

# WHAT IS THE VALUE OF GROWTH COMPANIES? A METHODOLOGICAL APPROACH TO THE VALUATION OF GROWTH COMPANIES IN THE BIOTECHNOLOGY AND PHARMACEUTICAL SECTOR

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**Abstract:** In the case of company takeovers, a comprehensive company valuation is an indispensable prerequisite for determining the actual value of the company. This is particularly important in times of increased company takeovers. Classical valuation methods, however, only take into account the financial situation, and other factors are not usually taken into account. The question therefore arises as to how a more comprehensive company valuation can be ensured. Theoretical concepts from business administration form a suitable basis to carry out a more comprehensive, holistic view of the company. This paper develops a comprehensive methodological approach for the valuation of growth companies. Aspects of the company to be evaluated that go beyond the financial aspects are included. Strategy, technology, organization and management skills as well as cooperation with other companies are fundamental components of this valuation approach in addition to the financial situation. A practical company example from the biotechnology sector is used to illustrate the application of the valuation approach.

**Keywords:** Company Valuation, Finance, Growth companies Pharmaceutical Business, Strategy

**JEL Classification:** F37

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## INTRODUCTION

In business management consulting, especially in the auditing and fiduciary sector, company valuation is a supreme discipline (Hüttche, 2012). The determination of the enterprise value comes into play, particularly in the case of the purchase and sale of a company, the formation in kind, conversion, takeover of a participation, merger, demerger, change of partners, calculation of the compulsory portion in the case of the division of an estate and property disputes between married couples (cf. Loderer & Wälchli, 2010). Classic valuation methods, such as the EVA approach, mainly consider the financial situation of a company (cf. Copeland, 2000; Hail & Meyer, 2002; Hoke, 2002; Volkart, 1999). Accounting-oriented company valuation methods represent a domain of auditing and also consider only the financial side (Gantenbein & Gehrig, 2007).

Growth companies, also known as growth companies, rarely make a profit in their early years. Growth companies can be characterized by their large intangible assets that might be converted into strong growth in the future. Classic financial and accounting-oriented valuation methods are short-sighted and can therefore only capture the value of these companies to a limited extent during this period.

Although the so-called hard indicators and models retain their validity, they have only limited informative value in fast-growing companies. In addition to the 'hard factors' such as sufficient liquidity to finance the extremely costly research, the so-called 'soft factors' are of great importance. These include, for example, the entrepreneurial competence of the management or the market potential of the products. A special assessment of these companies is therefore necessary. The entrepreneurial strengths

and weaknesses should be the focus of attention. A more comprehensive evaluation methodology that takes these additional aspects into account is of practical importance (cf. Gantenbein & Gehrig, 2007).

In the business literature (cf. Hüttche, 2012), a company is comprehensively described and categorized using the New St. Gallen Enterprise and Stakeholder Model (Rüegg-Stürm, 2017) and its typologies (Thommen, 2016). Based on the models mentioned, the most important factors relevant for entrepreneurial success can be derived (Stros & Hari, 2002; Stros & Hari, 2004). Some evaluation criteria can be quantified relatively easily and clearly on the basis of their methodology (analysis of given company data, 'hard factors'). Others, however, are based on a subjective assessment by the analyst ('soft factors') and are therefore always subject to greater uncertainty.

In order to adequately capture both the 'hard factors' and the 'soft factors', a methodical approach for the valuation of growth companies in the biotechnology and pharmaceutical industries is developed here. The purpose of this approach is to evaluate the enterprise value of growth companies in terms of their entrepreneurial strengths and weaknesses.

In total, the approach consists of five criteria that are used for the evaluation. These include the corporate strategy, the technology(s) used, organization and management, the financial situation and existing cooperation of the company.

In concrete terms, the assessment will determine the extent to which:

1. the corporate strategy is target-oriented and does justice to market opportunities.
2. the technology(s) used is (are) innovative and marketable.
3. the organization and management of the company is able to react flexibly while meeting the rigid requirements for the approval of new medicines.
4. a financial situation exists to achieve milestones set.
5. the cooperation with partner companies is suitable to place the products on the world market.

In chapters two to six, the five evaluation criteria are described in detail. Subsequently, their application is shown in a practical case study, the biotechnology company Biomarin. The final step is a comparison of growth company data with current data from the case study company using the evaluation methodology.

## **1. CORPORATE STRATEGY FOR SEIZING MARKET OPPORTUNITIES**

When valuing a company, it is imperative to take into account the corresponding economic environment and its development.

In the health care sector, there is a highly regulated market with little competition. The drug market is very highly regulated and has some special features. For example, the prices of medicines are set according to the purchasing power of the country concerned. The fact that the respective countries often do not permit parallel imports of patent-protected remedies manifests the different price formation (cf. Dogramatzis, 2002).

Overall, despite their comfortable profit situation, the pharmaceutical companies are in a rather difficult position. On the one hand, the costs of research and development are continuously increasing, on the other hand, competition from biotechnology companies and generic companies entering the market, is becoming increasingly fierce. Added to this is the pressure on prices exerted by the sharp global rise in health care costs (Taylor, 2015). This leads to the following fundamental strategic characteristics (cf. Black, 2005; Meinhardt, 2002):

### **a) Product/assortment market strategy**

This strategic approach focuses mainly on product-related market penetration measures to:

1. develop and offer new drugs (drug developers),
2. provide technologies and services to optimize research and development (technology providers),
3. make available information and databases, e.g., in the field of genome research (information providers),

4. offer branded products (branded product suppliers). Compared to other markets, there are relatively few branded products in the pharmaceutical market.

b) Price/conditions market strategy

The focus of this strategy approach is on price-related market penetration measures. This seems to be particularly important in the pharmaceutical market, as price is often the only marketing instrument.

c) Differentiation strategy

Growth companies very often enter a market with strong competition. The smaller biotechnology companies therefore develop a drug or process for a rare application and are therefore not of interest to large pharmaceutical companies.

d) Distribution market strategy

This strategic approach refers to sales-related market penetration measures. This includes:

1. Geographical strategy. Cooperation in regionally different markets creates access to a new clientele, e.g., Icos with Eli Lilly for the distribution of Cialis.
2. Service marketing strategy. The companies offer their customers complete service systems, e.g., support for medical practices in logistical matters.
3. Sales channel strategy. In the pharmaceutical sector this increasingly includes Internet pharmacies, e.g., [www.walgreens.com](http://www.walgreens.com).

## 2. INNOVATION AND MARKETABILITY OF THE TECHNOLOGIES USED

Many business ideas in biotechnology are based on a technological product innovation (cf. Fibig & Hutt, 2003). The opportunities and risks of a company's success are determined by the feasibility of this technical innovation. The actual market success often depends exclusively on it. In the glossy brochures of biotechnology and pharmaceutical companies, the products are described very advantageously. However, the assessment of the products is often (due to the lack of expertise), very difficult or impossible. The assessment of a company's technological potential, risks and competence is therefore the responsibility of a technical expert for understandable reasons.

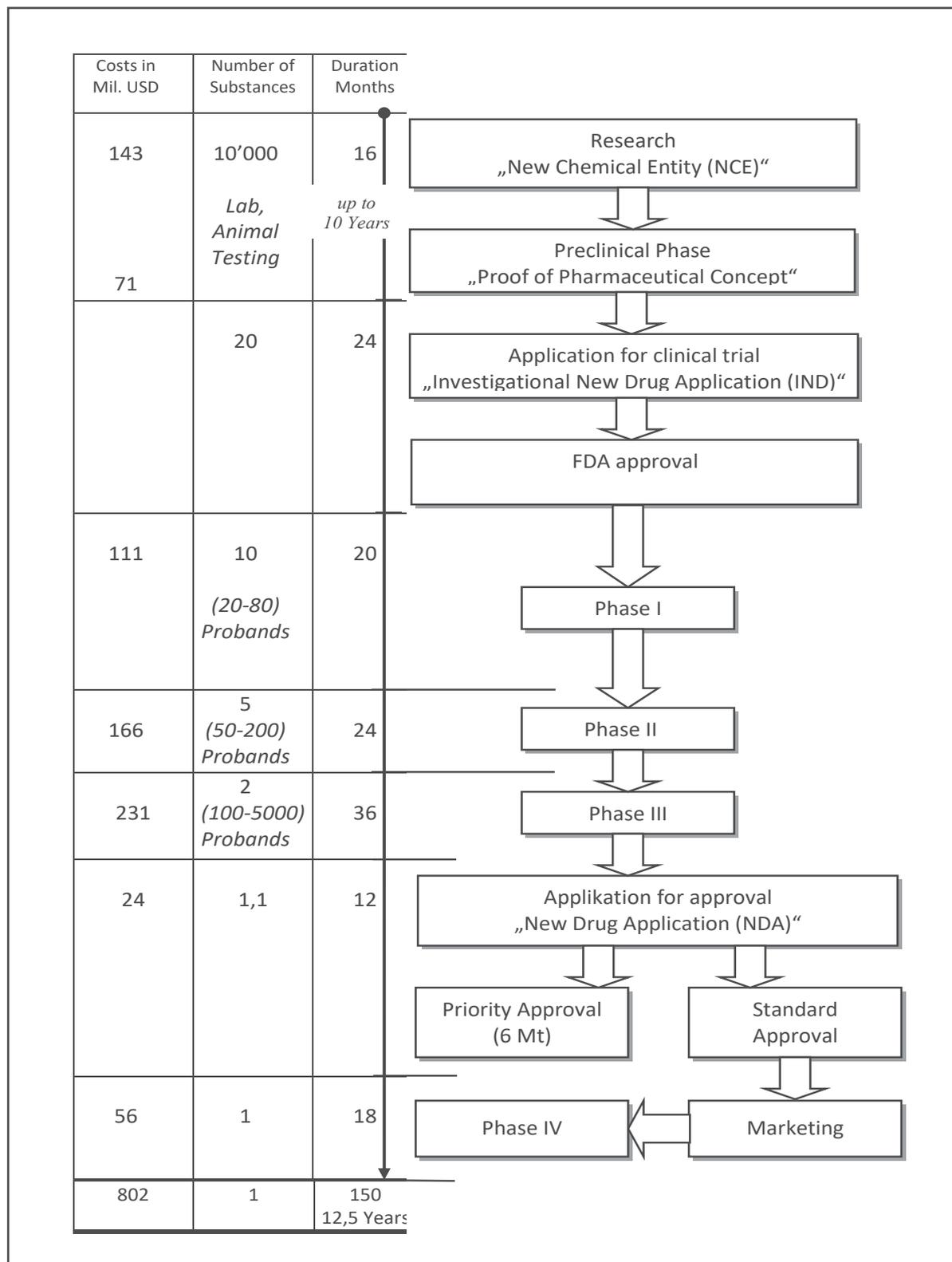
The knowledge then acquired by a company represents a lead over its competitors and is protected from access by patenting. The patent gives its owner the right to prevent a commercial use of the invention (innovation) by third parties. The term of a patent is 20 years from the beginning of the application (cf. Gassmann & Bader, 2016). As a result of the development and approval often required for market launch, the effective period of use can be significantly shortened. During the entire lifetime of a patent, licenses can be granted or sold by the patent holder. The granting of patented methods or substances to a partner for a fee is the only source of income for many young growth companies. This can be done against payment of a lump-sum, annual or royalty fee. When analysing a company, particular attention must be paid to the timing of the expiry of a patent and its quality. Since a product is no longer legally protected from this point on, it could possibly be threatened in the market by cheaper imitation products (referred to as generics in the case of drugs).

Product development represents a high risk for a pharmaceutical or biotechnology company. The development of a new drug is very time-consuming and costly. The efficacy of a drug must be confirmed in several clinical studies before it is approved by the American Food and Drug Administration (FDA). The probability that a newly found active ingredient will be registered as a drug is very low. It is roughly in the per mille range (Lesney, 2001; Pharma Information, 2017). It is therefore important for a company to clarify the market opportunities of the potential drug, the expected revenues and the question of amortization of the expenses incurred before the start of the clinical trials (Craig, 2001; Law, 2001) (see Figure 1).

This makes it necessary, when evaluating pharmaceutical and biotechnology companies, to take a special look at the status and probability of an approval as well as the economic potential of the active substances in the approval process ('pipeline'). One criterion here is certainly the number and breadth (diversification)

of products sold and in the product development pipeline. Strong diversification reduces the company's dependence on a single product, division or industry.

Figure 1: The FDA approval process



Source: Stros & Hari, 2004

### 3. ORGANIZATION AND MANAGEMENT OF THE COMPANY

Nowadays, management can only meet the different requirements of modern business management by means of appropriate organization. This is done by the management setting the framework conditions and defining the internal processes. This ensures that the strategy developed by the management is implemented correctly. Economic principles such as productivity, cost-effectiveness and profitability are always taken into account. Although difficult to quantify, the 'quality of management' factor is a key element in the assessment of companies (see Lombriser & Abplanalp, 2015).

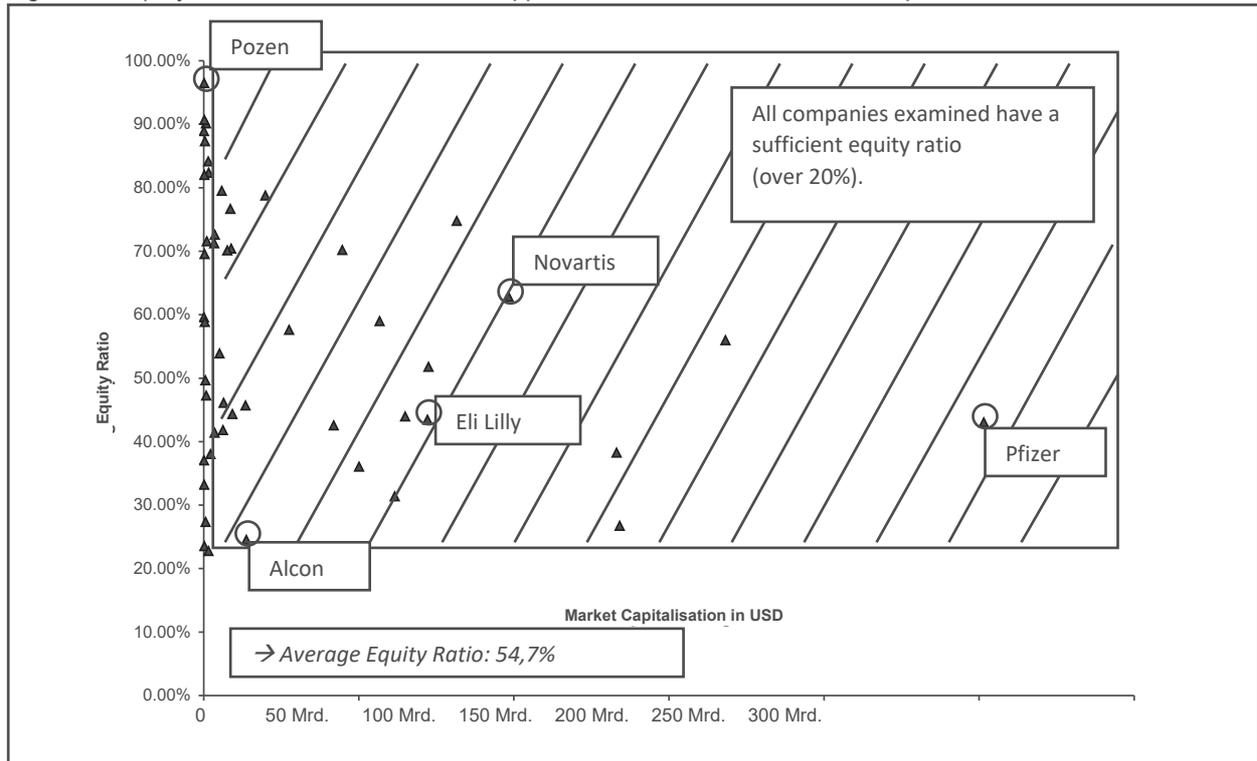
- Strategic management refers to the task of management to develop and implement a successful corporate strategy to achieve the goals already set. It deals with the problems that arise at the level of the owners and affects decisions of great and long-term significance.
- Operational management leads the design, development and control of the operational performance of the 'day-to-day business'. To lead a company to sustainable success, the management must have knowledge of the most important business disciplines, such as marketing, materials management, production, accounting, financing, investment, personnel, organization and of course, corporate management.
- The organizational structure is the created order, which guarantees the process necessary for the entrepreneurial achievement production. In order to guarantee efficient day-to-day business, a process organization must be defined, the process paths must be kept efficient and the division of tasks (task, competence and responsibility) must be regulated.
- The qualification and satisfaction of the employees, as well as their identification with the company, are important components of success. The will to actively cooperate, the introduction of ideas to promote innovation and the creation of a fruitful corporate culture can be decisively controlled by the management.
- The network relevant to a company consists of cooperation partners, supervisory bodies, investors, suppliers, competitors, customers, the public and legislators. The decisive factor here is the ability of the management to create a network of partners that gives the company the greatest possible competitive advantage. A good relationship with customers, investors, shareholders and suppliers also has a beneficial effect. The existing knowledge is expanded through the integration of external competences.
- The infrastructure, i.e., the existing buildings, premises and laboratory facilities, determine the framework conditions of the employees and indirectly of the company's activities. The design of workplaces is also a relevant criterion.

### 4. FINANCIAL SITUATION

In valuation practice, the idea of evaluation by means of a comparison with other companies is known under the terms 'external comparative values' or 'market comparables/market multiples' (Pratt, 2001). These methods compare the key figures of a company with those of selected companies, the industry or the overall market. The success and economic activity of a company cannot be comprehensively identified and assessed solely from the absolute data of the accounting annual financial statements (Gantenbein & Gehrig, 2007). A company valuation is only possible when certain data and figures have been prepared and correlated. The substance value-oriented analysis (cf. Copeland, 2000; Hail & Meyer, 2002; Hoke, 2002; Volkart, 1999), which is explained in more detail below, deals with this purposeful evaluation of the annual financial statements.

The **equity ratio** indicates the proportion of a company's own funds used to finance itself. The equity capital is put in relation to the total capital (corresponding to the balance sheet total) (Fischbach, 2002). According to Kralicek, the equity ratio should be at least 20% and be able to cover three loss years (Kralicek, 1992). In practice, however, the entrepreneurial risk must also be taken into account. Therefore, the equity ratio should be about 30% for normal business activity, 40% if the company is privately owned and 100% if there is a high risk (Stros & Hari, 2004) (see Figure 2).

Figure 2: Equity ratio of 49 selected Nasdaq pharmaceutical and biotech companies

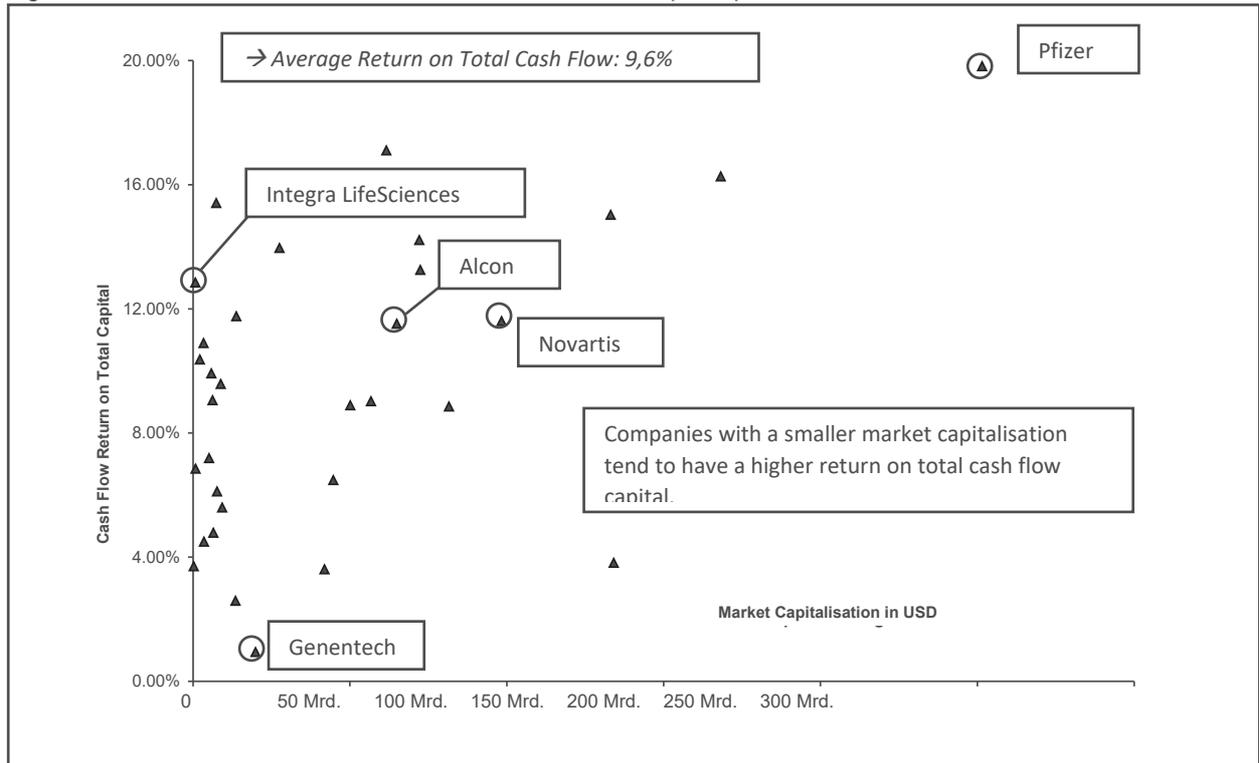


Source: Own, 2019

The **cash flow return on total capital** (also known as cash flow return on investment (CFROI)), which represents the self-generated funds of a company compared to total capital and thus measures the profitability of the invested capital, is the most meaningful indicator of the fundamental analysis (Vollmuth, 2002). Every investment should generate a cash flow in the long term that is higher than its cost of capital. A rising return on total cash flow capital thus creates value (Fischbach, 2002). The average return on total cash flow capital of 9.6% (Stros & Hari, 2004) can be used as a benchmark (see Figure 3).

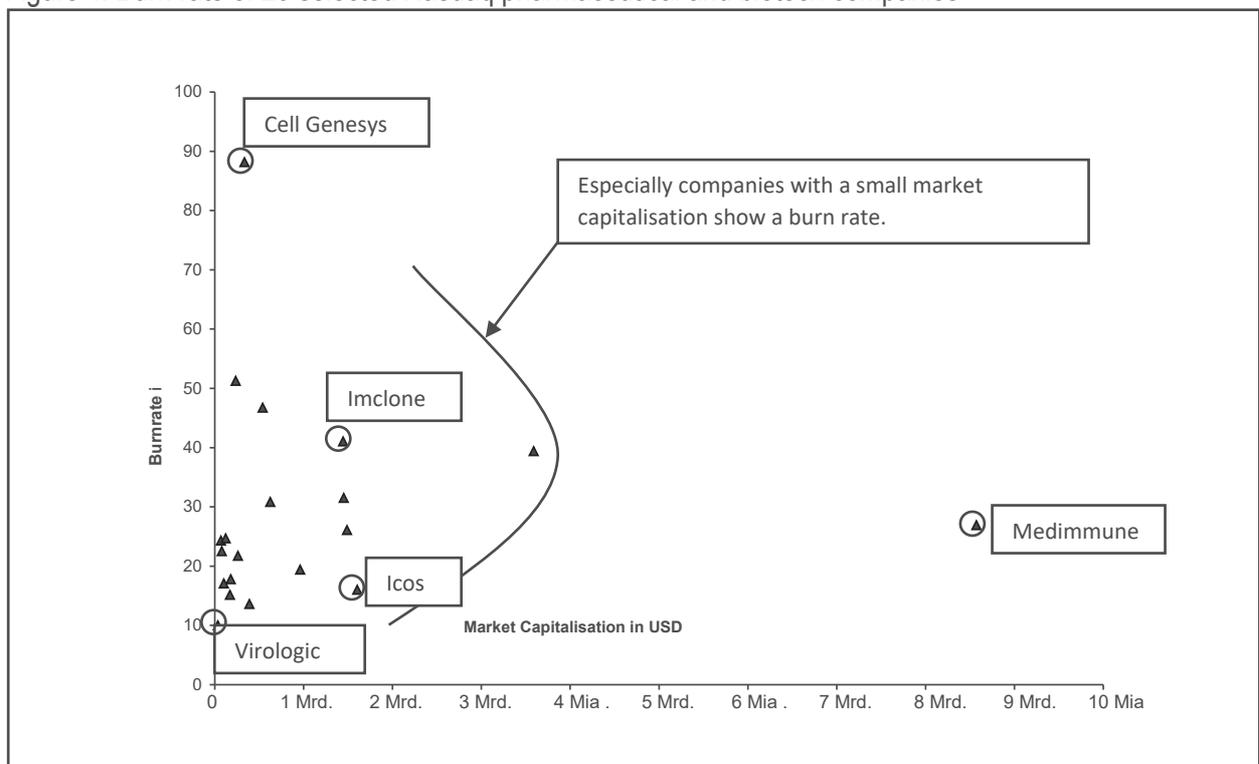
**Burn rate:** Many growth companies invest in rapid growth and generate losses over many years. It is therefore important to know how long the company can survive with the liquid funds (current assets) still available. This is indicated by the ratio known as the burn rate, which calculates the speed at which the capital is 'burned' (Pohl, 2001). In any case, the burn rate should be greater than 12 months so that there is sufficient time to raise capital (see Figure 4).

Figure 3: Return on total cash flow of 43 selected Nasdaq companies



Source: Own, 2019

Figure 4: Burn rate of 20 selected Nasdaq pharmaceutical and biotech companies

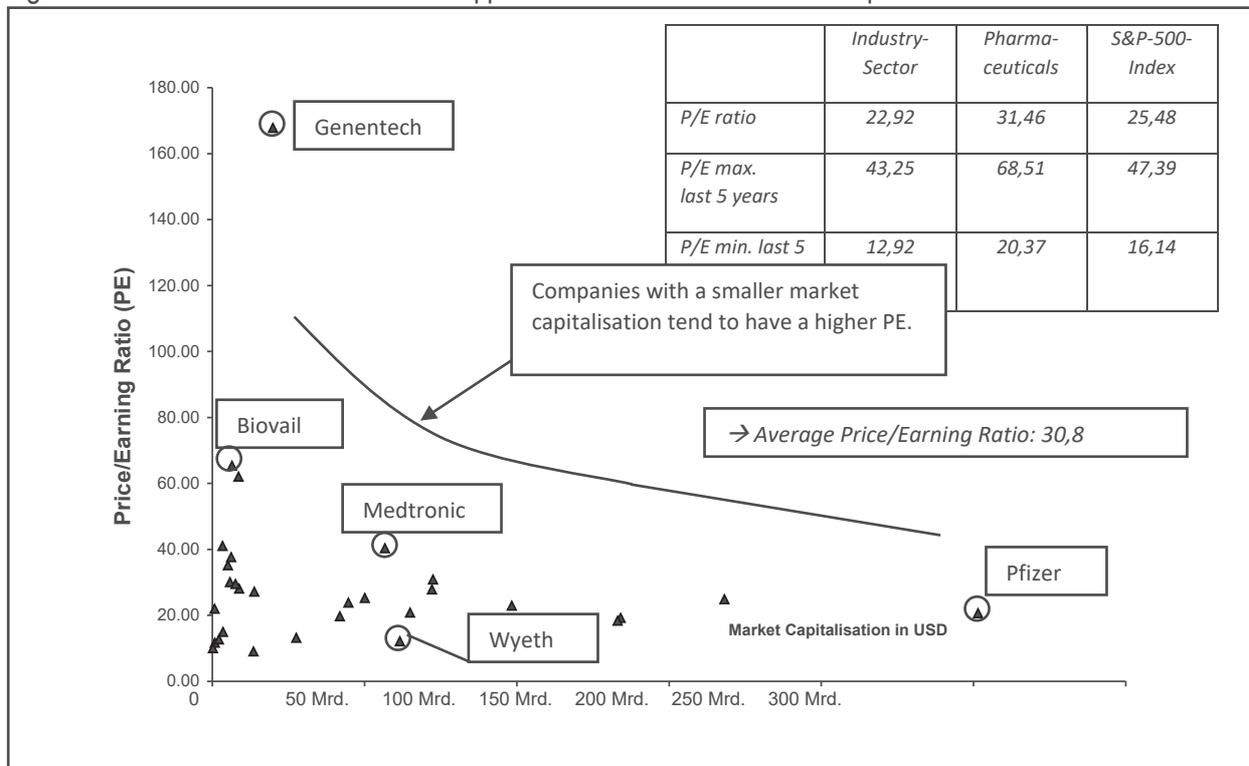


Source: Own, 2019

The **Price/Earning Ratio (PE)** is the ratio of the price of a share to the net profit attributable to these shares. For this purpose, the total net profit of the Company must be converted to the total number of shares held by the public. The price-earnings ratio shows the multiple of the net profit for the period

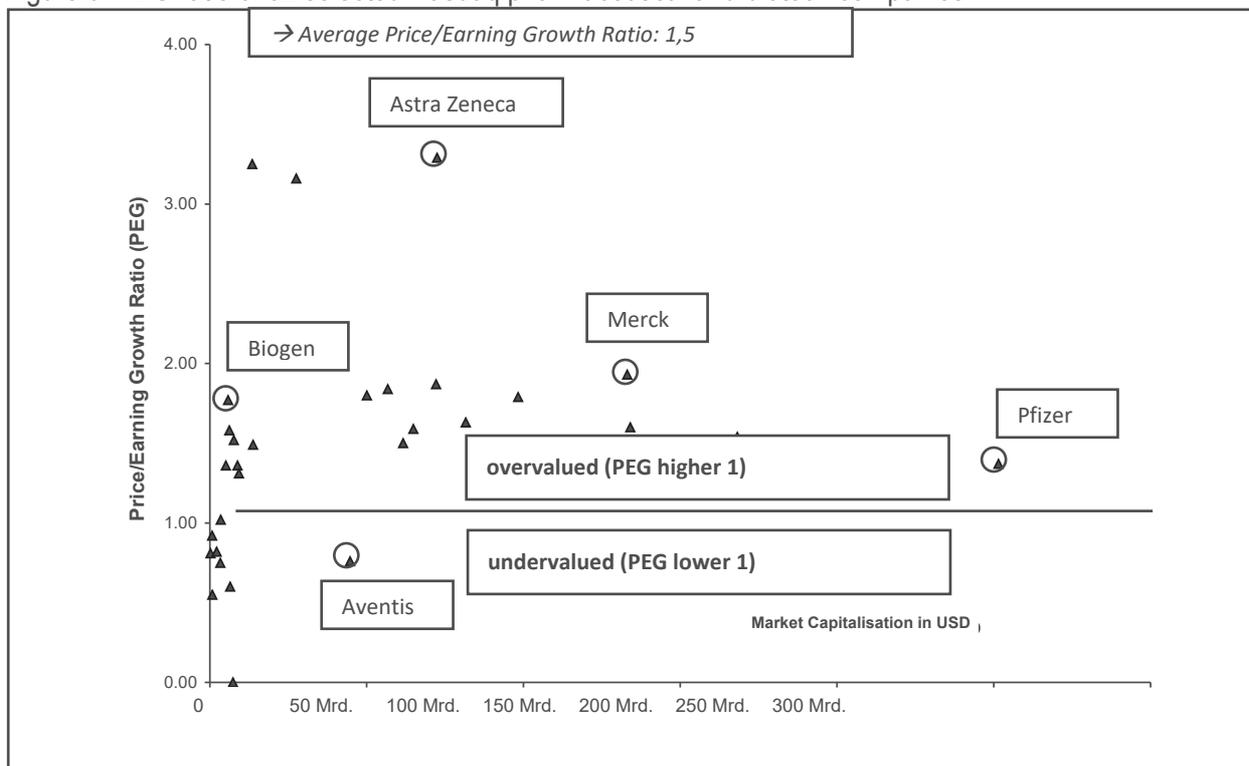
at which a share is valued. The lower the PE, the more advantageous the share appears. The value only becomes meaningful through a comparison with the PE of other shares. The PE of an individual share should not be significantly higher than that of its competitors (Fischbach, 2002) (see Figure 5).

Figure 5: PE ratio of 30 selected Nasdaq pharmaceutical and biotech companies



Source: Own, 2019

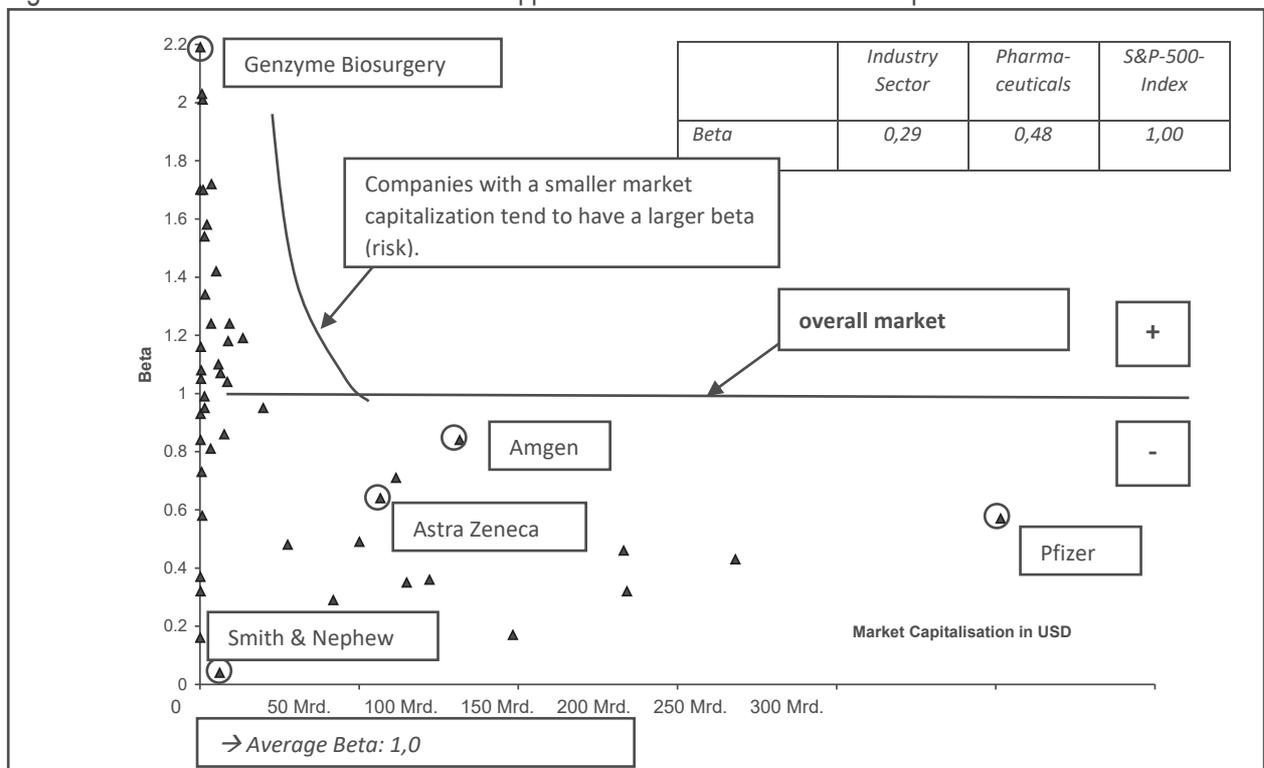
Figure 6: PEG ratio of 32 selected Nasdaq pharmaceutical and biotech companies



Source: Own, 2019

The **Price/Earning Ratio (PE)** is based on past gains. However, the profits in the future are of interest. This is taken into account by calculating the PE on an estimated future profit to give the **Price/Earning Growth Ratio (PEG)**, which is related to the PE ratio. The PE is related to the **Compounded Annual Growth Rate (CAGR)**. A company is considered to be fairly valued if this ratio is one to one and the PE and CAGR are equal. A PEG of well over 2:3 is very high. If, on the other hand, the PEG is less than one, the share is considered undervalued and the share has the potential for a higher valuation on the market. However, in the event of a slump in profits and in sectors that contain very heterogeneous companies, the valuation according to the PEG fails (see Figure 6). The **beta factor** (the beta) shows the fluctuation of the share price (volatility) compared to the overall market and is therefore a measure of the individual company risk. This key figure shows how the price of a share moves in relation to the price development of the overall market. If the beta factor equals one, the share price behaves exactly the same as the index, i.e., the overall market. If the beta factor is greater than one, the share price moves more strongly than the market. A stock with a beta of 1.1 outperforms the index by 10%. If the beta factor is less than one, the share price is less volatile than the market. Such shares are called sluggish values (see Figure 7).

Figure 7: Beta values of 44 selected Nasdaq pharmaceutical and biotech companies



Source: Own, 2019

## 5. COOPERATIONS TO SEIZE MARKET OPPORTUNITIES

In recent years, the importance of company connections (alliances), especially within the pharmaceutical and biotechnology sector, has increased markedly and is the prerequisite for success for many companies. Access to resources such as knowledge, technology, distribution channels, production facilities and laboratories is at the forefront of such cooperation. In addition, the companies concerned can better represent their common interests in public authorities, politics and the public (cf. Thommen, 2016; Widmann & Seibt, 2016).

In collaborations between biotechnology companies, the partners want to reach their critical size in order to better survive on the market. The aim is to increase attractiveness for potential investors, strengthen the negotiating position vis-à-vis third parties, achieve entrepreneurial goals and achieve profitability more quickly.

This can also expand the technology and product portfolio and thus reduce the risk through diversification. Cooperation between pharmaceutical and biotechnology companies also pursues more far-reaching goals. The pharmaceutical companies gain access to innovative patent-protected or already marketed products of the biotechnology companies. In this way, a small biotechnology company gains access to the marketing and sales network of a globally active pharmaceutical partner. For large pharmaceutical companies, cooperations are an interesting alternative to their own research because they can use them to acquire specific knowledge, but only have to bear a limited financial risk. On the other hand, it is also common for a research contract to be awarded or for the partner to participate in an existing development project and thereby secure the right to exclusive marketing. The research is financed by the partner company (client) through so-called milestone payments, which are agreed at the beginning of the partnership.

## **6. APPLICATION OF THE VALUATION APPROACH IN A CASE STUDY**

In order to be able to assess the plausibility of the valuation retrospectively, an example with older data was deliberately chosen.

Biomarin Pharmaceuticals (see also [www.biomarin.com](http://www.biomarin.com)) was founded in 1996 and specializes in life-threatening diseases for which there are no current therapies. The company is characterized by its high technical capabilities.

Biomarin was listed on NASDAQ and SWX on 23rd July, 1999. The shares were already trading 20% above the issue price on the day of listing. In November the company announced the first piece of negative news. The first drug developed, Aldurazyme, was not approved by the FDA. However, this did not prevent investors from increasing the company's market capitalization and the share reached its all-time high on 3rd March, 2000. Thereafter, the company continued to decline in value, even after approval.

Below, the developed approach will be applied to the areas of corporate strategy, technology(s) employed, organization and management, financial situation and cooperation. The evaluation ends with a final conclusion.

### **6.1 Corporate strategy**

Biomarin has developed a therapy for an incurable disease and has no competition for this product. Patients and their relatives (especially parents) will be very active in ensuring that this drug is administered. Biomarin has set the price for the therapy at a level comparable to other life-saving drugs. In recent years, a discussion has slowly begun as to whether these costs are actually justified. This discussion is, of course, only conducted cautiously for the time being, since the person with critical comments (or the paying health insurance company) does not want to be pilloried as a 'rationer' of life-saving drugs. It can be predicted that this discussion will be conducted more intensively in the medium term. This could mean that in the future the company might receive less revenue than planned.

Biomarin's strategy is mainly based on a technological focus, which leads to a neglect of the other parameters that are also important for successful corporate management. In this case, these were various misjudgements regarding the approval procedure by the authorities and errors in communication with the capital markets.

The strategic orientation focuses mainly on (a) enzyme therapies, (b) life-threatening (and rare) diseases, and (c) a selection of submarkets and market segments that have no or inadequate therapeutic methods. Biomarin's strategic goal was to achieve orphan drug status for the drug Aldurazyme. This status has both advantages and disadvantages. It protects the company with the product from the competition (for seven years in the USA and for 10 years in Europe). However, the company is obliged to immediately publish all relevant facts relating to this drug, which involves a great deal of additional effort and could lead to negative reactions. Another disadvantage is that this status does not include an exemption or abbreviation of the approval procedure. This is highly relevant as orphan drugs are approved for a very small market. In concrete terms, this means that the fixed costs of authorization are allocated to small sales.

In summary, the following can be said with regard to the 'corporate strategy' parameter for Biomarín: the economic environment is very positive. This is underpinned by the fact that the competition is unable to develop Biomarín's market (orphan drug status). A small deduction must be made with regard to the risk of a possible price reduction. All in all, there are many indications that the company will be able to implement the chosen strategy. The market development is likely to run in parallel with the market development of the pharmaceutical market.

## **6.2 Technology(s)**

The focus of the technologies is on securing enzyme replacement therapies. The missing enzyme is supplied to the patients by infusions. It causes significant improvements in the area of the joints (stiffening decreases), a reduction in the size of the liver and spleen and has a positive effect on breathing-pauses during sleep. The problem, however, is overcoming the blood-brain barrier so an effect on the central nervous system is still questionable. The enzyme is produced by cell culture in large reactors under optimal growth conditions. The entire production process is extremely complex and can be studied in detail on Biomarín's website.

The weekly treatment is administered to the patients intravenously. The expenditure of time and resources is an essential factor. Biomarín aims to achieve sales of around USD 147,000 per patient per year, which is a significant sum and will attract many health policy makers. Based on these factors, it can be estimated that the introduction of such a drug, although life-saving, will take some time.

On 17th November, 1999, the FDA announced that Aldurazyme would not receive approval for the time being. Biomarín's management had originally assumed that a single clinical trial with only 10 patients would be sufficient for approval. This was not the case and the FDA requested additional testing. Biomarín filed a total of 122 patents in 2003, all of which are still pending. Of these 122 patents, three relating to the drug Aldurazyme are referred to as core patents.

With regard to Biomarín's technologies, the manufacturing process is relatively complex and involves high fixed costs. For a small number of patients (3,400 patients; market size USD 500 million), treatment is costly and time-consuming. However, the drug is classified as life-saving. The FDA's approval was missed at the first attempt. In this context, the technology can be considered very complex and risky. The large number of patents, some of which even withstood legal proceedings, has had a positive effect.

## **6.3 Organization and management**

Biomarín replaced their CEO relatively shortly after the IPO in 1999. Frederic Price succeeded Grant Denison. Frederic Price has a good 25 years' experience in the industry and describes himself as 'implementation oriented'. According to his CV, his predecessor Grant Denison, is more the type who can start a company and accompany it through the first phase. The transition seems to make sense. The only negative aspect is the unfavourable timing. In addition, some changes were made to Biomarín's Board of Directors in 2002. Experienced people such as Elaine Heron and Vijay Samant joined the team. Operational management has also been strengthened and appears to be developing positively. The news revealed in the 2002 annual report that production costs could be reduced by around 70% can be seen as an indicator for the 'growing up' of Biomarín. This means that both operational and strategic factors appear to be appropriately weighted. On the negative side, there are occasional announcements that are not followed through? Of course, this also had consequences with regard to the promised sales and profit thresholds.

With regard to the Organization and Management parameter, it can be said that the company appears to be positively managed and has a 'hands-on' management team. Consequently, for the reasons mentioned above, both operational and strategic management can be considered positive.

## **6.4 Financial situation**

Biomarín's balance sheet can be described as very solid. As of 31st December, 2003, the company had approximately USD 206 million in cash and cash equivalents. This will last for some time as the first product was launched in the fourth quarter of 2003 and was well received. However, the cash outflow of approximately USD 25 million per quarter should be monitored.

Biomarin's success is expected to be driven by the launch of Aldurazyme. In the final quarter of 2003, this product generated sales of approximately 7 million Swiss francs. Sales in the previous quarter (third quarter 2003) were approximately 4 million Swiss francs. These figures must be seen in relation to the outlook: Biomarin estimated the sales potential of Aldurazyme at approximately USD 500 million some time ago. This is calculated from the number of patients (approximately 3,400) and the above-mentioned treatment costs (USD 147,000 per patient per year). In purely arithmetical terms, this results in potential sales of USD 499.8 million. The estimate shows that about 70% of all patients can be reached in about seven years. This would correspond to a turnover of USD 350 million in 2010. Of these, approximately 10 to 15% should be achieved in the first year (2004), which corresponds to sales of 35 to 52 million USD for Aldurazymes in 2004. It is important to bear in mind that Biomarin has to share half of its sales and half of its profit with Genzyme for its main product, Aldurazyme. This has to be considered, as both companies often mention the total turnover (or profit) of Aldurazyme in their communication.

Biomarin raised USD 87 million in new capital at the beginning of 2002. This can be interpreted as a sign of confidence on the part of the investor group involved. At the end of December 2003, the company held USD 206 million in cash and short-term deposits. A further financing round does not seem necessary at the moment.

The enterprise value is estimated on the basis of expected sales. As has already been shown, Aldurazyme can be expected to generate sales of around USD 500 million in the best case scenario, while the estimate for 2010 is now USD 350 million. Furthermore, it is assumed that in 2010 a successful biotechnology company will be valued at six times its current turnover (market capitalization). This would correspond to a value of USD 2.1 billion. This value can be discounted at an interest rate of 15%, resulting in a value of USD 680 million. However, Biomarin accounts for only 50% of this, as the other half has to be accounted for by Genzyme. This results in an enterprise value of USD 340 million in relation to Aldurazyme.

Biomarin also has a new drug in phase III, i.e., shortly before approval. This drug treats mucopolysaccharidoses, and is very similar to Aldurazyme. According to the company, this drug is expected to increase sales by around 20 to 25%. This means that around USD 80 million can be added to the 340 calculated. This gives USD 420 million as the most realistic estimate. Other medicines are at a very early stage of development and therefore cannot be included in the calculation. Biomarin is estimated to have a market capitalization of just over USD 400 million. Market capitalization, as mentioned above, is approximately USD 390 million.

With regard to the financial situation, the following conclusion is drawn: financially, the company is on a healthy footing. The equity ratio can be assessed as good. With regard to the PEG, it is expected that the communicated targets can be achieved, but no positive surprises can be expected. The beta factor is calculated at 0.85, which is a good value. The consideration of the company size shows a market capitalization of the company of approximately USD 390 million. With regard to the market capitalization/enterprise value ratio, the first sales will not be booked until 2003. Therefore, it does not make sense to relate these to market capitalization.

### **6.5 Cooperation with partner companies**

Biomarin cooperates with Genzyme for the entire distribution (a joint venture with each partner holding half of the profits) with half of the profits being shared. Genzyme has experience in this challenging field (enzyme therapy) and can therefore competently handle the marketing. The physical distribution is carried out by Accredo Health and TheraCom, both of which are already active for Genzyme.

A summarized assessment of the cooperation parameter is as follows: Genzyme is a suitable partner. For the other products under development, a partner should be sought. Overall, the cooperation parameter is positive.

## **DISCUSSION, AND THEORETICAL AND PRACTICAL CONTRIBUTION**

This example of a company valuation refers to data from 2003. Using the valuation methodology developed, a comparison can be made between current data and 2016 data from Biomarin.

Five evaluation criteria are evaluated. These include the corporate strategy, the technology(s) used, organization and management, the company's financial situation and existing cooperation. Currently, the following picture emerges.

With regard to the corporate strategy, it can be stated that Biomarin's strategy has developed very positively.

The strategy now focuses on the growth and acquisition of technologies through acquisitions. The company is now also generating considerable earnings as a result. The acquisitions have enabled the company to acquire new products, technologies and patents. Further potential active ingredients could be generated in the development. As in 2003, Biomarin's current core business is the sale and research of enzyme replacement therapies (ERTs). Biomarin is the first company to provide therapeutics for mucopolysaccharidosis type I (MPS I) by producing laronidase (Aldurazyme, distributed by Genzyme Corporation). Biomarin is also the first company to provide phenylketonuria (PKU) therapeutics. The company now has operations in the United States, South America, Asia and Europe.

Biomarin has been able to leverage its technological potential. On the one hand, the company has successfully developed and marketed the substance Aldurazyme (orphan drug status has now expired) and another four preparations (Kuvan, Naglazyme, Firdapse, Vimizim). On the other hand, further promising new active ingredients are now being developed.

Due to the impressive performance of Biomarin, the parameter organization and management can still be rated as good.

The financial situation of Biomarin has also developed in the meantime, as shown by a further evaluation. The PEG (Price/Earning Growth Ratio) is -2.39 (five years). The negative value shows that the company has been unable to make a profit in recent years and points to an unhealthy financial situation. The PE (Price/Earning Ratio) is -26.34. This appears to be relatively fair. The beta factor has increased from 0.85 to 1.96 (230%), making it relatively volatile compared to the overall index. The company has now reached an average market capitalization of USD 14 billion. Despite a turnover of USD 997 million (in 2016), the company has an operating result of USD -717 million with equity of USD 2.47 billion. This results in a return on equity of -22.8 % and an equity ratio of 24%. The company does not generate a profit (profitability -47.6%). This means that costs are significantly higher (especially for R&D and marketing) than revenues. This results in a burn rate of 3.4 years. In general, the financial situation is still not particularly pleasing. A participation would therefore be either strategic or speculative in nature.

As far as cooperation with other companies is concerned, Biomarin has made a number of acquisitions in recent years and has thus been able to expand its cooperation and corporate relationships. The company acquired Huxley Pharmaceuticals in 2009 and LEAD Therapeutics in 2010. This acquisition was followed by the acquisition of ZyStor Therapeutics and in 2012 they acquired Zacharon Pharmaceuticals. In 2014, Biomarin acquired a histone deacetylase inhibitor chemical library from Repligen. Overall, the company is attempting to secure market growth through comprehensive acquisitions.

In conclusion, it can be stated that Biomarin has developed in line with the valuation. In this individual case, the methodology presented represents a suitable instrument for a well-founded company valuation. Due to the combination of multiple key figures, the presented approach derives more reliable valuation results. For potential investors as well as business partners, a reliable company valuation is essential. It needs to be noted that due fact that besides of financial data (quantitative), additional (qualitative) information are included, the outcome of the valuation is rather qualitative than quantitative. The presented valuation methodology of growth companies focuses on pharmaceutical and biotech companies. However, as long as business data are available, any company within the technology sector (also non pharmaceutical) can be valued using this approach.

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