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**The Insulin Pen by Novo Nordisk –
A Disruptive Innovation in the Treatment of Diabetes**

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Physical inactivity and obesity are increasing rapidly in the world's population. Due to this fact, diabetes mellitus has become a globally widespread chronic disease with a huge impact on national health care systems and individual lives (cf. WHO I 2013). Because of its complexity and numerous possible complications it affects most aspects of everyday life of the patients. In 2008, 347 million people worldwide had diabetes and the World Health Organization predicts diabetes to become the seventh leading cause of death in 2030 (WHO II 2013).

Regarding therapy of this chronic disease, multiple intensive insulin therapy is required frequently (cf. Hyllested-Winge/Jensen/Rex 2013: 644). This implies the patients have to self-administer “multiple daily injections of short- and intermediate-/ long-acting preparations” (ibid.) of insulin to control and handle their disease, so they are able to self-manage their diabetes and to act independently.

In 1985, Novo, a Danish company in the pharmaceutical sector (later to become Novo Nordisk after merging with Nordisk), launched the first insulin pen: NovoPen (cf. ibid.). As this insulin pen appears to have changed the management of diabetes essentially, this text will discuss whether it is a disruptive innovation and the strategies of Novo Nordisk in 1985 and today. Therefore, the following question will be assessed in this essay: Why is the insulin pen a disruptive innovation and what was the strategy of Novo Nordisk in 1985 and how does Novo Nordisk operate today?

A disruptive innovation?

To begin with, I will explain why the insulin pen is a disruptive innovation: It makes a process simpler and more convenient for the patients: The insulin pen is quicker and easier to handle than syringe and vial (the conventional way of injecting insulin), because it combines syringe and vial in one device. Regarding less technically talented patients, the process of injecting insulin is easier because they are able to dose the amount of insulin *and* to inject it with this single device. While drawing insulin into the syringe from the vial in the conventional way, it is hard to dose the amount of insulin accurately. When using the pen, scales attached to it simplify accuracy of dosage. On

top of that, the insulin pen enhances flexibility of use while it is portable and therefore easier to use while you are on the way. Furthermore, the insulin pen is more discreet than syringe and vial and the patients are able to use it in public in a discreet way. While at first commercialized in an insignificant market, the insulin pen disrupted the established industry of conventional therapy. Today, most patients prefer this device. The NovoPen enabled a new market to emerge: the market of insulin pens. Novo Nordisk succeeded with their new product and grew larger, today it has become one of the largest pharmaceutical companies in the world (cf. NY Times 2013).

Novo Nordisk's strategy in 1985

How did Novo Nordisk manage to become this successful with the production of insulin pens? How did this certain company revolutionize the market of diabetic self-management? Back in 1985, nobody knew whether the NovoPen would become 'a top or a flop'. Other companies such as the world's leading insulin manufacturer at that time, Eli Lilly, rather concentrated on creating pure human insulin (cf. Christensen 2000: 224-225), why did Novo Nordisk develop the NovoPen and why was it successful with its strategy?

Christensen states in his book about disruptive innovations that Eli Lilly "had spent enormous capital and organizational energy overshooting the market's demand for product purity" (ibid.). Only a few diabetic patients could not tolerate insulin from animals because of a resistance in their immune system. As pure human insulin by Eli Lilly was more expensive than insulin extracted from animals, most patients did not want it and were satisfied with insulin of animal extraction, so Eli Lilly overshot the market's demand for pure human insulin and did not succeed with its new product (cf. ibid.). To develop disruptive innovations, companies have to listen to the problems and needs of their customers. They have to detect where there are difficulties for the customers and figure out how to solve them. In 1985, most diabetic patients used syringes and vials to inject insulin on a daily basis. In my opinion, Novo Nordisk simply considered the problems and needs of the patients: The syringe was difficult to use due to insufficient accuracy of dosage etc. However, Novo Nordisk developed a way to simplify this process for the customer by combining syringe and vial in one device that can be easily used, the NovoPen. According to Christensen, Novo Nordisk succeeded

with this new product and “increased its share of the worldwide insulin market substantially – and profitably” (ibid.) through the years.

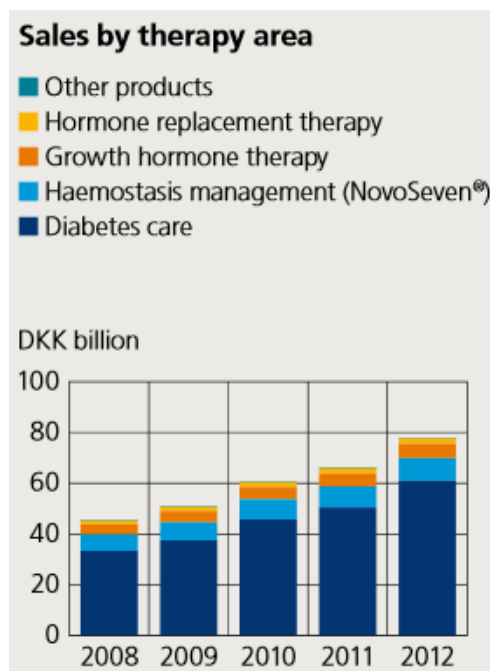
To learn more about the current market situation of Novo Nordisk and the development of this company, I will now go into detail about the company today and their strategies after giving a brief overview of the historical background of Novo Nordisk.

Historical Background and the Novo Nordisk Foundation today

Whereas the Nordisk Insulinlaboratorium was founded in 1923, the Novo Therapeutisk Laboratorium was founded in 1925. In the next years, both companies launched different types of insulins and in 1985, as I have already mentioned above, the Novo company introduced the NovoPen onto the market (cf. Novo Nordisk I 2013). Later in 1989 both companies merged to become the Novo Nordisk Foundation. In the following years, the company expanded its range of products by also launching medication of hormone replacement therapy, growth hormone therapy and haemostasis management (cf. ibid).

Figure 1: Sales by Therapy Area (source: Annual Report 2012

http://www.novonordisk.com/images/annual_report/2012/Novo-Nordisk-AR-2012-en.pdf)



According to the New York Times, Novo Nordisk has got a currently market capitalization of \$76.2 billion and is one of the largest pharmaceutical companies in the

world (cf. NY Times 2013). In comparison to other pharmaceutical companies, Novo Nordisk “has shown strong growth with a three-year annualized change of 33.72 % in its operating profit margin” (ibid.).

In the Annual Report of 2012, it is shown that from 2008 until 2012 sales of Novo Nordisk have increased. In addition, sales in the diabetic care business segment strongly outweigh their sales in the biopharmaceuticals business segment (see figure 1; cf. Novo Nordisk II 2013). Furthermore, Novo Nordisk sells its products internationally in North America, Europe, China, Japan and Korea with 35.154 employees and the ownership of more than 70 subsidiaries (cf. NY Times 2013).

Their business model/ strategy today

Considering Novo Nordisk’s business strategy, the company addressed an additional target group by launching an insulin pen for children, the NovoPen Echo, three years ago. This pen has got a memory function and is designed especially for diabetic children (cf. Novo Nordisk I 2013). Besides, their marketing strategy includes corporations with celebrities, for instance with the popular chef Paula Deen who promoted their medication ‘Victoza’ (cf. Moskin 2012).

Figure 2: Novo Nordisk’s Business Philosophy: The Triple Bottom Line (source: http://www.novonordisk.com/about_us/default.asp)



Furthermore, their business philosophy gives the customer the impression that with every decision they take, they are taking into account their model of “The Triple Bottom Line” (see figure 2): Every decision is considered from three different perspectives, whether it is “financially, socially and environmentally responsible” (Novo Nordisk III

2013). In addition, the patients are positioned in the center of their work. Since it is not proven that hormone replacement therapy is effective for postmenopausal women and some clinical trials even suggest this form of therapy may be harmful for the women's health, this statement does not appear to be convincing. In my opinion, such a large and successful company rather bears in mind financial considerations than social responsibility. On top of that, journalists of the New York Times accused Novo Nordisk in 2006 of paying pharmacists and doctor's assistants "to encourage switches from Lilly products or Novo's own lower priced versions to higher-priced ones" (Harris/Pear 2006). According to "federal anti-kickback statutes", drug companies are not allowed to offer financial incentives (cf. *ibid.*). The authors describe these actions of Novo Nordisk as "efforts companies will undertake to become No. 1 in a drug market, especially for chronic diseases like diabetes" (*ibid.*). I think it is alarming which methods companies use to earn the greatest possible amount of money, particularly because they emphasize in their company's philosophy to always keep in mind social responsibility and the patients themselves.

To conclude, the development of the insulin pen has changed the treatment of diabetes essentially. The administration of the multiple insulin injecting therapy and its convenience have improved a lot for the diabetic patients. The Novo Nordisk Foundation responded to the needs of the patients and simplified their possibilities to self-manage their disease via launching the NovoPen. However, the methods and strategies a company uses to successfully stay in business have to be considered critically.

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