

# *VibroLess*

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Delivering date: December 11, 2009

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## Prefatory Note

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This is a business plan developed in the course “*Knowledge based Entrepreneurship – 42435*”, and is developed in equal collaboration between 5 group members. The course material and the course book - *Knowledge-based Entrepreneurship (Aprill 2008)*, John Heebøll, Polyteknisk Forlag is used as the founding theory and inspiration for this business plan

We would like to thank our Nicolai Lønne for coaching and helpful guidance, as well as our teacher John Heebøll for guidance, inspiration and personal interest in our project.

## Executive Summary

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Dentists are much overlooked in the official statistics of work injuries. The main reason for this is that the typical work posture of dentists is sitting still. This work posture and the vibrant work tools do, though, lead to several inconveniences for the dentists such as headaches, pains in joints and Raynaud's Syndrome.

The primary source for vibration in dentistry is the micro motor of the dental drills. By reducing this vibration the dentists will be less exposed to work injuries caused by vibrant tools.

Vibroless is a micro motor with a special developed cabinet. This cabinet is the part of the drill, which the dentists hold while drilling. It damps the vibrations from the micro motor, and therefore improves the work environment of the dentists.

Vibroless is an alternative to the existing micro motors on the market today – only better. This entails that the dentists do not need to make big investments in order to improve their work environment just as they do not need to change their work processes when implementing Vibroless.

The dentists are a very preferable group of customers since they often own the practices they work in. Therefore an improvement in work tools such as purchasing Vibroless will affect them immediately. In this industry the buyer and the end user is in most situations the same person, which will also simplify the marketing.

# Table of Content

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<b>PREFATORY NOTE</b> .....	<b>1</b>
<b>EXECUTIVE SUMMARY</b> .....	<b>3</b>
<b>INTRODUCTION</b> .....	FEJL! BOGMÆRKE ER IKKE DEFINERET.
<b>1 THE IDEA</b> .....	<b>5</b>
<b>2 BUSINESS DESCRIPTION</b> .....	<b>6</b>
2.1 MISSION, VISION AND VALUES .....	6
2.2 THE PAIN.....	6
2.3 PRODUCT DESCRIPTION .....	8
2.3.1 <i>Opportunities of Development</i> .....	8
<b>3 THE MARKET</b> .....	<b>9</b>
3.1 THE DANISH MARKET .....	9
3.1.1 <i>Customers and Buying Power</i> .....	9
3.2 COMPETITORS .....	10
3.2.1 <i>Existing</i> .....	<i>Fejl! Bogmærke er ikke defineret.</i>
3.2.2 <i>Substitutes</i> .....	10
3.3 OPPORTUNITIES OF INTERNATIONAL EXPANSION .....	11
3.3.1 <i>The Italian Market</i> .....	11
3.4 PATENTING, COLLABORATION AND ISO CERTIFICATION .....	12
3.5 CONSUMER BENEFITS.....	12
3.6 BUSINESS PARTNER BENEFITS .....	13
<b>4 THE MANAGEMENT</b> .....	<b>14</b>
4.1 FUTURE TEAM MEMBERS .....	14
<b>5 THE FINANCIALS</b> .....	<b>15</b>
5.1 PRICE.....	16
5.2 SALARIES .....	16
5.3 BUDGET ON PROFIT AND LOSS.....	16
5.4 BUDGET ON ASSETS & LIABILITIES .....	17
5.5 OWNERSHIP.....	17
<b>6 STRATEGY</b> .....	<b>18</b>
6.1 OPERATIONS STRATEGY .....	19
6.2 STRATEGY OF ENTRY .....	21
6.2.1 <i>Collaborations</i> .....	21
6.2.2 <i>Distribution</i> .....	22
6.2.3 <i>Advertising</i> .....	22
<b>7 SENSITIVITY ANALYSIS</b> .....	<b>23</b>

# 1 The Idea

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The idea derived from an event with Stardust DTU and Danfoss Polypower, where a material was presented. Ideas for the use of this material were to be generated. One of the major advantages of this material is its ability to damp and absorb vibrations. This material was presented by a group member in this course, as a source for inspiration.

Ideas concerning the stabilization of vibration from different kinds of motors were put to the table, but a wish for solving a specific problem helped confining the ideas. From an early research phase two main industries were identified: dentistry and construction. The research showed that the vibrations, dentists were exposed to, were a much overlooked problem – overlooked by developers of dental tools as well as the *Danish Dental Association*. If vibrations were reduced, this could ease the operations for both dentist and patient.

The dentists are a very specific and defined group of costumers who have very similar working routines. This means, that the costumers are easily identified, their problems tend to be the same throughout the whole group. If the product gets success locally, there is great potential of getting the word spread.

## 2 Business Description

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The company provides work environmental friendly product of high quality, and provides improvements compared to existing similar products.

### 2.1 Mission, vision and values

In our company the mission, the vision and the values are clear and well defined. Vibroless everyday carries on its activities following these issues, looking well determined and creating value to all its internal and external stakeholders.

The mission of Vibroless:

*We are a small company concentrated on a local market, producing vibration damping for tools and handles with focus on creating customer value by making ergonomically improved products*

The vision of Vibroless:

*We want to become the leader of the established industry by increasing value-creation for the customers, and developing business with long-term perspective and sustainability*

The values of Vibroless:

*Passion motivates us to do things better and generates a sense of urgency to bring the best ideas quickly to those who need them*

### 2.2 The Pain<sup>1</sup>

The motto of Vibroless is; "less vibrations, less pain!" Indeed, towards the dentists, our goal is to reduce and avoid the diseases due to vibrations related to their profession. Being in contact with vibrating tools for several years can lead to several types of injuries. Below, is presented a description of the main effect and manifestation of these diseases, which our business will try to reduce as much as possible.

The following quote is from a speech from a professor at The University Hospital in Lund about the vibrations' negative effect on dentists:

*"The groups [of dentists] exposed to vibration had significant impairments of vibrotactile sensibility, strength, and motor performance, as well as more frequent sensorineural symptoms. Among dentists there were significant associations between the vibrotactile sensibility and strength, motor performance, superficial sensibility, and sensorineural symptoms. It can be concluded that dental hygienists and dentists had a slight neuropathy, which may be associated with their exposure to high frequency vibrations, and which may be detrimental to their work performance. Thus, development of safer equipment is urgent."<sup>2</sup>*

The vibrations that occur in the dentistry are mainly the ones due to vibrant tools. These vibrations are characterized by values highly variable by the amplitude and the frequency of vibration. It is possible to

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<sup>1</sup> [www.medicocompetente.it/documenti/18/Patologia-da-vibrazioni.htm](http://www.medicocompetente.it/documenti/18/Patologia-da-vibrazioni.htm)

<sup>2</sup> G Lundborg and oth. Occupational and Environmental Medicine, Univ.Hospital, Lund.  
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1128165/>

make a general distinction between the tools on the base of their amplitude and frequency: low frequencies and high amplitudes are typical of percussion tools, while vibrations with high frequencies and low amplitudes are created by tools with rotating motions.

Vibrations are a physical factor risk for humans working. The pain is caused by the transfer of mechanical energy from the tools to the user. This transfer can be divided into two categories: *local transmission transfer*, in which the contact surface is only the hand, and *generic transmission transfer*, in which the contact surface could be all parts of the body. The first category mentioned is associated with disorders, named "hand-arm vibration syndrome" such as "The Raynaud's syndrome"<sup>3</sup>. This syndrome is the one that dentists are exposed to from vibrating tools. Clinical symptoms affect the distal extremities of the upper limbs, most often the fingers. The symptoms are numbness, tingling and decreased sensitivity in fingertips. In more advanced cases there is the appearance of the phenomenon of "white fingers": phalanges except the thumb take a color close to white and suffer of tactile insensitivity to pain and difficulty of movements.

Danish dentists are not represented on the statistics of work related injuries. Due to the very still positions and small movement of the body dentists get pains in both joints and muscles, but it is difficult to prove in a case concerning compensation. In addition this type of injury is not even defined by the Danish Board of Industrial Injuries (Arbejdsskadestyrelsen). Therefore dentists have a special interest in preventing these injuries<sup>4</sup>.

In the introductory phase of the company, contact has been made with several dentists, and the majority of these dentists were personally affected by the vibrations. As one state:

*These micro vibrations are the cause of much professional pathology. My hands suffer from this and I have to sleep every night with a tutor.*

Dr. Riccardo Della Ciana

The statements of the dentists combined with research on pain caused by vibrations confirm and verifies the target group being dentists.

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<sup>3</sup> This disease has many causes, vibrations are one of these.

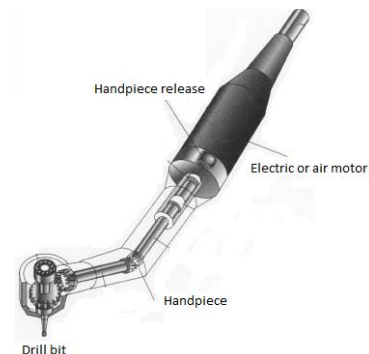
<sup>4</sup> [http://www.arbejdsmiljoviden.dk/Aktuelt/Magasinet\\_Arbejdsmiljo/Magasinoversigt/2008/09/Svaert\\_for\\_tandlaeger\\_at\\_faa\\_an\\_erkendt\\_arbejdsskader.aspx](http://www.arbejdsmiljoviden.dk/Aktuelt/Magasinet_Arbejdsmiljo/Magasinoversigt/2008/09/Svaert_for_tandlaeger_at_faa_an_erkendt_arbejdsskader.aspx)

### 3 Product Description

Dental drills consist of three main parts: a handpiece, an air turbine/motor, and a drill bit:



**Illustration 1** – Top: Micro motor; Bottom: Handpiece



**Illustration 2** – Dental Drill

Our product, Vibroless, is a new and improved micro motor, which damps vibrations created by the moving turbine. The micro motor consists of a turbine in a cabinet, to which a tube for water and a cord is attached. The production of the turbine, cord and tube is outsourced to competent suppliers. Our company assembles these parts, and small scaled Danfoss PolyPower actuators are attached between the engine and a specifically designed cabinet. Thereby vibrations caused by the driving turbine are reduced.

The Danfoss PolyPower is a special optimized material in the category of dielectric elastomer, which is polymers, whose shape is modified when a voltage is applied to them. PolyPower is also “intelligent”, as it is able to register impulses and through them damp vibrations. To perform this kind of action the material is rolled and shaped as a cylinder to act as an actuator<sup>5</sup>, which is how Vibroless exploits this multifunctional material. The reduction of vibrations will ease discomfort from drilling for both dentists and patients, as both are much affected by these vibrations. The implementation of Vibroless will additionally be very simple as one of its major advantages, besides reducing vibrations, is that no working process will be affected by a requirement. This results in no learning time and no extra investments.

As shown on the illustrations above, the handpiece is changeable, which means that different types of handpieces can be attached to the same micro motor. It is the turbine in the micro motor, which is causing the vibrations. This means that by changing only the micro motors with our new and improved product, vibrations will be damped for every type of operation using the dental drill, and will therefore only require an investment of the while, while all handpieces will be reusable.

#### 3.1.1 Opportunities of Development

The general idea of damping vibrations from a driving motor is possible to implement into other products in order to improve working conditions for other industries. A particular industry of interest to us is the construction industry. Every year 300 people are reporting work-related injuries caused by vibrations from handheld tools in the construction industry to *the National Board of Industrial Injuries* in Denmark. The direct costumer is harder to identify in this industry, where the users are no longer the investors. This means that an entry to this market will be facilitated if success is accomplished in the dental industry.

<sup>5</sup> <http://www.polypower.com>

## 4 The Market

The market of dental tools is expanding and producers are seeking new and innovative ways to optimize. Currently, competitors are many, but the first with a more effective and valuable drill will automatically have an advantage compared to its competitors. This valuable invention will also be necessary in order to penetrate the market as a new entrant, because of the close relations between dentists and their suppliers.

### 4.1 The Danish Market

The first market the product will enter is the Danish. This market has been chosen because the Danish dental market is narrow and with it we will be able to test the selling capacity of our product; thus also look at the response of our target group. The Danish dentists as a customer group have additionally been identified as beneficial.

For the purpose of expanding to markets of other countries the Italian market for dental drills as an example will be presented and finally analyzed.

#### 4.1.1 Customers and Buying Power

Our product is targeting a very specific and well defined group of costumers and our products is mainly focused on satisfying their needs, but purchasing will also result in positive benefits for our patients, as previously described. Our product will therefore strengthen the market position of our customers, the dentists, towards their customers, the patients.

From year 2006 to 2007 the total purchase by dentists have doubled and the amount has stayed the same during 2008<sup>6</sup>. This illustrates that Danish dentists have much more money to spend on their practices today:

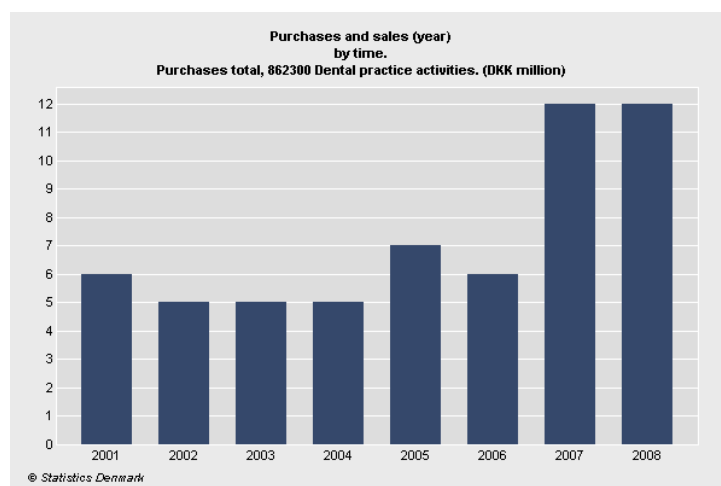


Illustration 3 – Money spent on dental drills

When analyzing the amount spent on dental drills, it is clear that this is stable from 2005 onwards while the total number of drill engines is increasing. Therefore there must be much competition on this market and the average price is decreasing as a result.

<sup>6</sup> All statistics are from <http://www.dst.dk>

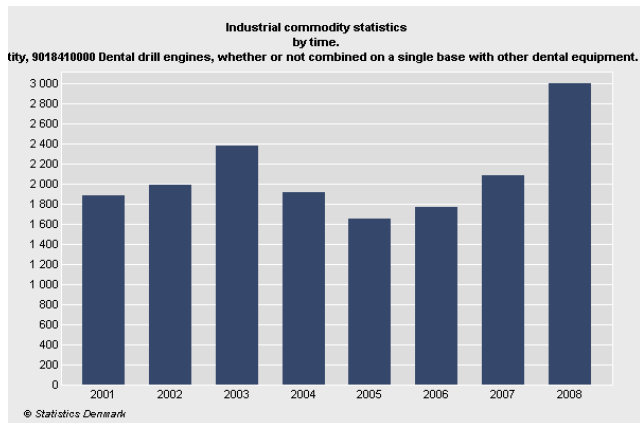


Illustration 4 – Value of Dental drill market

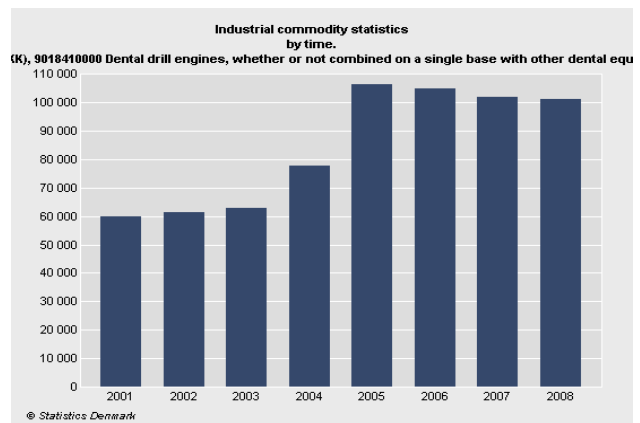


Illustration 5 - Purchases

The value of the dental drill market in Denmark is currently approximately 100.000.000 DKK, but with a differentiating product and taking into account that the dentists have doubled their power of purchase over the last three years, the potential value of the market could be even higher.

## 4.2 Competitors

As a new entrant to an already existing market with well established actors, it is necessary to investigate the primary competitors in order to understand the entry barriers.

Sirona is an American company which was bought out of Siemens in 1997. They have a revenue from sales of dental instruments of US\$73 million<sup>7</sup>. NSK is a Japanese company and is the world's leading producer in the dental instrument market, with US\$163 million sales in 2006, of which 32 % is in the European markets<sup>8</sup>. These prove that there is a large cash flow in this industry, but it is also a reminder that the market includes major actors and has high entry barriers

### 4.2.1 Substitutes

Today, development of dental tools primarily focuses on reducing pain and discomfort for the patients. One example is the technology of air-abrasion, which is exploited in the product Sandman Futura. With this product, patients are no longer met by drills, which minimizes vibrations and noise for the patients<sup>9</sup>. This product is only implemented in a smaller amount of practices nationwide.

The laser drill<sup>10</sup> is a new technology and is for now only used in one practice.

Another example of development in dental work is a robotic dental drill which should ease the process for both dentists and patients. When being introduced to the market, the product is forecast to cost about \$1000. The cost is therefore not a barrier. The problem might be the negative effect the robotic and non-personal technique will have on patients and if this will reduce or increase patients' dentophobia – the fear of dentistry<sup>11</sup>.

<sup>7</sup> <http://library.corporate-ir.net/library/88/887/88793/items/230963/annual2006.pdf>

<sup>8</sup> <http://www.nsk-nakanishi.co.jp/en/dental/company/sales/index.html>

<sup>9</sup> <http://www.sandman-dental.dk> – Air-abrasion

<sup>10</sup> <http://www.laserbor.dk> – laser drill

<sup>11</sup> <http://www.newscientist.com/article/dn7288> - Robotic drilling

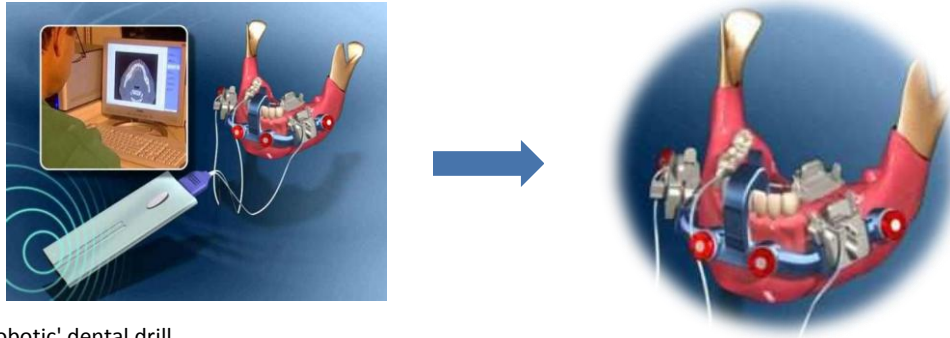


Illustration 6 - 'Robotic' dental drill

Where our product differentiates from the above mentioned is that we consider both actors of the drilling procedure: the patient *and* the dentist. It is difficult to define our products closest competitor, as the alternative products are still under development or just recently introduced to the market. It is therefore at this time reasonable to state, that the closest competitor would be the existing market supplier of dental drills, because of the similarities of usage.

### 4.3 Opportunities of International Expansion

The Danish market will be the market of entry. If our product obtains good results like expected the growth potential of the international market would be interesting. Therefore an analysis of the Italian market has been made:

#### 4.3.1 The Italian Market

The Italian production of all the professional tools and equipments produced for the studios and laboratories of dentists is the third in the world for the dimension of the gross sales, after USA and Germany, with a total economical value of 600 million of euro. The industrial dental sector is made up of almost 6.300 activities divided as follows: the productive sector, the detailed retailers and the gross retailers. Italian dental industry exports 40 – 45 % of the total volume of the production.



- purple: productive sector, 52 %
- green: detailed retailers, 30 %
- orange: gross retailers, 18 %

Illustration 7 – Italian dental sector

For what regards the Italian dentist’s activities, studies in the 2005<sup>12</sup> have revealed the existence of 34.238 activities divided as follow (due to CAN research, 2005): the small size activities are 57,69 %, the big size activities are the 3,27% and the medium size activities are 17,39%. Moreover there are activities specialized in prostheses (5.77 %) and periodontal, surgery and implantation (12.37 %)

The activities of small and medium dimension cover almost the 75% of all activities, and so it is important to mainly focus on them for our product. 90% of the total dental studios are private which means easy contact to the end user.

<sup>12</sup> [http://www.cna.it/sno/news\\_230505\\_all.doc](http://www.cna.it/sno/news_230505_all.doc)

#### 4.4 Patenting, Collaboration and ISO Certification

Intellectual property rights (IPR) include the ideas, inventions, knowledge and experiences which together form the knowledge basis of the business. Part of this basis can be protected - more or less effectively - against the plagiarism of the competitors by the use of patents.<sup>13</sup>

As Vibroless do not have a limited potential on the Danish market and as our company considers international expansion, the IPR is one of the key aspects which need to be taken into account when introducing the new product on the market. The revolutionary idea of our product is possible due to the technology developed by Danfoss Polypower. Danfoss Polypower is in a position, where they are searching for entrepreneurs to present a product which introduces their technology to the world. This fact increases our bargaining power over Danfoss as our supplier, but as Danfoss is the only supplier of this product, the power is leveled. Instead of creating a situation of competition, we want to create close collaboration, which strengthens both companies. This partnership would consist of a proviso, which ensures our right to be the only one using the technology for the purpose of damping vibrations in handheld tools.

As Vibroless is in the category of medical devices, security is of major concern, and we will strive, as soon as possible, to be certified with the ISO 13485, which represents the requirements for a quality management system, where an organization needs to demonstrate its ability to provide medical devices that consistently meet requirements and regulatory requirements applicable to medical devices<sup>14</sup>.

The impacts of vibrations transmitted to hands and arms can be evaluated through the guide lines of the international standard ISO 5349 called "Mechanical vibration – Guidelines for the measurement and the assessment of human exposure to hand-transmitted vibration".

#### 4.5 Consumer Benefits

The success of our company is based on the ability to provide our customers, the dentists, with tools which are almost free of vibrations. Our product will furthermore provide our customers with the ability to market their practice with a marketing message for their clients: "*less vibrations, less pain*". We can offer:

- *Continuous improvement*: We will through close consumer contact continuously improve our products. The improvement will be focused on every aspect of the operations, optimizing the process for both patients and dentists.
- *Less pain*: Our product will ease the pain caused by the vibrations. Our unique focus on the working condition for the dentists as well as the wellbeing of the patients is in stark contrast to our competitors whose focus primarily is on only the patients.
- *Routines*: Our products will not intervene with well established routines during operations, as our product is a redesign of the existing products.
- *Easy purchase*: Our product will be distributed through our own webpage as well as the well established Danish distributor Zenith.

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<sup>13</sup> Course book

<sup>14</sup> [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=36786](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=36786)

Our product idea has already created interesting and positive comments:

*"I found your idea really good. In our activity the most fastidious vibrations for the patient are the ones of the micro-engine. Using local anesthetic this vibration are not avoided, and moreover them are amplified by the maxillary sinuses."*

Chiara Candini, dentist of Ferrara

*"The idea looks so interesting! The problem of vibrations exists seriously in our sector. The problem exists also for the patient because the vibrations created by our rotating tools, turbines, micro engine, are transmitted to the teeth of the patient and as a consequence to the head. I think the idea has to be taken in a deep analysis."*

Giovanni Serafini, Italian dentist of Modena

#### **4.6 Business Partner Benefits**

By working with our company, our partners will participate in solving a much overlooked problem of the pain dentists are exposed to during the drilling process. The dentists are a very well defined which means that collaborating with us will mean a lot of publicity in this specific industry.

Our suppliers will get access to and become a part of a great knowledge base concerning the development of vibration dampers for handheld tools. Additionally, they will be able to promote themselves as companies, who support innovative thinking and development. At the same time, they will be involved in the expected expansion into the international dental market, as well as an expansion into the construction industry, which will make the publicity reach new levels.

## 5 The Management

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Our management is what drives this company forward into the dental market. As we are young, engaged and energetic, the motto for our management team is “Innovative and competitive”. Four different nationalities provide culture of variation and appreciation, which will be very useful when engaging in our future market strategy international expansion. This variation of culture matches our variety of skills knowledge and educations. Product development has been a great part of our education as well as management and planning introductions. Furthermore, we as a team have knowledge and skills which qualify us as a strong and innovative management team.

Each member of the management team is committed and engaged in securing the future of the company and is willing to contribute with his/her knowledge gained through our respective educational experience.

In order to achieve our company mission, management is divided as follows, according to the skills and competencies of the individual members of the team:

- Management engineers – Simone and Nikolina
  - marketing, sales, logistic, facilities and organization
- Materials engineer – Amaury
  - implement materials in production and quality issues
- Product designers – Christina and Karina
  - design, innovation, R&D and user involvement

Detailed presentation of the management team members’ background can be found in Appendix 1.

### 5.1 Future Team Members

Because of our limited experience in managing a company, a more experienced manager is to be employed in order to secure an effective strategy and its implementation. It is also necessary to engage a team member with extensive knowledge in production of dental tools, from whom we will gain knowledge from this particular industry.

## 6 The Financials

The financial part of this business plan allows estimation of which results could be obtained when launching the product with respecting to the strategies of the company. In order to do so, assumptions are made e.g. for the discounting of the unit price, and the file of Budget model from the course is used to facilitate them<sup>15</sup>.

Initial investments represent the first cash which we need to launch our company. It is calculated by separating investment in different kinds of needs, such as the expenditure for the production, both machines and tools, but also the basic equipments; as computers, software and furniture. It is important to estimate these investments by doing some "overestimation". Indeed, it is necessary ensure that this amount of money will be sufficient to cover all of our needs. These expenditures are spread over the first two quarters.

Our product is launched into four different geographical markets. As described previously the product will be introduced first to the Danish market. Sales will start after two quarters of preparation.

At the beginning of the second year, the product will enter the Italian market, as this market seems perfect for our business regarding number of possible customers and their buying power. Subsequently, the product will be introduced to the Spanish and French market. Analyses of these markets will be carried out at the time of relevance. These two markets have a lot of similarities with the Italian market so entry will not bring too many risks.

The number of possible sales is estimated by looking at the number of dentists and their buying in activity in each country. It is assumed for the three big markets that 10-15% of the dentists will be reached after the fifth working year and 20-22% of the Danish dentists. The Danish market could give better sales because Denmark is a country where the problems of health and of work environment are much considered. Our budget plan follows the "hockey-stick" form. So we have to determine at which time and with which amount we need money. Considering this market entry strategy the projections are as follows (The red curve shows the cash in hand without investments and the blue one the cash in hand after investment):

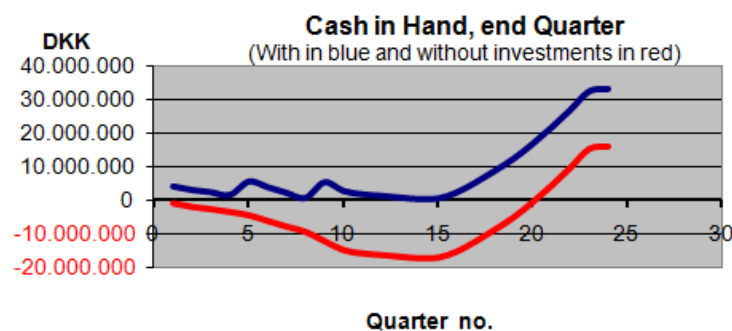


Illustration 8 – Cash in hand

When considering the money input by the investor and by the loan it appears that this budget plan is always higher than zero and that proves that the assumptions and the strategy are correlated and allow to launch the product

<sup>15</sup> The complete file is attached to the Email.

## 6.1 Price

The production costs of our product will involve the production costs of the actual motor/turbine part, as well as the actuators. Danfoss is not able to provide an exact price of the small scale actuators/inlastors, but if the price is scaled down by size and a mass order is included in the calculation, the price for 8 actuators/inlastors will be DKR<sup>16</sup>. The sales price of a micro motor depends on rpm. of the motor, and varies from 6-8.000 DKR<sup>17</sup>. This specific product will as the existing product range in the factor of rounds per minute, in order to satisfy the dentists' needs and demands, which will mean that the sales price of the product will range from 7-9.000 DKR.

## 6.2 Salaries

To determinate the quantity of the money which will be spent on salaries, the different kinds of activities of our company are divided into six categories, then we estimated the number of worker in each category that we need and finally we took a basic range of salary for each.

One department needs further explanation: The Environment and Work-Environment Department. Eventually our product will be developed and produced around the idea of sustainability and work-environmental awareness. This department will be created after two working years because at the time our sales will increase a lot and thus these issues will become more important.

## 6.3 Budget on profit and loss

This section will account for the budgeting of Vibroless. The numbers used as well as the results are attached as Appendix 2.

Revenue per employee: After 5 years the revenue per employee will reach a factor of 3. This number is good because that means the productivity is quite high. Moreover this number is increasing throughout the year, which proves an improvement of our productivity.

EBITDA: Earning before taxes; depreciation and amortization can be considered as a very good indicator of the profitability of our company. In our case, the first three years it is negative; meaning that more money is spent than earned, which is an unsustainable situation. This is the reason why we accept large personal investment, investor capital and an additional loan.

For the Net Profit / Loss we consider the ITDA and we see that our company is viable without any external liquidity after three years of work.

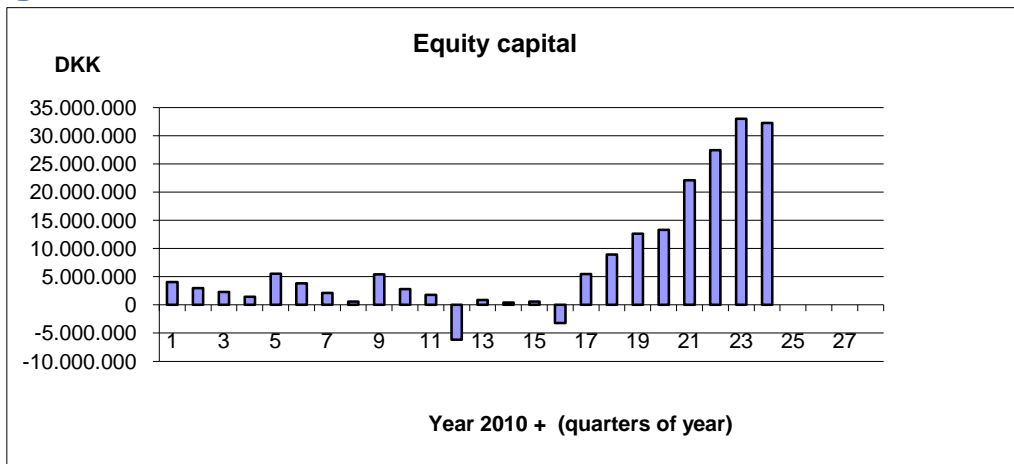
By considering that the investor holds 45% of the company, a return of investment after five years of work is equal to a factor 10. This implies that our company is a venture case. With these assumptions our project is viable.

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<sup>16</sup> <http://www.polypower.com/Products/Price-List.aspxh>

<sup>17</sup> [http://www.zenith-dental.dk/index.php?cPath=20\\_88\\_319](http://www.zenith-dental.dk/index.php?cPath=20_88_319) and [http://www.bienair.com/dental\\_home.asp](http://www.bienair.com/dental_home.asp)

### 6.4 Budget on Assets & Liabilities



The assets and the liabilities of our company are equal and with that it is possible to calculate the equity capital which corresponds to the amount of money that the investor and founders have put into this project. A positive equity capital shows the good health of our company. For two quarters the company has a negative equity capital due to the loan taken. It is therefore preferred to take a loan even if the equity capital becomes negative instead of diluting shares with a new investor.

### 6.5 Ownership

At the beginning of our project each founder will invest DKK 1,000,000. After one year a new investor will invest DKK 5,000,000 into Vibroless (with a pre-valuation of our company of DKK 6,000,000) so the founders have 55% of the shares and the investor get 45%. The discounting and division of shares are based on the founders' motivation and previous to the entrance of the new investor sales have already begun. At the beginning of the second year the company will establish a loan of DKK 7,500,000. Because sales are increasing rapidly it is possible to avoid the entrance of other investors and maintaining shares.

## 7 Strategy

To support the vision and mission of Vibroless the company has prepared a strong strategy. This strategy consists of two main components, which are Operations Strategy and the Strategy of Entry. The content of these will ensure a successful entry of Vibroless to the market together with a stable yet improvable production.

The SWOT analysis is performed in order to analyze our business in the market and to assess its future potential.

	<i>Helpful to achieving the objective</i>	<i>Harmful to achieving the objective</i>
<i>Internal Origin attributes of the Organization</i>	<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>• Damps non-ergonomic vibrations</li> <li>• Easy to implement</li> <li>• Limited production development</li> <li>• Positive feedback</li> <li>• Innovative idea</li> <li>• Management with different abilities</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>• New company, no experience</li> <li>• Similarity to existing dental drills</li> <li>• Unestablished and unknown</li> </ul>
<i>External Origin attributes of the Organisation</i>	<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>• Geographical expansion</li> <li>• New products for new industries</li> <li>• Collaborations</li> <li>• Increasing purchasing power</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>• Difficult entry of the market</li> <li>• Competitive radical technologies</li> <li>• Quantity discounts</li> </ul>

Strengths:

- Vibroless *damps non-ergonomic vibrations*, which is currently not done by existing products.
- Vibroless is *easy to implement* with current dental tools and does not change the work process of the dentists.
- Vibroless requires *limited production development* since basic manufacturing technologies are used to produce the drill and new technology should only be developed for the handle.
- As a result of the market research Vibroless has received much *positive feedback* from dentists.
- Vibroless is an *innovative idea* because of the use of Danfoss Polypower, which has never been done before.
- The company has a *management with different abilities* regarding professionalism, experience and culture.

#### Weaknesses:

- Vibroless is a *new company with no experience* in the industry.
- Vibroless' *similarity to existing dental drills* could prevent the customer from making an investment in the new product.
- Vibroless is *unestablished and unknown* on the market and among the dentists.

#### Opportunities

- Enterring the Danish dental market may lead to *geographical expansion*.
- Adjusting and redesigning Vibroless could lead to *new products for new industries* with vibrating working tools.
- *Collaborations* with the Danish Dentist Association, The Danish Association of industrial Injuries etc. could increase sales and strengthen the position of Vibroless in the market.
- The financial crisis has limited the sales in all markets. The turning point has been reached, which will result in *increasing purchasing power* of the dentists. In this situation Vibroless can be very attractive, since it is a new product with no further investments.

#### Threats

- The market of dental supplies consists of few well established manufacturers, which makes it an oligopoly. Therefore Vibroless could have a *difficult entry of the market*, since the customer already has a strong relationship to the competitors.
- *Competitive radical technologies* are also currently trying to enter the market and they may be more attractive to costumers, who are willing to make large investments.
- Competitors selling multiple tools may be able to offer *quantity discounts*, which could prevent customers from purchasing Vibroless.

Having analyzed the market the strategy of Vibroless can now be conducted.

## 7.1 Operations Strategy

Vibroless is produced by the company, which implies the need of an operations strategy. Vibroless consists of a turbine and a specially designed cabinet, which damps the vibrations from the motor. Since the core competencies of the company is to construct and produce this cabinet, the production of the turbine is outsourced to the world leading manufacturer of this product NSK. Materials for the cabinet, such as cords, tubes and metal are bought from suppliers as well. The Danfoss Polypower material is the essential part of Vibroless, which differentiate the product from its competitors. Therefore the alliance with Danfoss Polypower needs to be strong. In order to strengthen this alliance we have considered our relationship with Danfoss Polypower. According to Porter<sup>18</sup>, one of the five main forces affecting a company is the bargaining power of its suppliers. Since Vibroless is not functional without this material, Danfoss Polypower is very strong positioned. Conversely Vibroless will be the only product containing Polypower and we as a company will therefore be the only costumer. This will balance the relationship as the product launches, but as Polypower has many attributes it must be expected to be used in future products. In this future

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<sup>18</sup> Course book

scenario we will be a trusted, acknowledged customer and therefore capable of maintaining the alliance and bargaining power.

Illustration 9 illustrates the supply chain of Vibroless. The actors of the supply chain will be described in the following.

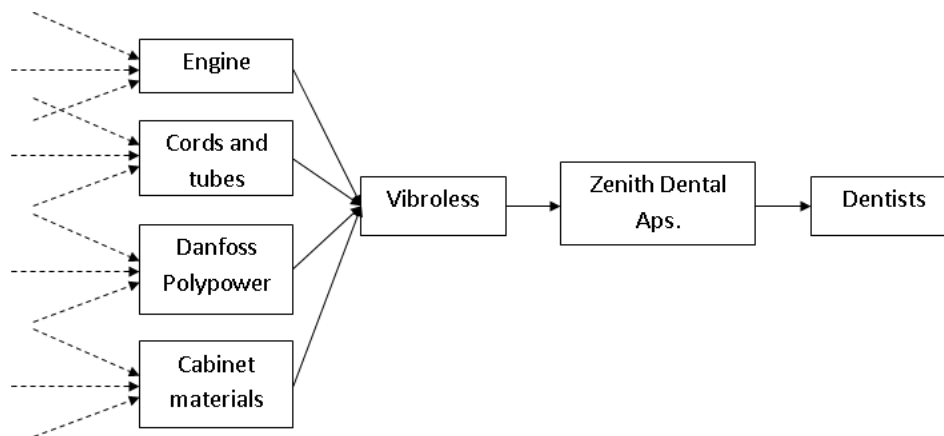
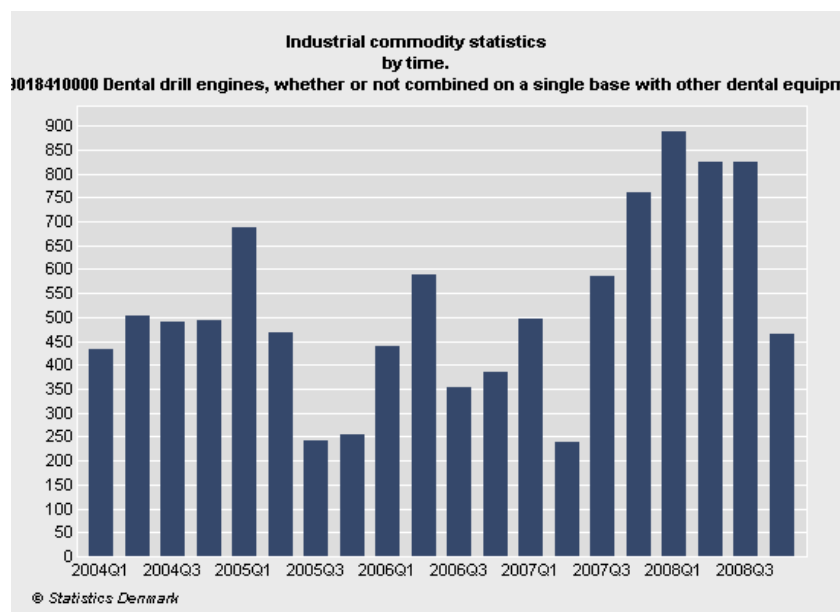


Illustration 9 – Supply Chain

When ordering materials from suppliers the company will use the Economic Ordering Quantity system. As seen in the figure, the demand for dental drills is very varied over time and the EOQ system will therefore be crucial in ensuring that the holding of materials matches the orders from customers.



The production will mainly be a push system. If the demand had been steady it would be favourable to choose a pull system, which in this situation would be more efficient and flexible, but since the kanban cards have a fixed value and the pull system is vulnerable towards changes in demand, the push system is preferred. Therefore a storage facility will be necessary. No additional investment needs to be done, though, since the inventory could be placed with the production.

If the company chooses to expand product wise, the production will need to be more flexible. In this situation a new production plan must be developed.

When the products have been produced they are distributed to Zenith Dental Aps. This company sells dental supplies directly to dentists and has a good reputation among dentists. On the website of Zenith Dental Aps. the dentists can order their supplies and get them transported to their practises. This part of the supply network will be described in more detail in the section regarding the strategy of entry.

Overall the operations strategy of Vibroless will support an effective production, which enables the company to meet the demand of the dentists.

## 7.2 Strategy of Entry

We look at the downstream part of the supply chain network when considering entry strategy, taking into account the distributor and the customer:

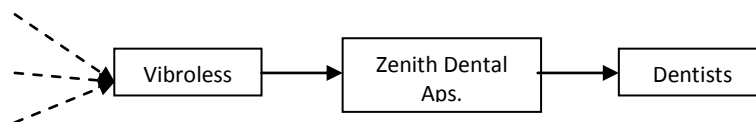


Illustration 10

The following explains our strategy of collaborations, distribution and advertising, in order to secure our entry to the market.

### 7.2.1 Collaborations

The market of dental tools is expanding and producers are seeking new and innovative ways to optimize. Currently, competitors are many, but the first with a more effective and valuable drill will automatically have an advantage compared to its competitors. This valuable invention will also be necessary in order to penetrate the market as a new entry, because of the close relations between dentists and their suppliers.

Close collaboration must be formed with several actors:

- Collaboration with Danfoss Polypower: A working relationship with the manufacturer of the technology which makes our invention possible is important in order to secure them as supplier as well as to secure that our company is the only one to use the technology to damp vibrations from motors. Additionally, the name Danfoss is very respected and recognized as a provider of solid and trustworthy product, which will help clear the way into the market.
- Collaboration with the Danish school of Dentists. This will ensure future customers, as well as a great opportunity of development based on response from the students and teachers.

Especially collaborating with the Danish Dental School will be of interest of the new company. The Danish welfare system offers public dental service until the age of 18 through the state schools. Since the Danish Dental School is also public, collaboration could lead to a contract with the Danish state.

### 7.2.2 Distribution

As a new entrepreneurial actor on the market, it is necessary to communicate our uniqueness to dentists and the distributors. Zenith Dental Aps is a Danish distributor of dental drills, and alliance with distributors is important in order to reach the costumers. Selling our product through an already established distributor will secure immediate contact to costumers compared to selling our product directly to the end costumer. This distribution strategy will also result in easy access for the costumers. There will therefore also be collaboration with Zenith Dental Aps.

### 7.2.3 Advertising

Still, it is necessary to advertise directly to the dentists to make awareness in the industry. This advertising will among others consist in participation with a stand at the annual Scandinavian Dental Fair called Scandefa, with participants from the dental industry. We will also use advertising channels like specific dentists newspaper, *Tandlægebladet*, and we will promote our idea through the Danish Dental Association as a part of the collaboration.

Additionally we plan to advertise to the patients as well, and let them know, that a visit at the dentist not necessarily means as much discomfort as it is the case now. Hopefully this will make them request our motors, when choosing a dentist.

## 8 Sensitivity Analysis

The Sensitivity Analysis will be used to examine different scenarios concerning the forecasts made regarding finance. Our investors and stakeholders may request a financial view in more scenarios, taking in account not just the planned economical development of the company but also considering pessimistic and optimistic situations.

This analysis enables us to present a true picture of the potential for gain and loss of our company. While the best case is what is hoped for, the worst case is what is needed to be prepared for. Instead of changing numbers throughout the financial model, with this unique page it is possible to “play what-if?” all in just one place.

	2010			2011	
	PESSIMISTIC	PLANNED	OPTIMISTIC	PESSIMISTIC	PLANNED
	90%	100%	105%	95%	100%
<b>Cash in</b>					
Sales	390.000	400.000	420.000	4.864.000	5.100.000
Group money	5.000.000	5.000.000	5.000.000	-	-
From investor A	-	-	-	4.750.000	5.000.000
Loan	-	-	-	7.125.000	7.500.000
<b>Cash out</b>					
Salaries	1.127.700	1.253.000	1.315.680	2.546.000	2.680.000
Rent	45.480	50.500	53.025	106.875	112.500

Illustration 11 – Extraction of Appendix 3

In the table, Appendix 3, in the value of the percentage in the red row relative to “OPTIMISTIC” and “PESSIMISTIC” can be adjusted in order to see the difference in the profit/loss. A worst situation than the one planned can take place due to unexpected effects related to financial crisis, success of competitors, breakdown of machines or other inconveniences. In this “optimistic and pessimistic” table, if the Investors want to enter their own assumptions about the business, here they can do it relatively quickly.

It is a similar situation for the optimistic scenario, in which the company can sell more than expected as a result of e.g. finding cheaper solutions for producing, distributing, advertising and for all the activities that contribute to the incomes and outcomes.

The other percentage numbers presented in the table that are possible to change refer to the depreciations. It is the reduction in the value of an asset due to usage, passage of time or others, and is usually represented by a percentage value. Our business has been planned using the value of 25%, but there can be considered other situations with different amounts of depreciation percentage.

Even If a pessimistic situation will occur, Vibroless has all the strengths to face it. In fact, in five years the company registers a big economical growth; though even in a pessimistic case of an 80 % of the planned incomings, the company will continue to register a growth satisfying its stakeholders.

## 9 Conclusion

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In a growing and competitive market such as the dentists' equipment market, it is crucial to emphasize the unique qualities, which make our product advanced to our competitors' products. As the product is similar to existing on the market and our company develops "new technology in existing product"<sup>19</sup>, the UPS (Unique Selling Proposition) needs to be very strong.

Many studies were made in order to investigate the work conditions of dentists and the occurrence of neck, shoulder and back pain and to assess the risk factors affecting them. In relation to the article "Hand-arm vibration exposure of dentists", "the vibration exposure of dentists is low determined according to European legislation. However, a long work history in dental filling and root treatment seems to be associated with the risk of frequent finger symptoms of dentists"<sup>20</sup>.

By using the new dental Vibroless, modern dentists can treat patients more quickly, more efficiently and more comfortably. Some technologies have struggled to allow dentists to make improvements to a patient's treatment by reducing or eliminating the use of drilling. The development of these new technologies has some significant disadvantages, while the new developed Vibroless will enable patients to visit the dentist without mixed feelings.

As can be seen in the section which presents the idea, after an early research phase for potential market and pain, two main industries were identified: dentistry and construction industries. Subsequently, contacting the Danish Dental Association for cooperation, no database for registered injuries among dentists was provided. That challenged us in decision making, which market to address.

As far as cost, there really will not be much difference for the patient. On the other hand, the cost for the dentist in offering an acceptable product and service is initially not quite high. But by buying the new micromotor they eliminate one of the major daily problems and over time it can prove to be a big financial benefit to the dentist. However, as can be seen from our market research in the market analyses section, for many dentists the benefits far outweigh the initial costs. An additional benefit is that the material that is used to reduce the vibrations can be implemented in various micro motors.

As a conclusion from the financial analyses, after 5 years the productivity will be quite high and will continue increasing throughout the year, which proves an improvement of our productivity. Furthermore, after three years of work, our company will be viable without any external liquidity.

All perspectives considered the new Vibroless will change the way that modern dentists operate. Introducing the new micro motor to the market will give dentists the ability to complete their work painlessly, since there is much less vibration.

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<sup>19</sup> Course book

<sup>20</sup> <http://www.springerlink.com/content/p0u4w7g862130273/>