

## Changing diabetes in China

Since 1994, Novo Nordisk guided by our Triple Bottom Line principle has pursued a long-term business strategy in China. We have made major investments in strengthening the healthcare system, establishing local presence across the value chain and building strong relations with local stakeholders. Today, Novo Nordisk is the leading player in the insulin market in terms of market share and reputation.

KNOWLEDGE  
SOCIETY  
**HEALTH**  
TOGETHER

GUIZHAN HAN  
China  
Guishan Han has type 2 diabetes

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This report on changing diabetes in China assesses the business and societal value of three aspects of Novo Nordisk market entry strategy: physician training, patient education and local production. The Blueprint for Change demonstrates that our focus on building the market for the long-term has created significant value for Novo Nordisk, as well as the Chinese society by reducing the personal and economic burden of diabetes. Lastly, this Blueprint for Change explores challenges ahead.

# the challenge

## China faces growing diabetes burden

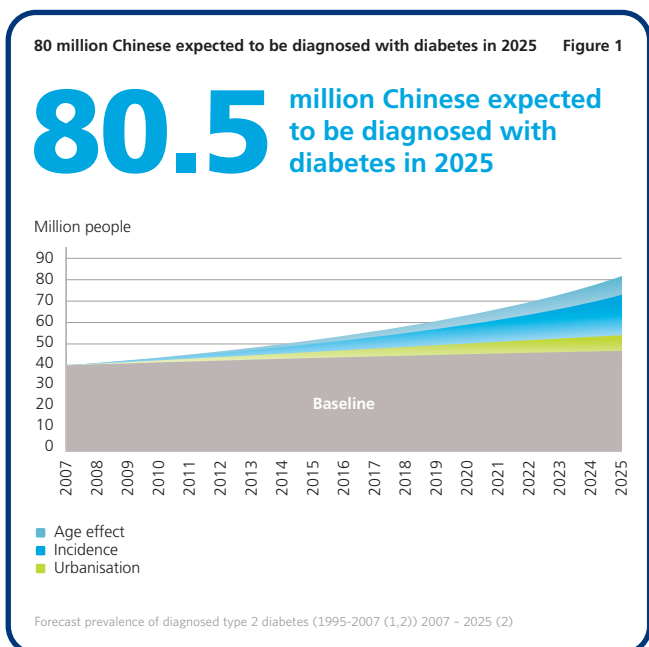
China is one of the fastest-growing economies in the world and registered a 6% increase in the human development index (HDI) from 2000 to 2007 (1). The Chinese rise in the HDI is a result of growing GDP per capita, increased life expectancy and a higher average level of education. This development is accompanied by an increase in lifestyle related chronic disease. Diabetes poses a growing social, educational and economic challenge for the Chinese society and the people and families affected by diabetes. An estimated 40 million people in China have type 2 diabetes in 2010, a number expected to reach 80 million over the next 15 years (Figure 1). Urbanisation, high calorie diets and physical inactivity are all lifestyle related factors known to cause diabetes (2).

The growth of diabetes is so serious that health care systems will soon be struggling to cope. Increasing childhood obesity in China is to diabetes and chronic diseases what melting glaciers are to climate change: a warning signal of times to come.



Chronic diseases such as diabetes and hypertension are becoming public health challenges.

Chen Zhu, Chinese Health Minister



1. Anonymous. Human Development Report 2010 - 20th Anniversary. 2010 2010.  
2. Yang W. Diabetes, the hidden pandemic and its impact on China. 2009;1:28.

## novo nordisk's approach

### Early entry, long-term commitment, local presence

Novo Nordisk is among the first pharmaceutical companies to demonstrate a long term commitment to enhancing diabetes treatment and care in China. We have been present in China for nearly 50 years (Figure 2), and in 1994, at a time of great turbulence in China, we intensified our focus and established an affiliate with the long term goal of changing diabetes in China by improving the availability, accessibility and quality of care in the country.

We pursued a holistic strategy that went beyond business as usual – provision of new innovative treatments and services – by also focusing on physician training, patient education, strengthening the healthcare system, public awareness, local production and R&D.

In 1995, we opened our first production site, a packaging facility, in Tianjin. In 2002, we were the first pharmaceutical company to open a biopharmaceutical R&D centre in China. In 2006, the production of our durable insulin device NovoPen®3 was transferred from Denmark to Tianjin, and 2009 saw the complete transfer of all NovoPen® production, including the successor, NovoPen®4. In 2008, we began construction of a new high-tech insulin filling plant in Tianjin, which will begin producing Penfill® for the Chinese market in 2012. By 2015, the total ramp up will be completed, supplying the entire Chinese market.



The decision to focus on changing diabetes in China and continue to build support of the market during turbulent times was about balancing short term risks to the business with our long term commitment to changing diabetes.

Ron Christie, General Manager, Novo Nordisk China



Our targets in China were to strengthen the health care system, to build the understanding of diabetes, and to make a profit. We believed a holistic approach, combining public awareness, physician training and patient education was the right business approach to deal with diabetes in cooperation with the Chinese authorities. Even our most optimistic business forecasts could not have predicted the success we had with this strategy.

Thorkil K. Christensen, VP Asia Pacific (1989-2000)  
and General Manager China (2001-2003)

## Strengthening health care systems

In the early 1990's and for the next decade, the Chinese diabetes community experienced a lack of focus on diabetes by pharmaceutical companies. Physicians and specialists identified long-term access to the best products and services as the most important factor enabling them to improve diabetes treatment and care.

In 1994, China had limited services and institutions to provide the necessary physician training and patient education (3). To fill this gap, we invested in community programs focusing on diabetes prevention. Later, we invested in a National Diabetes Program, including several public-private initiatives developed and executed in partnership with the World Diabetes Foundation and the Chinese Ministry of Health. The largest project, involving the World Diabetes Foundation and the Chinese government, was initiated in 2002 with a focus on developing diabetes guidelines, training and health system integration (4).

## Effective diabetes management requires more than good medicines

Effective diabetes management requires the availability of high quality medicines, clinics, trained doctors and nurses, as well as training of patients to competently manage their condition. For a person with diabetes, proper use requires education on managing the balance between diet, blood glucose response, prescribed treatment and daily life activities.

Timeline of Novo Nordisk's commitment to changing diabetes in China

Figure 2



3. Nielsen OK. Interview with Thorkil Kristensen, former General Manager, Novo Nordisk China. 2010.

4. Anonymous. National Diabetes programme WDF02-036 (China). Available at: <http://www.worlddiabetesfoundation.org/composite-119.htm>. Accessed 12/21/2010, 2010.

# value creation

## 63% market share, 14,600 jobs and 140,000 life years saved

Looking at 2005 to 2010, our approach to – and investments in – the Chinese market created significant value for the Chinese society and Novo Nordisk.

Today, China is the third biggest market in Novo Nordisk’s business and the second largest insulin market. In 2010, we realised a 63% market share and sales of DKK 4,500 million (Figure 3), and insulin sales by volume of 12,000 mega units (Figure 4). Our long-term commitment to changing diabetes in China has built trust and our reputation among physicians while strengthening the relationship with key government agencies. Our goal is to be perceived as the world’s leading diabetes care company, leading the fight against diabetes type 1 and type 2. The trendline has been positive and stable compared to competition, and increasing among diabetes specialists (Figure 5).

Looking at the societal value generated, we contributed to the increase in GDP per capita by providing 14,600 direct and indirect jobs (Figure 6). The direct jobs consist of jobs in sales, education, production and R&D, reflecting the commitment to establish a strong local presence across our value chain.

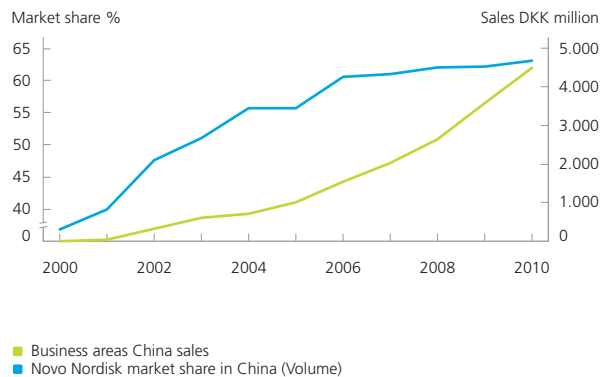
The improved products and services provided saved 140,000 life years as of 2010 (Figure 7), a number growing annually by 30%. This increase is a result of improved products, increased physician training and greater patient education. Saving 140,000 life years is equal to every individual in the Danish city of Odense – or the Hong Kong new town Tin Shui Wai – living one year longer.

In the following value cases, we zoom in on three specific initiatives characteristic of our long-term business strategy for China: physician training, patient education and local production.

Novo Nordisk sales and insulin market share

Figure 3

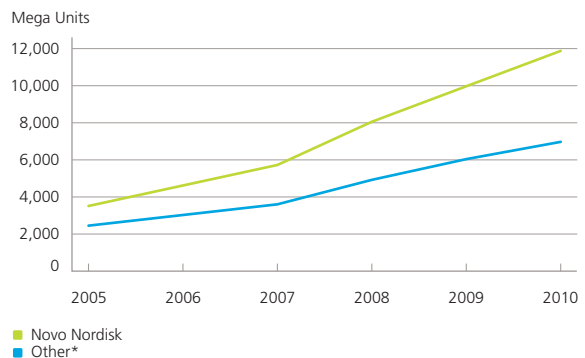
**63%** Insulin market share reached in 2010



Our share of the volume of insulin sold in China is increasing

Figure 4

**12,000** Mega Units insulin sold in China in 2010



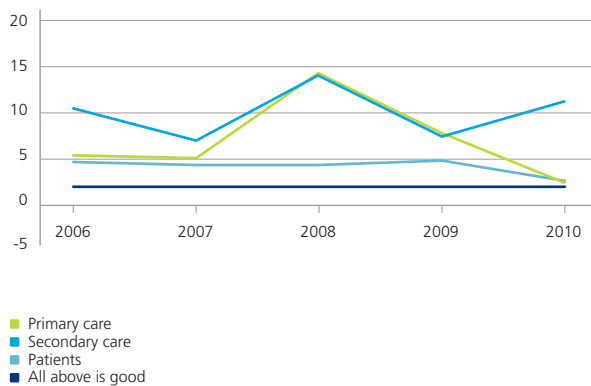
Source: IMS, other is a measure of total insulin sales from competitors. The IMS data covers 50% of the Chinese market, but is the best available public data

Novo Nordisk recognised as the world leader in the fight against diabetes in China

Figure 5

**No. 1** Physicians and patients rate Novo Nordisk higher than peers

Average brand goal development

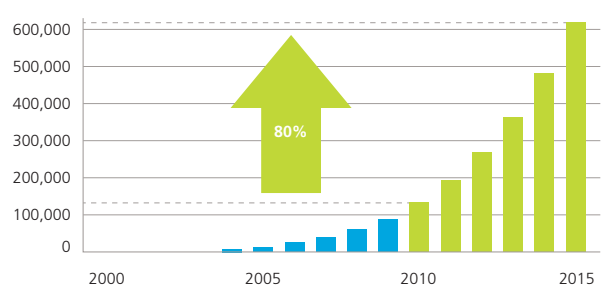


Improved products and services make patients live longer

Figure 7

**80%** extra lifeyears because of improved products and services in 2015

Lifeyears



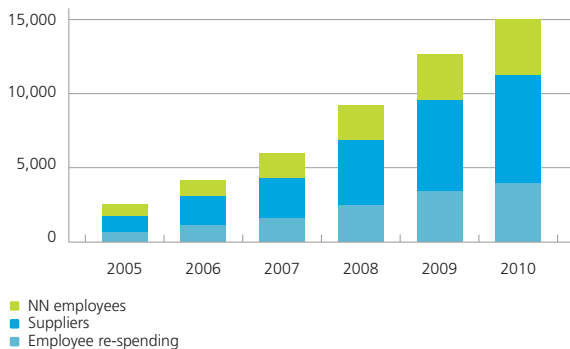
Henriksen et al., 2011 (8)

Number of direct and indirect jobs created by Novo Nordisk in China

Figure 6

**15,000** jobs created by Novo Nordisk in China

Number of jobs



The life years saved estimate was based on four CORE model (7) simulations.

The number of patients treated, and the mix of human and modern insulin sold in China was assessed using a method developed by Henriksen et al., 2011 (8).

The number of derived jobs is based on the Chinese national accounts and illustrates the direct and indirect jobs created by re-spending and suppliers. The job creation is calculated by job category, where production workers create more indirect jobs than sales persons.

7. Palmer AJ, Roze S, Valentine WJ, Minshall ME, Foos V, Lurati FM, et al. The CORE Diabetes Model: Projecting long-term clinical outcomes, costs and cost-effectiveness of interventions in diabetes mellitus (types 1 and 2) to support clinical and reimbursement decision-making *Curr Med Res Opin* 2004 Aug;20 Suppl 1:S5-26.  
8. Henriksen O, Jain P, Nielsen OK. New model to assess the lifeyears saved by having access to modern Novo Nordisk insulin in China from 2000-2015. ISPOR, Baltimore, MD, USA 2011.

# physician training

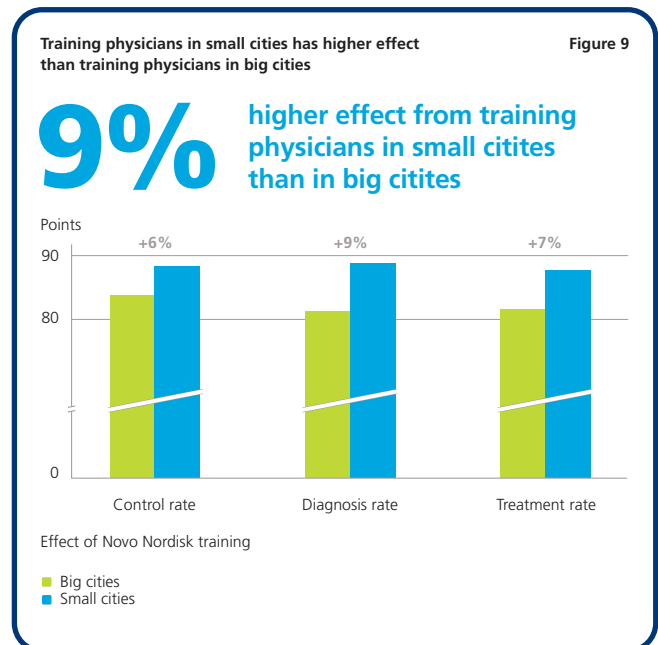
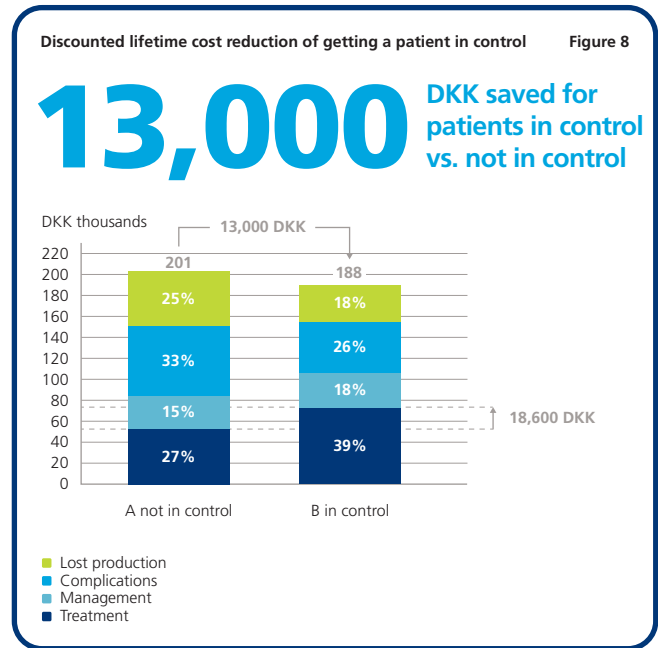
## Training saves billions on healthcare budgets and increases sales

Since 2003, we have facilitated training of physicians with focus on prevention, screening, optimising treatment and patient communication. Specific initiatives included targeted training days where key opinion leaders have educated physicians. We were the first to establish partnerships with the Ministry of Health and The World Diabetes foundation. Until 2010 we have formed six such partnership projects. We have promoted diabetes awareness with the Changing Diabetes Bus, and held Novo Nordisk Diabetes Update congresses where international key opinion leaders have been in dialogue with key Chinese physicians and diabetes specialists. In total we have been facilitating more than 220,000 physician training sessions. According to a market analysis by Marketview conducted in November 2010 (5), each physician in the survey had participated in four training sessions on average, indicating that a total of 55,000 physicians were trained in diabetes management. On average, each of these physicians treats 230 diabetes patients annually.

The physicians who responded to the survey rated training facilitated by Novo Nordisk as a significant contributor to bringing patients in control. Getting a patient in control saves society total lifetime costs of DKK 13,000, while it increases the lifetime insulin sales per patient (discounted lifetime sales) by DKK 18,600 (Figure 8) (2).

The trained physicians responded that 35% of their patients were in control, meaning that each physician had an average of 79 patients in control. Multiplying the numbers shows a DKK 56 billion reduction in diabetes related societal costs (discounted lifetime cost of treatment). It is not possible to directly attribute the total societal saving to the training facilitated by us, but it can be noted that a study from 2007 showed that 26% of patients were in control (6). Therefore, we argue that some of the value derived by training physicians can be associated with the input provided by us.

We conduct training in smaller cities as well as in big cities. Physicians in the smaller cities rate the effect of training higher than physicians in larger cities (Figure 9). Medical updates by the pharmaceutical industry provide important on the job training, keeping the medical community informed about the latest medicinal breakthroughs. In China, such updates normally only target doctors in the bigger cities, which may explain this finding.



The analysis of the health economic impact of physician training was based on (2).

2. Yang W. Diabetes, the hidden pandemic and its impact on China. 2009;1:28.

5. Anonymous. Report of training effects on physician of endocrine departments in China. 2010.

6. Pan C, Yang W, Jia W, Weng J, Tian H. Management of Chinese patients with type 2 diabetes, 1998-2006: the Diabcare-China surveys Curr Med Res Opin 2009 Jan;25(1):39-45.



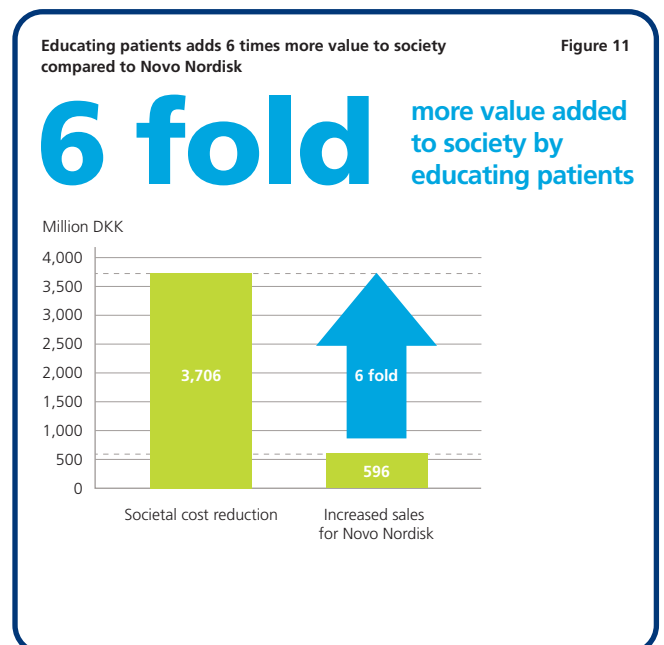
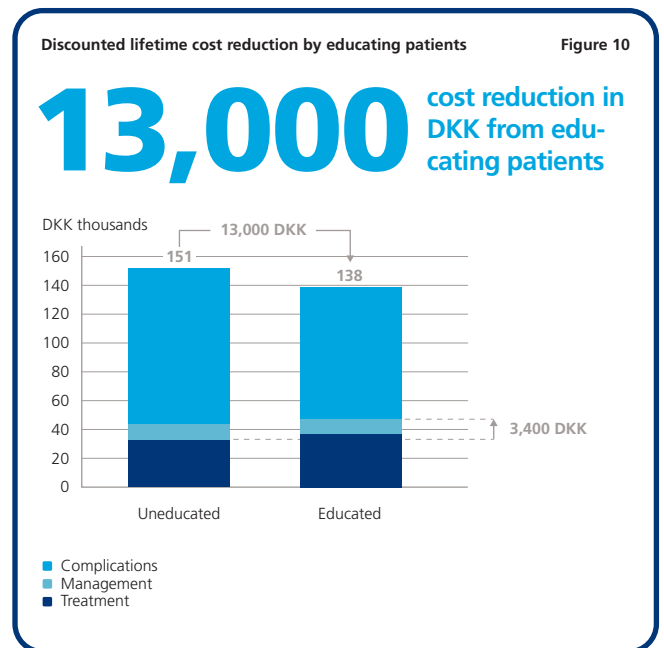
# patient education

## Education provides value to society and business

Since 1997, we have operated several education programmes in China to support patients in using our medicines optimally, but also to facilitate lifestyle changes and prevention. Our first program was the NovoCare telephone hotline, where diabetics could directly communicate with trained diabetes management specialists. The Novo Care education is a unique program running under the Novo Care club with more than 300.000 members. The changing diabetes bus both promote awareness of diabetes, but gives feedback to already diagnosed diabetics locally and facilitates local education initiatives. The initiatives mentioned, and the unique partnership between the World Diabetes foundation, the Ministry of health and selected key opinion leaders have since educated 280,000 patients – 145,000 directly and 135,000 indirectly.

From a business perspective, the upside of patient education is an increase in total sales per patient (discounted lifetime sales) by DKK 3,400 (Figure 10) (9). Assuming a 62% market share, the total extra lifetime sales would be DKK 596 million. The lifetime cost of an educated patient to society would be reduced by 13,000 DKK compared to a patient not educated. Based on the 280,000 educated patients, patient education is estimated to contribute DKK 3.7 billion in lifetime societal savings (discounted lifetime cost of treatment). Based on the figures regarding lifetime societal savings and increased life-time sales per patient and assuming a constant market share, educating patients provides six times more value to society than to us (Figure 11).

The health economic analysis of educating patients was based on a CORE model application (9).



9. Henriksen O, Jain P, Nielsen OK. Changing diabetes in China: Cost-effective patient education. ISPOR, Baltimore, MD, USA, 2011.

# local production

## Improved production efficiency, stable supply and stronger relations

To secure a steady future supply of high quality insulin, local production is important. It supports appropriate diabetes care, while providing jobs and stimulating economic development. Furthermore, local production has strengthened relations with critical stakeholders and increased our share of voice.

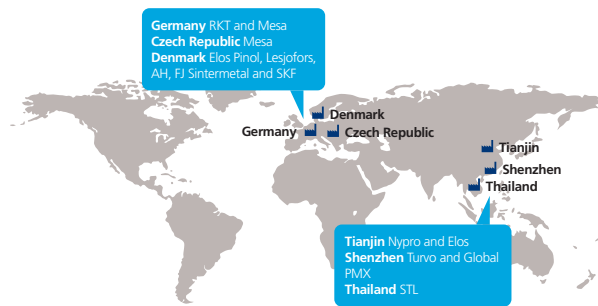
Establishing production in China with the latest “State of the art factory” has enabled us to gain production efficiencies and by being close to our customers we can respond quicker to market demand. In addition, local production mitigates future regulatory risk and ensures our license to operate.

Establishing production in China compared to other countries is more CO<sub>2</sub> intensive, as energy sources are based on coal. Therefore, initiatives to reduce CO<sub>2</sub> are increasingly urgent. Energy efficient production also mitigates future CO<sub>2</sub> compliance costs. The carbon footprint of the products sold on the Chinese market was reduced by optimising production, producing locally, and using localised suppliers. Our existing production facility in Tianjin and the new filling plant under construction have both optimised production. In terms of environmental impact, the new factory is established with the target of a 20% improvement in CO<sub>2</sub> emissions, energy efficiency and waste performance compared to the current best in class Novo Nordisk production facility in Brazil, while also decreasing the construction and running costs of the plant. The energy efficiency projects at the existing Tianjin plant will provide a reduction of 10,000 tons of CO<sub>2</sub> from 2007 to 2015. The new filling plant will save 5,200 tons of CO<sub>2</sub> per year by 2012. Local production of PenFills® saves 30 grams of CO<sub>2</sub> per PenFill in import transportation – accumulated CO<sub>2</sub> savings from 2012 to 2018 will total 25,000 tons. Localising suppliers for Novopen®4 reduced transport distances by a factor of 6 (49,000 km) (Figure 12); the distance saved is significant and would be equal to sending one NovoPen® to the sun 290 times\*. The carbon footprint reduction would be of a factor 13 for a pen sold in China (Figure 13). Energy efficient production also mitigates future CO<sub>2</sub> compliance costs.

Localisation of suppliers drives reduction in transport distance of NovoPen® 4

Figure 12

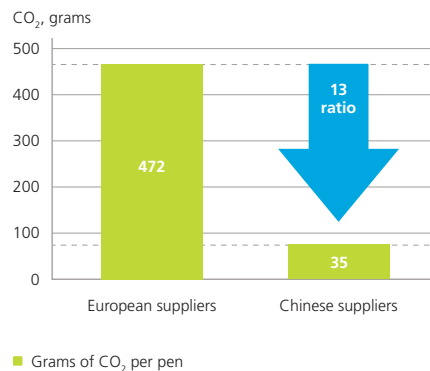
**6** times less CO<sub>2</sub> emission from reducing transportation from 59,860 to 10,050 Km.\*



Localised suppliers reduced NovoPen® 4 carbon footprint with a factor 13

Figure 13

**13** times less CO<sub>2</sub> emission by localising suppliers



\* 49860 km pr pen\*880.000 pens in 2009 / 149 \* 106 km to the sun.

Transport distance saved by localising production of the Novo-Pen® in China has been calculated as a point to point distance calculation with automated software ([www.mapcrow.info](http://www.mapcrow.info)). The software compares the travel distances of the former suppliers from their point of origin to Tianjin and the newly implemented supplier's set-up. The most important assumption is shipment aggregation, which groups components by geographic supplier proximity. Thus, 60,000 Km is a very conservative number, as all suppliers from Germany for instance were considered as one shipment from Germany.

# methodology

## Assessing value creation in China

The blueprint for changing diabetes in China is based on the holistic value creation model in Figure 14. With this model, we can assess the business and societal value of specific sustainability investments by adding the benefits of ‘maximising the upsides’ and the benefits of ‘minimising the downsides’. ‘Maximising the upsides’ includes generating revenue and intangible value such as reputation, trust, license to operate and employee engagement. ‘Minimising the downsides’ includes cost savings, efficiency gains and short- and long-term risk mitigation for business and society.

The blueprint for changing diabetes in China assesses the value of three aspects of our long-term market strategy aimed at strengthening the healthcare system and relations to key stakeholders in China: physician training, patient education and local production. Managers in our Chinese affiliate identified these three market strategy initiatives as those they believe have delivered the most value to patients, the business and Chinese society.

Five value drivers are used to assess value to business and society. A set of value measures are associated with each value driver (Figure 15).

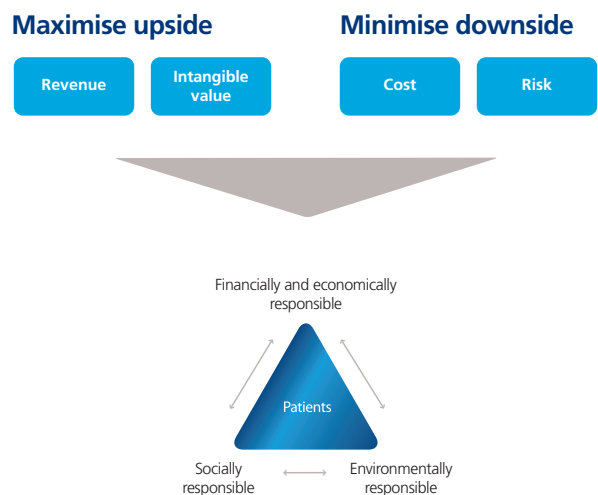
The assessment of value is based on an evaluation and selection of business initiatives, several health economic analyses, a local market analysis and an environmental analysis of our production facility in Tianjin. The study was conducted by Novo Nordisk in collaboration with Accenture. For further information on methodology, please contact Ole Kjerkegaard Nielsen.



In the longer term, earnings should be higher at a company with a favourable CSR profile. This is because the company will be better positioned to benefit from changing political, regulatory and industry regulations, taxes and trends. Other companies may not be as well positioned for these developments. In many cases, this beneficial CSR profile is not reflected in current earnings or price forecasts. Therefore, as an investor I am keen to invest in companies with favourable CSR profiles in order to capture the potential upside.

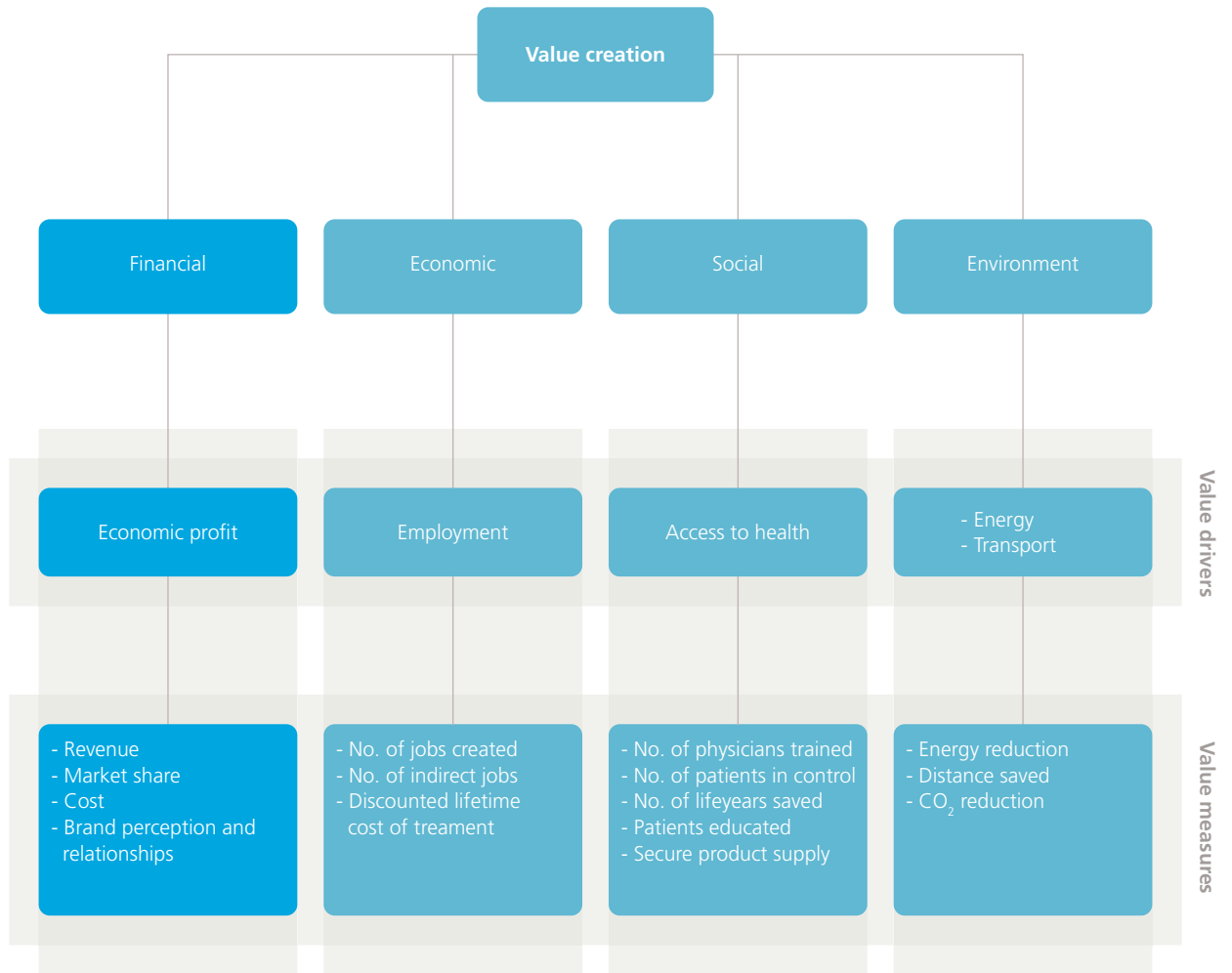
Colin Purdie, ESG investor, Aviva investors

Triple Bottom Line investments create value by maximising the upsides and minimising the downsides Figure 14



Four dimensions of business and societal value have been assessed

Figure 15



■ Novo Nordisk benefits  
■ Societal benefits

## challenges ahead

With a leading position comes great responsibility and expectations – and fierce competition and price pressure

- How do we sustain our position in the Chinese market, balancing short term revenue and cost concerns with long term value creation for business and the Chinese society?
- We want to change diabetes in other emerging markets – to what degree can the approach in China be copied as a proxy?
- To what degree is a green approach the way forward on the Chinese market?
- Can ethical behaviour move from being compliance driven to driving business value in developing markets?
- What should we do to create more value for our future customers?

## about Blueprint for Change

By definition, a blueprint is a guide or plan that gives instructions about how to build or create a new structure. Based on a common methodology, the Novo Nordisk Blueprint for Change programme aims to assess and communicate how our Triple Bottom Line business principle delivers value to business and society. The programme seeks to explore aspects of our approach to sustainability and related value creation that:

- Exceed, or seek to exceed traditional challenges of incremental improvement, compliance and accountability.
- Drive, or have potential to drive genuine market transformation through innovative partnerships, products and practices.
- Deliver ethical robustness and transparency throughout the value chain, or are en route to doing so.

We are not aiming to present a final solution. Rather, each paper presents work in progress, while also identifying key challenges ahead.

### Get in touch

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## changing diabetes

Novo Nordisk is a global healthcare company with 87 years of innovation and leadership in diabetes care. The company also has leading positions within haemophilia care, growth hormone therapy and hormone replacement therapy. Headquartered in Denmark, Novo Nordisk employs more than 30,000 employees in 76 countries, and markets its products in 179 countries. Novo Nordisk's B shares are listed on the NASDAQ OMX Copenhagen (Novo-B). Its ADRs are listed on the New York Stock Exchange (NVO).

Novo Nordisk strives to conduct its activities in a financially, environmentally and socially responsible way. The strategic commitment to corporate sustainability has brought the company onto centre stage as a leading player in today's business environment, recognised for its integrated reporting, stakeholder engagement and consistently high sustainability performance. Novo Nordisk is listed in the 2010/2011 Dow Jones Sustainability Indices with a gold class rating. For more information, visit [novonordisk.com/sustainability](http://novonordisk.com/sustainability).