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DENTAL IMPLANTS & PROSTHETICS MARKET *(ARTIFICIAL TEETH, DENTURES, CROWNS & BRIDGES)*

**CURRENT TRENDS, OPPORTUNITIES &
GLOBAL FORECASTS TO 2016**



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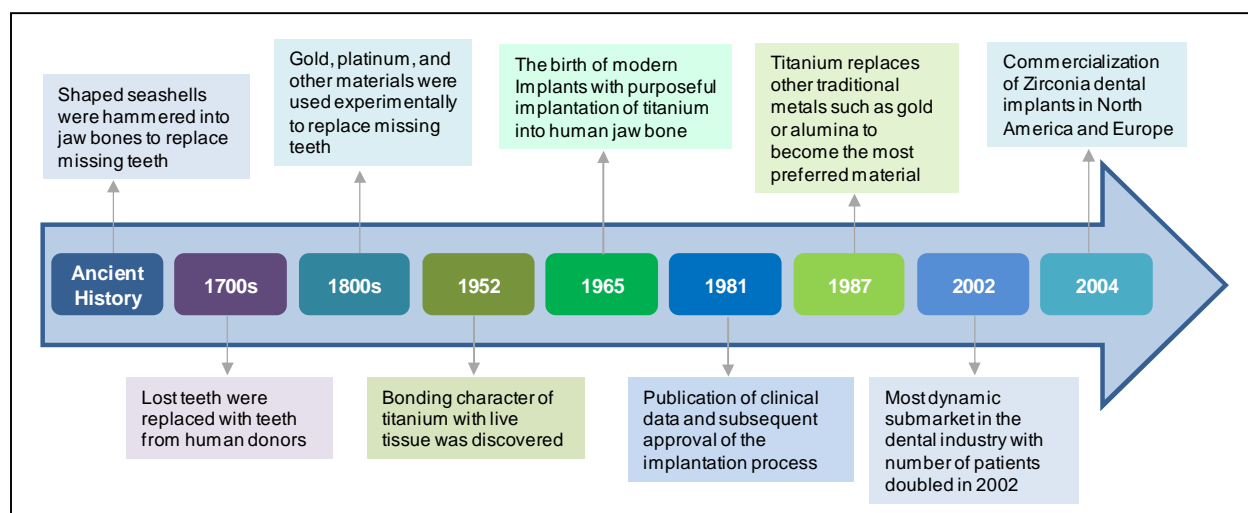
1 MARKET OVERVIEW

1.1 EVOLUTION

Although the osseointegrative property of titanium was discovered in 1952, these implants were commercialized in 1978 after acquiring the necessary regulatory approvals. Before endosseous implants made of titanium or zirconia gained popularity, sub-periosteal and transosteal implants were also used for creation of artificial dentition. However, these complicated procedures are now obsolete. Zirconia dental implants were commercially launched in Europe and North America in 2004; and mini implants are also gaining popularity partly due to their suitability for narrow jaw-bones especially for the front teeth where jaw bone is quite narrow.

FIGURE 1

EVOLUTION: DENTAL PROSTHETICS MARKET



Source: Annual reports, SEC filings, ADA, FDI World Dental Association, Expert interviews, MnM Analysis

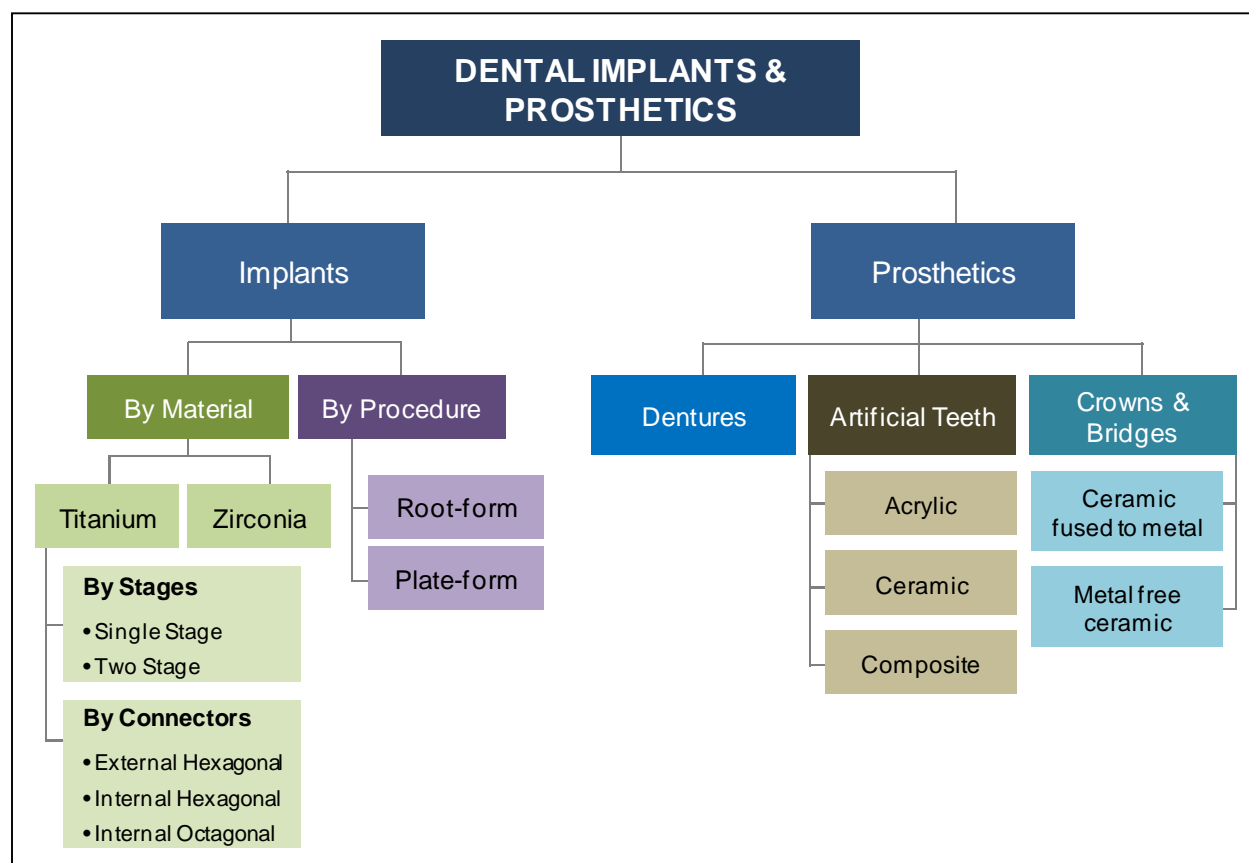
Technological shifts in cosmetic dentistry with the advent of digitized systems for designing and manufacturing prosthetics characterize the growth of dentistry in the 20th & 21st centuries.

1.2 MARKET SEGMENTATION

The dental implants & prosthetics market is mainly segmented as dental implants market and dental prosthetic market. Dental implants have been segmented on the basis of material used and procedure. Based on the material used, implants are segmented into titanium implants and zirconia implants. On the basis of procedure, they are segmented into root-form and plate-form implants.

FIGURE 2

DENTAL PROSTHETICS MARKET SEGMENTATION



Source: Annual reports, SEC filings, ADA, FDI World Dental Association, Expert interviews, MnM Analysis

Titanium implants are further classified on the basis of stages involved in surgery (single stage & two stage); and type of connectors (External Hexagonal, Internal Hexagonal, and Internal Octagonal).

Dental prosthetics is mainly categorized into three segments such as Dentures, Artificial teeth, and Crowns & Bridges. On the basis of materials used the artificial teeth market is segmented as Acrylic, Ceramic, and Composite. Crowns & Bridges are also further segmented as Ceramic fused to metal crowns & bridges, and metal free ceramic crowns & bridges.

1.3 MARKET DYNAMICS

The major factors influencing growth of the global dental implants & prosthetics market are the increase in life expectancy across the globe and the rising demand for cosmetic dentistry and dental prosthetics worldwide across all age groups. While lack of consumer awareness in developing economies may hinder market growth, industry players still have immense growth opportunities due to low penetration levels and less stringent regulations with respect to introduction of new and advanced products. Increasing insurance coverage in developed countries and rising income levels in developing nations like India and China are also expected to drive growth momentum.

1.3.1 DRIVERS

1.3.1.1 Increase in ageing population

One of the major factors influencing growth of the dental implants & prosthetics market is the increasing ageing population and life expectancy, worldwide. More than XX% of the global population by 2050 is expected to be over 60 years of age, and this population segment is significantly high in the developed countries. With increase in the percentage of population above 65 years of age, the number of individuals suffering from oral problems is also increasing. Edentulousness (toothlessness) is considerably high in the elderly population in the U.S. about XX% of the elderly population was edentulous in 2005, and merely XX% to XX% of the global edentulous population has as yet received dental implant treatment. Also, there is an increasing desire to retain all teeth, and replace the lost ones with natural-looking prostheses or implants. As a result the demand for dental implants & prosthetics used to

replace lost teeth is rising, indicating huge potential for market growth during the forecast period.

1.3.1.2 Increasing disposable incomes in developing countries

The expanding middle class population and increasing income levels in developing nations such as India, China, and Brazil having relatively high DMFT (decayed/missing/filled tooth) index are expected to boost demand for dental implants & prosthetics. In 2005, the middle class represented XX% of the total global population, and this is expected to increase to XX% by 2030. This is expected to drive growth of the dental market mainly due to the increased affordability of expensive dental procedures like implant treatment and use of prostheses such as dentures and CAD/CAM crowns & bridges. In case of countries such as China and India, the population explosion coupled with increase in the purchasing power of people has enabled them to avail high cost dental implant treatments.

1.3.1.3 Rising demand for cosmetic dentistry

With increasing disposable incomes, the willingness to undergo expensive cosmetic procedures has also increased. There is a rising trend in the demand for dental restoration solutions and also aesthetic treatments like whitening, polishing, and preventive measures. Cosmetic dentistry is witnessing rapid growth in both developing as well as developed nations due to changing lifestyles and an increased desire to retain natural teeth. Dental implantology, one of the most rapidly growing segments in the dental markets, accounts for about XX% of the overall market for cosmetic dentistry procedures. The number of cosmetic procedures conducted worldwide is expected to go up from XX million in 2010 to about XX million in 2013. The high annual growth rate of the cosmetic dentistry market (about XX%) is expected to contribute significantly to the growth of the overall dental devices, consumables, and prosthetics market.

1.3.1.4 High DMFT index & rising concerns about oral health

Decayed, Missing, Filled Teeth (DMFT) index indicates the oral health of a population at a given time, and also as an indicator for dental caries. Lower the DMFT index, better the oral health of a given region. In case of regions like North America, Europe, and the Pacific, the elderly

population as well as children (12 years old) shows moderate to high DMFT index indicating high market potential for dental preventives, implants & prosthesis products. Also, rising concerns about oral health, hygiene and high DMFT index in developing countries will also contribute to the increasing demand for oral care, implants & dental prosthetics.

1.3.1.5 Emerging markets – Relatively untapped & favorable markets for dental products

1.3.1.5.1 Growing medical & dental tourism in developing countries

Emerging economies such as Asia and Latin America have significant growth opportunities with huge untapped patient populations and growing economic prosperity. Medical tourism has propelled the growth in the dental market in these economies. In 2010, about 850,000 Americans traveled to countries such as India, Thailand, Singapore, and South Africa to undergo various health-related treatments. Around XX% of American patients and more than XX% of European patients travelled to India alone for dental treatments, in 2010.

Countries such as Thailand and Malaysia offer dental tour packages, which includes the cost of a dental treatment as well as a vacation, and is still lower than the total cost of a dental treatment incurred in U.S. and U.K. This is luring more and more Americans and Europeans to avail dental treatments in Asian countries, thereby rendering dental tourism a major source of revenue collection in the same. India is one of the cheapest options for a dental treatment where an implant costs around \$XX as compared to \$XX in the U.S. Also, in countries where advanced aesthetic products are not as popular as the west, there is a significant market potential for the introduction of aesthetically enhanced products and advanced equipments like CAD/CAM systems. Owing to the growing dental tourism, introduction and availability of newer and advanced dental products will fuel growth of this market.

1.3.2 RESTRAINTS

1.3.2.1 Lack of proper reimbursement

Dental treatments still lack proper reimbursement in many countries like Australia, Japan, and South Korea, which hinders growth of the overall dental market. In developing nations such as India, China, and Thailand, patients are not covered for expensive dental implantations by

their medical insurance policies. In case of the U.S., dental procedures like implants & crowns & bridges are partially covered or very less % of expenses is eligible for reimbursement, due to which a patient's decision to opt for a treatment is largely dependent on the affordability. Also, dentists in developing countries do not prefer installing high cost equipments of leading brands due to the high pricing; repair or using second hand instruments and devices is preferred instead. This is leading to slow growth of the market despite the increasing demand.

1.3.3 OPPORTUNITIES

1.3.3.1 Dental disorders on a rise

Dental disorders are on a rise globally due to longer life expectancy and growing elderly population. Dental caries is highly prevalent in developed countries in the aged population as well as children aged between 10-14 years. Periodontal diseases are expected to grow at the rate of XX% globally from 2012-2017. In addition, the increasing DMFT standards are also expected to fuel demand for more implantation & prosthesis, in the coming decade. In developing countries, the penetration rates for treatment devices and products is considerably low opening up avenues for market growth in these segments. Introduction of technologically advanced and innovative products in low cost but rapidly developing countries will ensure tremendous growth of the dental market.

1.3.3.2 Changing demographics

Demographics greatly influence growth of the dental market. For example, the younger population shows a high demand for orthodontic products, whereas the ageing population demonstrates high demand for tooth restoration products like dental implants, crowns, bridges, artificial teeth, and dentures. Also, products like dentures, crowns, bridges, etc. need replacement or repair after a few years as they are prone to breakage there would be more than XX million people who will demand the dental procedures for their aging dentures. This will also affect the demand for dental implants and prosthetics solutions.

1.3.3.3 Low penetration rate

The penetration level of dental implants is very low in the less developed parts of the world; penetration level of dental implants was XX% in 2010. Advanced aesthetic solutions in restorative dentistry have limited acceptance in countries like India, Brazil, and Russia, where

manufacturers can conduct extensive promotional and awareness campaigns for both dentists as well as end consumers to ensure product visibility. This indicates a huge growth potential in various segments of the overall dental market.

2 DENTAL IMPLANTS MARKET

2.1 TECHNOLOGY DEVELOPMENTS

2.1.1 NANOTECHNOLOGY BASED DENTAL IMPLANTS

TABLE 1
**DENTAL IMPLANTS MARKET VOLUME, BY GEOGRAPHY,
2009 - 2016 (THOUSAND UNITS)**

Region	2009	2010	2011	2016	CAGR % (2011-2016)
Americas	XX	XX	XX	XX	XX
Europe	XX	XX	XX	XX	XX
Asia	XX	XX	XX	XX	XX
ROW	XX	XX	XX	XX	XX
Total	XX	XX	XX	XX	XX

Source: Annual reports, SEC filings, ADA, FDI World Dental Association, Expert interviews, MnM Analysis

Europe is leading the global dental implant market with the largest share of XX%, at an estimated \$XX million in 2011; and is expected to reach \$XX million by 2016, at a CAGR of XX% from 2011 to 2016.

2.2 IMPLANTS MARKET, BY MATERIALS

The material used for an implant is of prime importance. The two common materials in dental are titanium and zirconium. Among the two types, titanium dental implants are the most prolifically used dental implants in the market and contributes XX% share of the global dental implants market, by material.

Titanium in its purest form is most suitable for osseointegration integration with body tissue and compatible with the human body in most of the cases. Along with pure titanium, different types of titanium alloys are also used in the manufacturing of the dental implants. In the recent years, use of zirconium oxide/zirconia is also gaining acceptance among the dental implant users due to its better aesthetic value compared to titanium.

Although alumina was also used on experimental basis previously but that practice is no more in use in modern dentistry.

TABLE 2

DENTAL IMPLANTS MARKET REVENUE, BY MATERIALS, 2009 - 2016 (\$MILLION)

Material	2009	2010	2011	2016	CAGR % (2011-2016)
Titanium	XX	XX	XX	XX	XX
Zirconia	XX	XX	XX	XX	XX
Total	XX	XX	XX	XX	XX

Source: Annual reports, SEC filings, ADA, FDI World Dental Association, Expert interviews, MnM Analysis

Titanium is leading the global dental implant market with the largest share of XX%, at an estimated \$XX million in 2011; and is expected to reach \$XX million by 2016, at a CAGR of XX% from 2011 to 2016.

3 DENTAL PROSTHETICS

3.1 ARTIFICIAL TEETH

Artificial teeth can be defined as synthetically manufactured teeth used to replace one or more missing teeth, usually sold in the form of a single tooth, a set of 6-8 teeth, or a full set of 16-28 teeth. Of the total number of artificial teeth produced globally, XX% teeth are used for making dentures and X% are used in dental implants. The market is segmented by materials used into –

- Acrylic resins (PMMA beads)
- Ceramics (porcelain, silicate glass, etc.)
- Composites (acrylic teeth with ceramic fillers, metal teeth with ceramic fillers, etc.)

The acrylic teeth type of artificial teeth lead the artificial teeth market by material with XX% share in 2011. Increasing number of old age population is driving the artificial teeth market.

Acrylic teeth include polymethyl methacrylate (PMMA) resin as its basic ingredient. Acrylic artificial teeth have advantages such as better strength, aesthetics, and bonding. The market for acrylic teeth is further expected to grow at a CAGR of XX%, owing primarily to the increasing ageing and edentulous population worldwide, which has boosted the demand for stronger artificial teeth with improved aesthetics.

Ceramic is a type of artificial tooth, made of ceramic which is strong and natural looking. It is also biocompatible. Ceramic tooth offer better esthetics and hence are used mainly over the front teeth.

A composite tooth is made by using two or more types of materials like ceramic and synthetic resin. These are is a tooth-colored material. Growth in the composite-based teeth segment, which involves use of acrylic resins, is also expected to drive the growth of this market.

The global artificial teeth market is valued at \$ XX million in 2010; and is estimated to reach \$XX million by 2016, growing at a CAGR of XX% from 2011 to 2016.

TABLE 3

**GLOBAL ARTIFICIAL TEETH MARKET REVENUE, BY MATERIAL,
2009 - 2016 (\$MILLION)**

Region	2009	2010	2011	2016	CAGR % (2011-2016)
Acrylic	XX	XX	XX	XX	XX
Ceramic	XX	XX	XX	XX	XX
Composite	XX	XX	XX	XX	XX
Total	XX	XX	XX	XX	XX

Source: Annual reports, SEC filings, ADA, FDI World Dental Association, Expert interviews, MnM Analysis

Acrylic teeth is leading the global artificial teeth market with largest share of XX% in 2011 and an estimated \$XX million in 2011; and is expected to reach \$XX million in 2016, at a CAGR of XX% from 2011 to 2016.

4 GEOGRAPHIC ANALYSIS

4.1 EUROPE

Europe accounts for the largest share (XXXX %) of the overall market for dental implants & prosthetics in 2011, growing at a CAGR of XX% from 2011 to 2016. The main factors driving the growth of the European dental market are the increase in the region's ageing population and also in the governmental expenditure on oral healthcare across Europe. The demand for dental care and procedures increases with increasing age, owing to a rising desire to maintain natural-looking teeth. Thus, the European market for implants, artificial teeth and dentures is expected to significantly benefit from this rise in the ageing population, which is expected to constitute XX% of the total European population by 2025. With many leading global dental manufacturers offering a wide range of artificial teeth in various forms like single tooth or sets of 6-8 teeth, full/partial dentures etc. and in various materials, the large consumer base in Europe has a variety of options to choose from, satisfying the huge demand in this region.

Increasing demand for permanent dental solutions also influences the growth of the market. Introduction of technologies such as CAD/CAM have enabled dentists to offer better dental aesthetics. Efficiency and permanent solutions provided by implant treatments have helped gain customer confidence and increased acceptance from end-users.

The dental implants & prosthetics market in Europe was estimated to be \$XXXXX million in 2011 and is expected to reach \$XXXXX million by 2016, at a CAGR of XX% from 2011 to 2016.

TABLE 4

**EUROPE: DENTAL IMPLANTS& PROSTHETICS MARKET REVENUE,
BY COUNTRY, 2009 - 2016 (\$MILLION)**

Country	2009	2010	2011	2016	CAGR % (2011-2016)
Germany	XX	XX	XX	XX	XX
France	XX	XX	XX	XX	XX
Italy	XX	XX	XX	XX	XX
Spain	XX	XX	XX	XX	XX
UK	XX	XX	XX	XX	XX
Russia	XX	XX	XX	XX	XX
ROE	XX	XX	XX	XX	XX
Total	XX	XX	XX	XX	XX

Source: Annual reports, SEC filings, ADA, FDI World Dental Association, Expert interviews, MnM Analysis

Germany commanded the largest share – XX% – of the global dental implants and prosthetics market at an estimated \$XXXXmillion in 2011; and is expected to reach \$XXXX million in 2016, at a CAGR of XXX% from 2011 to 2016.

4.2 CHINA

The Chinese dental products market is still at a nascent stage but shows significant growth potential owing to the country's economic boom and increasing per capita income. These factors have led to a significant increase in demand for dental care services, which in turn has boosted the number of oral health clinics and dental hospitals. Tier-I cities in China such as Beijing and Shanghai, have a structured distribution network; while Tier-II cities capture XX% of the total imports. This is almost double of the consumption in Tier-I cities.

In China dental care services are provided through basic medical insurance, government services, other insurance systems, and out-of-pocket payment by patient. However, over xx% is out-of-pocket payment by the patients. Low insurance coverage and over-charging issues inhibit market growth in this region. Huge opportunities lie in the rural areas, where the government encourages private players to set up private clinics and hospitals, thus opening up great prospects for distributorship as well.

For a foreign company to establish a distribution network in China, it is necessary to establish a joint venture or to have a wholly foreign owned (WFO) company. Manufacturers wishing to enter the Chinese market may have to build their distribution channels by collaborating with local companies and regional dealers in key cities such as Shanghai, Beijing, Chengdu, and Guangzhou. Suppliers may also collaborate with dental hospitals such as Beijing Medical University Stomatological Hospital, to introduce a new product in the Chinese market. International players entering the Chinese market need to register with and receive an approval from China's State Food and Drug Administration (SFDA), Ministry of Health (MOH), or the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ). FDA and EU certification is also helpful but the SFDA also requires documentation and licenses from the country of origin.

Out of the XX billion plus population in China, XX% adults and XX% children have decayed teeth, and over XX% of the population has periodontal disease. This large patient population and consumer base and the increasing number of specialized dental hospitals or clinics have contributed the growing demand for dental implants& prosthetics in China.

The Chinese dental implants& prosthetics market was valued at \$XXXX million in 2011, and is estimated to reach \$XXXX million by 2016. The market is expected to grow at a CAGR of XXX % from 2011 to 2016, due to growing importance of aesthetics and health in the wake of growing living standards.

TABLE 5

**CHINA: DENTAL IMPLANTS & PROSTETICS MARKET REVENUE,
BY PRODUCTS, 2009 - 2016 (\$MILLION)**

Segments	2009	2010	2011	2016	CAGR% (2011-2016)
Dental implants	XX	XX	XX	XX	XX
Dental Prosthetics	XX	XX	XX	XX	XX
Total	XX	XX	XX	XX	XX

Source: Annual reports, SEC filings, ADA, FDI World Dental Association, Expert interviews, MnM Analysis

Dental Implants segment accounted for the largest share – XX% – of the overall dental implants and prosthetic market in 2011. This segment is expected to reach \$XXXX million in 2016, at a CAGR of XX% for the same period.

5 COMPANY PROFILE

5.1 NAKANISHI INC

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Japan

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5.1.1 OVERVIEW

Nakanishi Inc., a dental device company, was founded in 1930 and is headquartered in Kanuma, Japan. The company is engaged in developing dental precision rotary instruments and general industrial precision rotary instruments. It operates through three divisions, namely, dental instruments, industrial instruments, and repair services. For dental division the company provides restoration and prosthetics products, endodontics products, oral care products, surgical products, laboratory products, and accessories.

The company geographically operates in Japan, Australia, China, France, Germany, South Korea, New Zealand, Russia, Singapore, Spain, UAE, U.K., and U.S. It has more than eight subsidiaries and markets its products in more than 130 countries globally. The company had a headcount of 606 people as of 2010.

5.1.2 FINANCIALS

The company reported revenue of \$XXXX million during the fiscal year ended December 2010, an increase of XXX% over 2009.

TABLE 6

**NAKANISHI INC.: TOTAL REVENUE AND R&D EXPENSES,
2008 - 2010 (\$MILLION)**

Particular	2008	2009	2010
Total revenue	XX	XX	XX
R&D expenditure	XX	XX	XX

Source: Annual reports / SEC filings

The company spent \$XXX million on its R&D activities during the year 2010, an increase of XX% over to 2009.

TABLE 7

**NAKANISHI INC.: TOTAL REVENUE, BY SEGMENTS,
2008 - 2010 (\$MILLION)**

Segment	2008	2009	2010
Dental instruments	XX	XX	XX
Industrial instruments	XX	XX	XX
Repair services	XX	XX	XX
Total	XX	XX	XX

Source: Annual reports / SEC filings

In 2010, dental instruments accounted for XX% of its total revenue for fiscal year 2010 followed by industrial instruments (XX%) and repair services (X%). Dental instruments recorded XXX% increase followed by industrial instruments (XXX%) and repair services (XXX%) over 2009.

TABLE 8

**NAKANISHI INC.: TOTAL REVENUE, BY GEOGRAPHY,
2008 - 2010 (\$MILLION)**

Region	2008	2009	2010
Japan	XX	XX	XX
North America	XX	XX	XX
Asia	XX	XX	XX
Europe	XX	XX	XX
Others	XX	XX	XX
Total	XX	XX	XX

Source: Annual reports / SEC filings

During fiscal year 2010, the company generated XX% of its revenue from European region, XX% from Japan, XX% from North America, XX% from Asia and XX% from others. Japan reported XX% increase followed by North America (XXX%), Asia (XXX%) and Europe (XX%) in 2010.

5.1.3 PRODUCTS & SERVICES

Nakanishi develops high cost performance products for the dentistry industry. The company's key products include restoration, prosthetics, endodontics, oral hygiene, surgical, laboratory, maintenance (automatic maintenance system, lubrication spray, accessories, led couplings, VarioSurg tips, various tips, blades, spare parts, cordless prosthodontic screwdriver).

5.1.4 STRATEGY

Nakanishi continues to invest heavily in new products development and expansion of geographic market. Recently, the company expanded NSK America's North, Central, and South American headquarters in order to improve its precision machinery for dentistry and industrial

applications. In July 2010, Nakanishi Inc. opened a new subsidiary in Vietnam, NSK Precision Co. Ltd for strengthening its dental instruments business globally.

5.1.5 DEVELOPMENTS

Date	Approach	Description
June 2011	Expansion	McShane Development Company developed NSK America North, Central, and South American headquarters. The expansion helped the company to increase its precision machinery for dentistry and industrial applications.
July 2010	Expansion	Nakanishi Inc. opened a new subsidiary, NSK Precision Co. Ltd in Vietnam. The new subsidiary focuses on developing the dental instruments. The new plant enables the company to speed up its production and thus fulfill the growing demand of dental products.
June 2009	Expansion	NSK Asia opened in Singapore in order to expand the company's base for its South Asian sales and service network.

Source: Press releases

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