Livial®)**		Breast Cancer
70	**Org 50081**		Insomnia
71	**Org 25935**		Schizophrenia
72 MTX is i	**Infliximab** + methotrexate (MTX)		Arthritis, Rheumatoid
73	**Org 36286, corifollitropin alfa**		In Vitro Fertilization
74 (Zyrtec	**Desloratadine (Clarinex) + Cetirizine (Zyrtec)**		Allergic Rhinitis
75	rocuronium + **sugammadex** + **succinylcholine**		Neuromuscular Blockade
76	**Peginterferon Alfa-2b (SCH 54031)**		Hepatitis C, Chronic
77	**Mometasone furoate nasal spray (MFNS)**		Allergic Rhinitis
78	**mometasone furoate/formoterol**		Asthma|Airway Inflammation
79	**Corifollitropin Alfa**	Org 36286	Infertility
80	**Mometasone Furoate Nasal Spray**		Nasal Polyps
81	**Sugammadex**		Anesthesia, General|Neuromuscular Rel
82 (Atorva	**Ezetimibe + Atorvastatin**		Hypercholesterolemia|Atherosclerosis|Co
83	**Peginterferon alfa-2b (SCH 54031)**		Hepatitis D, Chronic|Hepatitis B, Chronic
84	**Ezetimibe + Simvastatin**	vytorin	Hypercholesterolemia|Atherosclerosis
85	**Ganirelix (Orgalutran®)**		Controlled Ovarian Stimulation
86	**sugammadex**		Anesthesia
87	**SCH 497079**		Obesity|Overweight|Body Weight
88	**SCH 527123**		Psoriasis
89	**Temozolomide**		Astrocytoma
90 (Zyrtec	**Desloratadine (Clarinex) + Cetirizine (Zyrtec)**		Antihistamine
91 (Atorva	**Ezetimibe + Atorvastatin**		Hypercholesterolemia
92 (seprac	**Org 50081 + Zopiclone**		Sleep Initiation and Maintenance Disorde
93	**sugammadex**		Anesthesia, General
94	**Preladenant**		Akathisia, Drug-Induced|Dyskinesia, Dru

Women's Health, Contraception and Fertility			yes (Organon company)
Neuroscience			yes (Organon company)
Allergy, cold and respiratory			yes (Organon company)
Allergy, cold and respiratory		yes	
Inflammatory diseases			
Allergy, cold and respiratory			yes (Organon company)
Women's Health, Contraception and Fertility			yes (Organon company)
Other		Yes	
Allergy, cold and respiratory		yes	
Infectious diseases and Cancer			
Infectious diseases and Cancer		peginterferon	ribavirin acquired from organon
Allergy, cold and respiratory			
Infectious diseases and Cancer		yes	
Neuroscience		Yes	
Infectious diseases and Cancer		yes	
Infectious diseases and Cancer			yes (Organon company)
Neuroscience			yes (Organon company)
Neuroscience			yes (Organon company)
Inflammatory diseases			
Women's Health, Contraception and Fertility			yes (Organon company)
Allergy, cold and respiratory			desloratadine acquired from organon
Neuroscience			sugammadex and succinylcholine from orga
Infectious diseases and Cancer		yes	
Allergy, cold and respiratory			
Allergy, cold and respiratory			
Women's Health, Contraception and Fertility			yes (Organon company)
Allergy, cold and respiratoy			
Neuroscience			yes (Organon company)
Cardiovascular/Cholesterol		ezetimibe	
Infectious diseases and Cancer		yes	
Cardiovascular/Cholesterol			
Women's Health, Contraception and Fertility			yes (Orgnanon company)
Neuroscience			yes (Orgnanon company)
Other		yes	
Inflammatory diseases		yes	
Infectious diseases and Cancer			
Allergy, cold and respiratory			Desloratadine acquired from Organon
Cardiovascular/Cholesterol		ezetimibe	
Neuroscience			org 50081 acquired from organon company
Neuroscience			yes (Organon company)
Neuroscience		yes	

			SP acquired Organon
		central nervous system disorders	SP acquired Organon
		allergy and respiratory	SP acquired Organon
		allergy and respiratory	
agreement with Centocor for the commercialisation/distribution		dermatologicals	license is named in AR 2000
		allergy and respiratory	SP acquired Organon
			SP acquired Organon
		allergy and respiratory	
markting license from Aston university		anti-infective and anticancer	Aston University not named in AR 2000
		anti-infective and anticancer	SP acquired Organon
	co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
		anti-infective and anticancer	
		central nervous system disorders	
		anti-infective and anticancer	
		anti-infective and anticancer	SP acquired Organon
		central nervous system disorders	SP acquired Organon
		central nervous system disorders	SP acquired Organon
agreement with Centocor for the commercialisation/distribution		allergy and respiratory	license is named in AR 2000
			SP acquired Organon
		allergy and respiratory	SP acquired Organon
non		central nervous system disorders	
		anti-infective and anticancer	
	co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
	co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
			SP acquired Organon
	co-development with Novartis	allergy and respiratory	Novartis facility bought according to AR 200
		central nervous system disorders	SP acquired Organon
		cardiovascular diseases	
		anti-infective and anticancer	
	joint venture (ezetimibe is SP, simv	cardiovascular diseases	Merck is named in AR 2000
			SP acquired Organon
		central nervous system disorders	SP acquired Organon
		allergy and respiratory	
markting license from Aston university		anti-infective and anticancer	Aston University not named in AR 2000
		allergy and respiratory	SP acquired Organon
		cardiovascular diseases	
		central nervous system disorders	SP acquired Organon
		central nervous system disorders	SP acquired Organon
		central nervous system disorders	

name is unkown, category is **not** projected	no
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
name is unknown. Area is projected	yes
new name matches disease	yes
name is unkown, category is **not** projected	no
unkown	no
new name matches disease	yes
	yes
	yes
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
	yes
	yes
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
name is unkown, category is **not** projected	no
new name matches disease	yes
new name matches disease	yes
	yes
new name matches disease	yes
new name matches disease	yes
name is unkown, category is **not** projected	no
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
	yes
new name matches disease	yes
name is unkown, category is **not** projected	no
new name matches disease	yes
unkown	no
new name matches disease	yes
	yes
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes
new name matches disease	yes