

**Czech University of Life Sciences Prague**

**Faculty of Economics and Management**

**Department of Economics**



**Bachelor Thesis**

**Economic Analysis of Milk Powder Market**

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## **Declaration**

Hereby I declare that my bachelor thesis titled “Economic Analysis of Milk Powder” represents my own original work and effort. I have worked on my own with using the referenced literature and other resources which are to be found in the bibliography.

In Prague on 29<sup>th</sup> March, 2012

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## **Acknowledgment**

I would like to thank my supervisor Ing. Petr Procházka MSc, Ph.D. for his advice and support during my work on this Bachelor Thesis. Finally, I would like to express thanks also to my family and friends, who supported me while creating this Thesis.

# Economic Analysis of Milk Powder Market

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## Ekonomická analýza trhu sušeného mléka

### Summary

This Bachelor Thesis deals with Milk Powder. At first thesis explains its exact process of manufacture and focuses on its kinds. Furthermore thesis depicts its accurate storage, packaging, nutritional content and also a topic about energy and environmental considerations is included there. Consequently it deals with consumption, import, export and milk powder trade all over the world. Also there is mentioned China and its milk powder trade in there and one of the Chinese leading businesses. In the last part of this work it is chosen a world renowned company Nestle India Limited which is applied to SWOT analysis.

**Keywords:** Milk powder, Import, Export, Trade, Market, Consumption

### Souhrn

Tato Bakalářská práce se zabývá Sušeným mlékem. Nejdříve vysvětluje jeho výrobu a soustředí se na jeho typy. Dále práce popisuje jeho správné uskladňování, balení, výživový obsah a také je zde zahrnuto téma o energii a faktorech životního prostředí. Následně se zabývá spotřebou, dovozem, vývozem obchodem sušeného mléka na trhu po celém světě. Dále je zmíněna Čína a její trh sušeného mléka a jedna z jejích vůdčích společností. V poslední části této práce je vybrána celosvětově proslulá společnost Nestle India limited, na které je aplikována SWOT analýza.

**Klíčová slova:** Sušené mléko, dovoz, Vývoz, Obchod, Trh, Spotřeba

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# 1 Introduction

The topic of my Bachelor Thesis is the Economic Analysis of Milk Powder. The reason for choosing this subject is that because it is very interesting and important, even though many people do not realize the real essence of it. Milk powder also plays an important role in developing countries. It is needful element for their daily diet. Without creamer it would evocate overall deterioration. Powdered milk according to my opinion is immensely considerable part of our everyday lives. People do not even appreciate how Dried Milk is necessary for our workaday routine consumption. Therefore in my work I will try to do my best to clarify the consequences and potential problems of a given topic.

Milk powder is manufactured dairy commodity made by evaporating milk to dry atmosphere. One of the intentions of powdered milk is much longer shelf life than liquid milk. Nor it is necessary to refrigerate the milk powder due to its low moisture content. Another purpose of milk powder is that it can diminish its size of the transportation economy. Therefore it is powdered milk extremely important for development in the Third world countries.

The first references about milk powder date back to 13<sup>th</sup> century. Marco Polo announced that troops of Kublai Khan who performed sun-dried skim milk as “a kind of paste” on their expeditions. The primary applicable commercial procedure to launch out dry milk was invented by Russian chemist M. Dirchoff in 1832. Consequently in 1855 T.S. Grimwade took a patent on a powdered milk proceeding. Thorough William Newton patented vacuum drying process as far back as in 1837. In more recent times, milk powder is generally made by spray drying non fat skim milk, full cream milk, whey or buttermilk. Milk is being dried in slender layers on heated cylinders. The first patents for this procedure originate from the turn of the 20<sup>th</sup> century. This roller drying were the principal means of producing milk powders up to the 1960s when spray drying took over on the role. [2]

These days milk powder manufacture is being considered as a highly relevant business. If I mention for example New Zealand which has manufactured and exported over 450 000 tones of powdered milk during the dairying season in the 1993 and 1994 and has earned more than NZ\$1 billion. [1]

## **2 Objectives and Methodology**

### **2.1 Objectives**

The aim of this Bachelor Thesis is to evaluate key determinants of global milk powder market such as trade, imports, exports, production and demand. Of course there is included some basic information about milk powder.

### **2.2 Methodology**

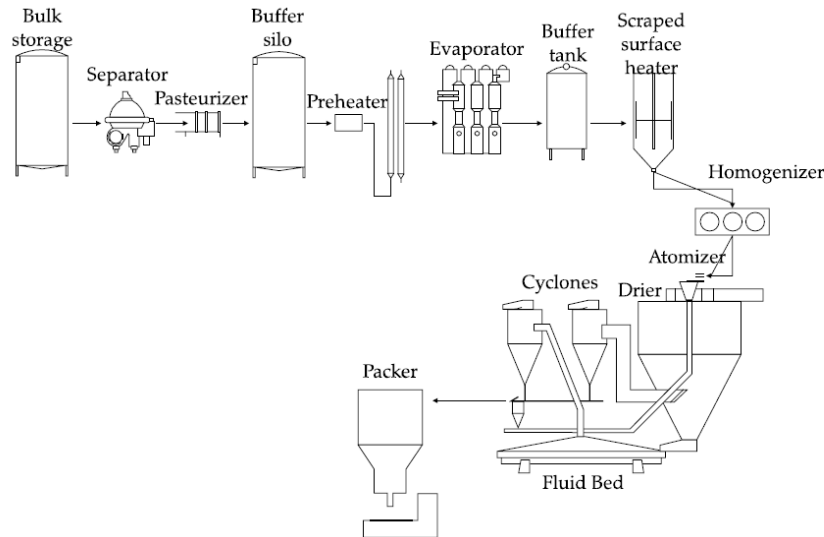
This thesis is concerned with quantitative and qualitative analysis of market data such as production, consumption and trade. The approaches and methods which are used through the whole thesis are mentioned and explained.



### **3 Milk Powder Manufacture**

Production of powdered milk is a single procedure currently performed on an enormous scale. It includes the smooth elimination of water at the minimum cost under strict hygiene conditions. However during that procedure must be preserved all the desirable natural characteristics of the milk – colour, flavour, fusibility and nutritional value. Full cream milk generally contains approximately about 87% of water and non fat milk typically includes about 91% of water. In the course of the milk powder manufacture this water is eliminated by boiling the milk under depression pressure at low temperature in a procedure known as evaporation. The final condensed milk is subsequently sprayed in a fine haze into hot air to remove further moisture and so give rise to powder. Roughly about 13 kg of whole milk powder (WMP) or 9 kg of skim milk powder (SMP) is able to be made from 100 L of full cream milk. New Zealand produces a large range of spray dried powdered milk (up to 100) to comply with diversified and special needs of customers. Creamers may differentiate in their gross compound (milk fat, protein and lactose), thermal treatment they obtain during manufacture, powder particle size and packing. Particular “high-heat” or “heat-stable” milk powders are needed for the manufacture of specific products such as recombined condensed milk. Powdered milk in various types are used in a broad range of commodity such as baked goods, snacks and soups, chocolates and sugar confectionary (milk chocolate), ice cream, infant formulas, nutritional products for invalids, athletes, hospital use, recombined milk and other fluid beverages. The whole milk powder manufacturing procedure is shown in the following schematic figure and it is described in detail below. [1]

**Figure 1:** Schematic figure of manufacturing process.



Source of Figure no.1: [1]

### 3.1.1 Separation and Standardization

Academic procedure for the production of milk powders begins with taking the raw milk obtained at the dairy workshop and pasteurizing and disconnects it into defatted milk and cream using an eccentric cream separator. When it becomes the time to manufacture WMP, a dose of the cream is appended back to the skim milk to make milk with a normalized fat content. This content is typically approximately about 26 – 30% fat in the powder. The residual cream is used to produce butter or waterless milk fat. [1]

### 3.1.2 Preheating

The following step in the process is “preheating” during which the normalized milk is warm up to temperatures between 75 – 20°C and keep for a specific time form a few seconds up to

several minutes (*cf.* pasteurization: 72°C for 15 s). Preheating gives rise to controlled denaturation of the whey proteins in the milk and it destroys bacteria, disables enzymes, generates natural antioxidants and confers heat constancy. The accurate heating/holding arrangements rely on the type of product and it is designed for the ultimate need. High preheats in WMP are related to improved keeping durability while solubility is reduced. Preheating might be both indirect (through heat exchangers) and direct (through steam injection or infusion into the product) or it may be a combination of these two types. Indirect heaters typically use waste heat from other parts of the procedure as an energy efficiency measures. [1]

### **3.1.3 Evaporation**

The preheated milk in the vaporizer is concentrated in phases from more or less 9.0% of overall content for skim milk and just about 13.0% for full cream milk. In the total number of solids it moves around 42 – 52%. This is attained by boiling the milk a vacuum at temperatures bellow 72°C in a falling film on the inside of vertical pipes, and disposing the water as a steam. This steam which might be mechanically or thermally pressurized is subsequently used to warm up the milk in the following effect of the evaporator which might be operated at a lower compression and temperature on the previous effect. Contemporary factories can have up to seven effects for maximum energy efficiency. In excess of 85% of the water occurring in the milk may be removed in the evaporator. Evaporators are immensely noisy due to the huge quantity of water steam moving at very high velocities inside the tubes. [1]

### **3.1.4 Spray Drying**

Spray drying includes the milk concentrate from the evaporator into gentle droplets. This is made up inside a huge drying chamber in a stream of hot air (up to 200°C) with use of spinning disk atomizer and series of high – pressure jets. The milk drops are refrigerated by evaporation and they never reach the air temperature. The extract can be heated before to

atomization to reduce its viscosity and to enhance the energy available for drying. A large sum of the remaining water is evaporated in the drying chamber, leaving behind a gentle powder of approximately 6% moisture capacity with a mean granularity typically with diameter of size less than 0.1mm. Finite or “secondary” drying is held in a fluid bed or in a series of such beds. In these beds is blown hot air through a layer of fluidized powder diminishing water to give artefact with a moisture content of 2 – 4%. There must be taken safety measures to prevent fires and to vent dust explosions which could occur in the drying chamber or elsewhere. Such explosions may be extremely dangerous to life, property and markets. [1]

### **3.1.5 Packaging and Storage**

Powdered milk is immensely more constant than fresh milk. However in order to retain their durability and quality there are very needful these factors such as protection against moisture, oxygen, light and heat. Milk powders promptly take up moisture out of the air which leads to a rapid loss of quality and caking or getting together. The grease in WMPs can respond with oxygen in the air to give away flavours, particularly at higher storage temperatures more than 30°C which are typical of the tropics. Powdered milk is packaged into both plastic – lined multi – wall packs of the weight of 25 kg and bulk baskets that weight 600 kg. WMPs are usually packed in nitrogen gas to preserve the product from oxidation and to maintain their flavour and to expand their compliance of quality. Packaging is selected to provide a barrier to moisture, oxygen and light. Bags are typically composed of a number of layers to provide strength and the required barrier properties. Consignments of milk powder should never suffer due to long term exposure to direct sunshine, especially in topical countries. A couple of hours at increased temperatures, up to 40°C, during transportation can aggravate many weeks of meticulous warehousing. [1]

### **3.1.6 Applications of Milk Powder**

New Zealand manufactures a wide range of spray dried milk powders (more than 100) to meet the miscellaneous and special need of customers. Milk powders may differ from their gross consumption (milk fat, protein, lactose), the heat treatment they receive during manufacture,

powder particle size and packaging. Particular “high heat” or “heat stable” milk powders are required for the production of certain products such as recombinant evaporated milk. [1]

Some powders are agglomerated and they may be in instant form for easy use at home. Instant powders must be wet, sink and disperse quickly with minimal stirring when it is added to water. [1]

The final liquid should closely resemble fresh milk and be free from undiluted particles. Any of milk powders are fortified with vitamins and minerals. It is really very relevant to use a powder which is appropriate to the determined application. Milk powders of various kinds are used in a huge range of products including the following:

- Baked goods, snacks and soups
- Cheese milk extension (powder is added to local fresh milk to increase the yield of cheese)
- Chocolates and confectionery
- Dairy desserts
- Direct customer usage
- Ice cream
- Infant formulae
- Nutritional products for invalids, athletes, hospital use
- Recombined cheeses, mainly “soft” or “fresh”
- Recombined coffee and whipping creams
- Recombined yoghurts and other fermented products [1]

### 3.1.7 List of selected definitions

**Atomiser:** A device for producing gentle droplets of liquid.

**Concentrate:** Milk concentrated by evaporation, generally it contains about 48% total solids

**Cyclone:** A device for separating air and powder particles.

**Effect:** a single unit in an evaporator operating at a particular pressure and temperature. Evaporators have generally three to seven effects to allow heat to be reused several times.

**Fluid bed:** A piece of equipment used for drying or cooling milk powder. Air is blown through the powder from below, causing the powder particles to separate and behave rather like a fluid.

### **3.1.8 Nutritional Content**

Different milk powder products contain varying percentages of protein, lactose, fat, ash and moisture. The articles retain much of the nutritional content in the original milk source. Powdered milks which have been manufactured in the United States contain high-quality protein, such as the whey protein that account for 20% of the protein in milk powders. Milk powders comprise high levels of essential amino acids and resoluble vitamins and mineral, such as calcium, magnesium and phosphorus which make the powders useful as fortifying ingredients in many food products. [1]

### **3.1.9 Energy and Environmental Considerations**

Large amounts of energy are expended in the procedure of elimination water and therefore plants over years have become increasingly more energy efficient. Evaporators are far more energy efficient than driers, using only a fraction of a kilogram of steam per kilogram of water which had been removed. On the other hand driers use several kilograms of steam per kilogram of water evaporated. Spray drying provides resources of rapidly and gently removing the bulk of the remaining water but, perfectly, spray driers have short delay times. Consequently fluid beds are used for the final stages of drying. The powder is still for several minutes in fluid beds allowing time for the last of the water to be removed. Plants manufacturing milk powder tend to be very large, there are a few of them and are located in rural areas. If these plants are modern and well managed, they have only relatively small effects on the environment. They are moderately energy challenging, burning coal or gas and they are consuming substantial electricity. Inside there are strong economic pressures to diminish energy consumption but there is little scope for further major improvement. [1]

Milk storage silos, cream separators and the evaporators and associated plant must be cleaned every single day, and driers less frequently. As cleaning agents are being used sodium hydroxide along with nitric acid. The spent cleaning fluids must be disposed of by an appropriate manner. There may be emission of powdered milk dust into the local environment during plant failures but this occurs very rarely. Noise is a big problem, mainly within plant buildings but ventilators can affect close neighbours. Unbleached paper and plastic laminate package should be disposed of in transatlantic markets. [1]

## **4 Milk Powder**

### **4.1 Types of milk powders**

Producers manufacture milk powder, or powdered milk, by removing the major part of the water through a drying process. The benefits of using milk powder that using the liquid milk form include longer shelf life of up to 18 months without any need for refrigeration. Beyond the nutritional benefits, in addition milk powder provides economic benefits over regular fluid milk because it is easier to store and transport. The convenience of powdered milk articles make them appropriate for usage in baking, prepared foods and nutritional beverages. They are used in foreign nutrition aid programs as well. [3]

#### **4.1.1 Agglomerated powders**

Standard powders, due to their smooth dusty nature, do not reconstruct well in the water. “Agglomerated” and “instant” powders were specifically developed to invert this. The whole manufacture of an agglomerated powder originally follows the standard procedure of evaporation and drying. However during spray drying tiny pieces of powder, leaving the drier (the so-called “fines”) are recovered in cyclones and get back to the drying chamber in the close proximity of the atomizer. The humid concentrate droplets coagulate with the fines and hold together and form larger (0.1 – 0.3 mm), irregular shaped “agglomerates”. Agglomerated powders diffuse in water more quickly and they are less dusty and it is much easier to handle than standard powders. [3]

#### **4.1.1 Instant Whole Milk Powder**

With WMP is required an extra step after agglomeration to make the product actually “instant” and overcome the hydrophobic nature of tracks of free fat on the surface of the particles. This extra step is composed of spraying minute quantities of the natural surfactant or wetting agent, soybean lecithin, on to the powder in a liquid bed. Soybean lecithin is plucked from soy bean oil. Soybean lecithin is widespread in nature and they occur originally in milk. [3]



#### **4.1.2 Skimmed Milk Powder and Non-fat Dry Milk**

Skimmed milk powder and non-fat dry milk which are both made from pasteurized skim milk typically contain about 1.5% or less of milk fat and 5% or less of moisture. The lower limit of protein content for skimmed milk powder is 34%, while non fat dry milk does not have a minimum protein level. These milk powders meet the manufacturing process criteria for classification as additives in products such as breads, meat products, beverages and dairy foods. [3]

#### **4.1.3 Powdered Buttermilk**

Manufactures produce dry buttermilk and buttermilk powder from buttermilk that is churned, pasteurized and condensed. Powdered buttermilk has approximately 5% or less moisture content. Milk fat content fluctuates about 4.5% or more and it is requested to have no less than 30% protein content. The federal norms for buttermilk powder prohibit the usage of dry whey, non fat dry milk or skimmed milk powder or other non-buttermilk products. Buttermilk powder may not contain added preserving agents or other chemicals. Uses include sauces, soups, confectionery and bakery. [3]

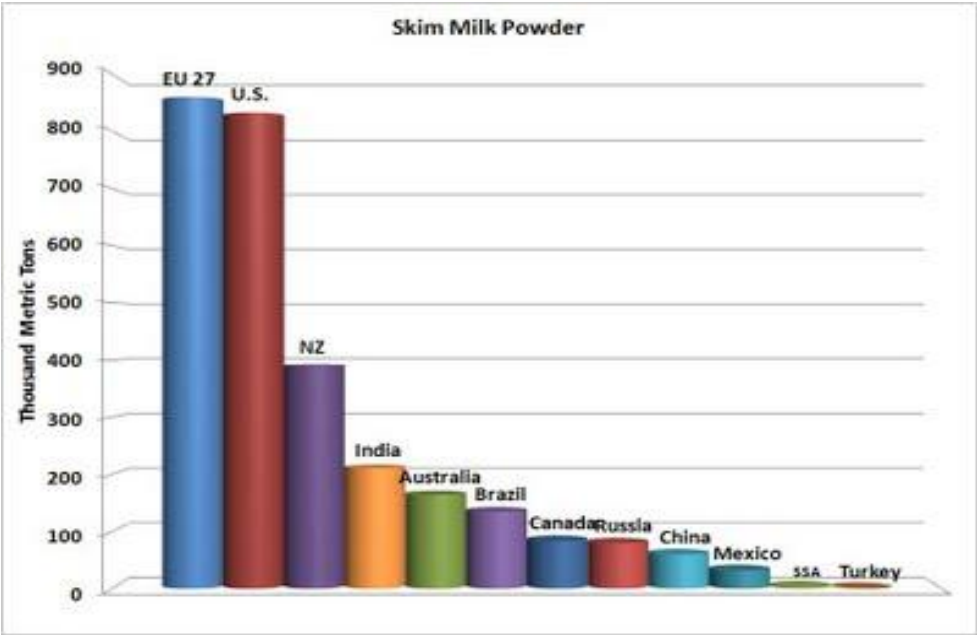
## 4.2 Exporters

### 4.2.1 Skim Milk Powder

The one of the biggest advantages of Skim milk powder is that it has a long shelf life without need of refrigeration. It is often used in cheese manufacturing to boost protein. However, Skim milk powder has a very low value, generally just above the \$.80/lb support prices. That really affects and limits the range for international shipments as shipping costs can easily outweigh other higher prices. [5]

In the graph bellow you can see the major exporters of Skim Milk Powder. With sum of 880 thousand metric tons dominates European Union and just a little step behind it follows the United States. On the vertical axis there is amount of skim milk powder expressed in thousand metric tons. [5]

**Figure 2:** The biggest exporters of Skim Milk Powder

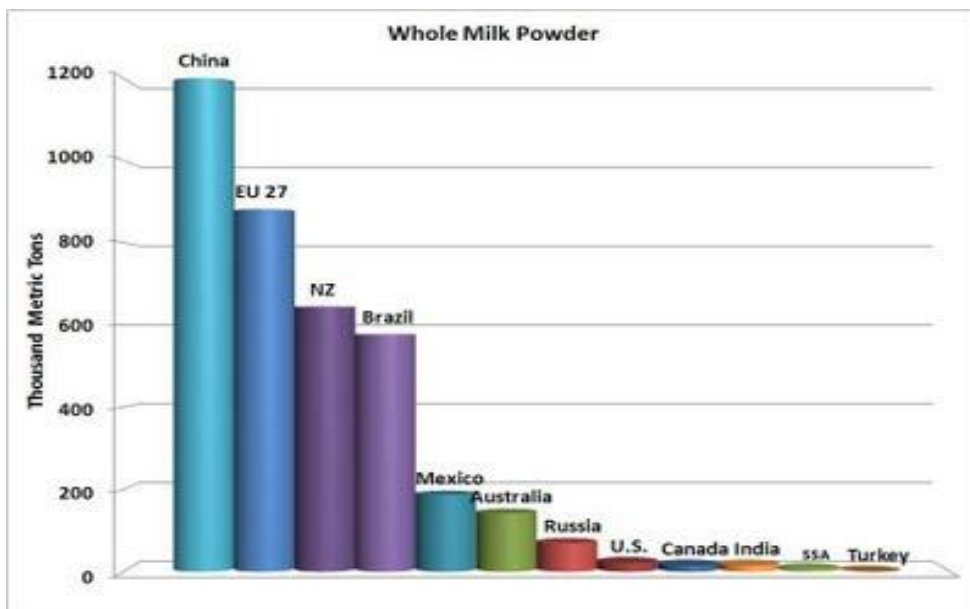


Source of Figure no. 2: [5]

### 4.2.2 Whole Milk Powder

For the big surprise China dominates this market with Whole Milk Powder. The United States is not really a relevant player in this market. Liquid milk which was made from WMP cannot compare to real milk. The ready availability of fluid milk in the U.S. remains no significant market for WMP. Due to the butterfat in WMP, it must be refrigerated and does not have a long shelf life. Whole milk powder is used mainly in cooking but this is a very small market. [5]

**Figure 3:** The biggest exporters of Whole Milk Powder [5]



Source of Figure no.3: [5]

### 4.2.3 Major exporters of WMP and SMP

In the chart below there are the major exporters of WMP and SMP with their exports expressed in thousand metric tonnes. [11]

**Figure 4:** Overview of Biggest Exporters

	<b>2007</b>	<b>2008</b>	<b>2009</b>
<b>Whole Milk Powder</b>			
World	1 757	1 849	1 826
New Zealand	680	607	686
European Union	366	484	386
Argentina	115	120	107
Australia	116	107	109
<b>Skim Milk Powder</b>			
World	1 145	1 201	1 186
United States	255	400	350
New Zealand	281	242	278
European Union	201	179	189
Australia	134	112	115

Source of Figure no.4: [11]

#### **4.2.4 Dairy Imports and Exports in general**

Dairy imports and exports are very unstable and they have a major impact on milk price volatility. Consumer demand is comparatively predictable. Import and export, although much smaller than domestic consumption, have a significant impact due to their volatility. [11]

Why are imports and exports so volatile and what it makes volatile? There exist a lot of things going on in this world that can influence the international market.

**A list would include:**

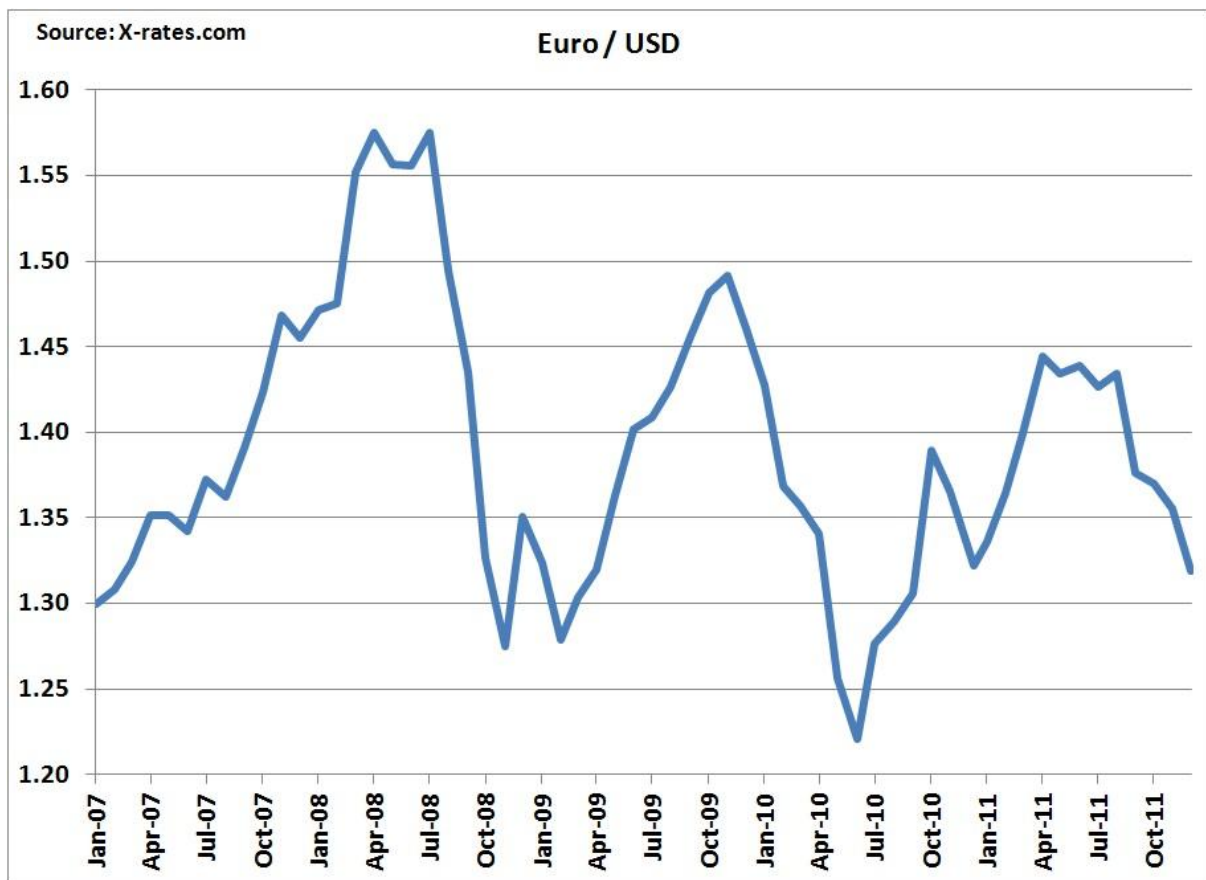
- changes in the global economies
- emerging market developments
- exchange rates
- weather influences in dairy producing areas of the world
- international import and export controls stored by countries [11]

None of these factors are anything a dairy producer has any control over. However, they can have a huge impact on imports and exports which have a significant impact on U.S. milk prices. The U.S. Dairy Export Council does a great job of assisting dairy processors in looking for export opportunities. Facts and figures, the year 2011 was an enormous and terrific year. Dairy exports for 2011 were up 30% reaching a new high of \$4.8 billion. Mexico remains our strongest export market with \$1.1 billion or 23% of our total dairy exports. Exports to Mexico were up 41% in 2011. In 2011 we had an increase in dairy exports to South Korea. Now is South Korea our second biggest export market. [11]

#### 4.2.5 Exchange Rates

Exchange rates have a considerable impact on exports of dairy products. The major competitors come for the European Union and New Zealand. In the beginning of 2008, a very weak USD caused a large increase in exports and as an outcome it was high milk prices. In 2009, the currency exchange rates turned to the opposite side and sent exports plunging along with milk prices. The USD has strengthened in recent months as compared to early 2011. [4]

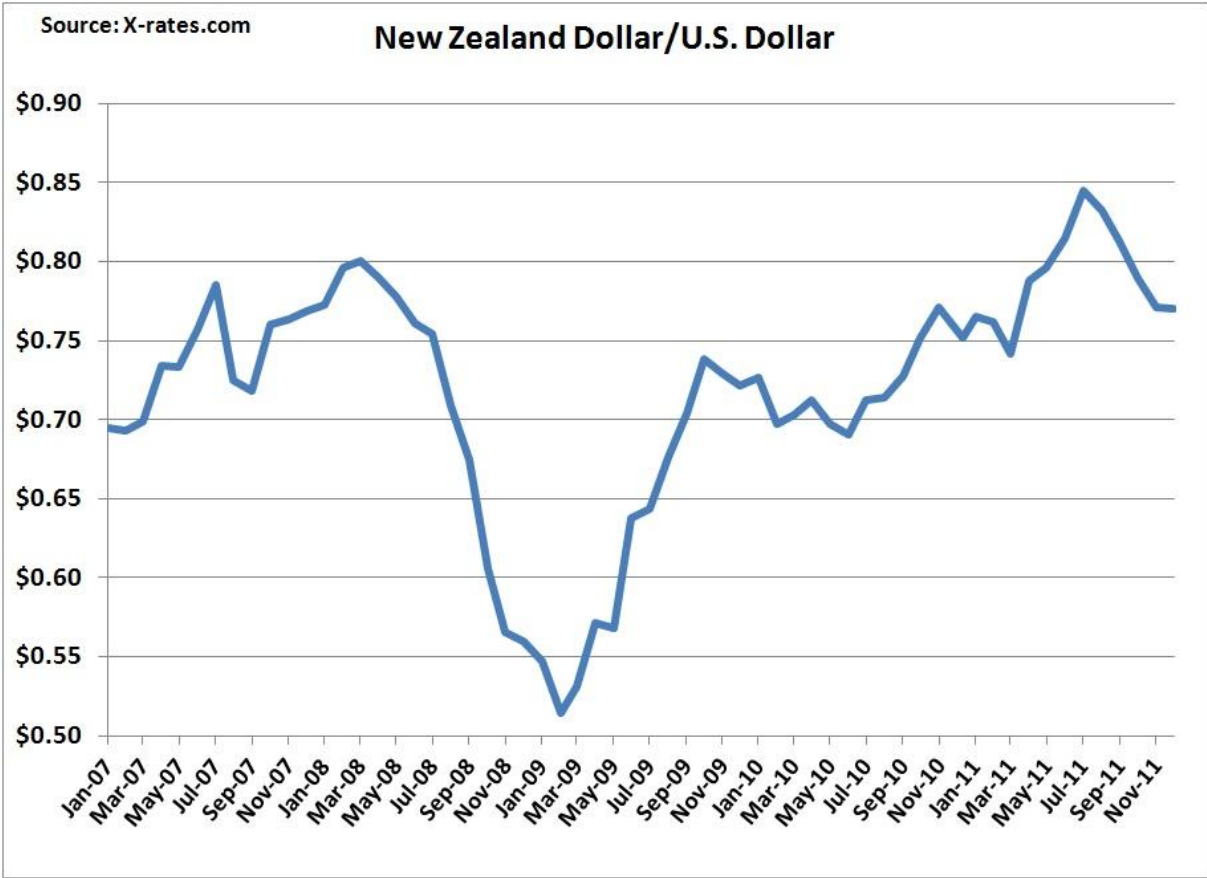
**Figure 5:** Curve of the euro exchange rate to the dollar



Source of Figure no. 5: [4]

The New Zealander dollar weakened somehow but not as dramatically as the Euro. [4]

**Figure 6:** Curve of the NZD exchange rate to the USD



Source of Figure no. 6: [4]

## 5 Dairy Sector

### 5.1 Dairy production

Milk has certain characteristics that distinguish it from other agricultural products and form its production, processing and trade. In contrast to grains, milk is an extensive and heavy commodity. Liquid milk contains 87% of water and 13% of solids such as fats, proteins, lactose, minerals, enzymes and vitamins. On the other hand, milk is highly perishable and starts to worsen as soon as it leaves the udder. [7]

Milk is a very valuable and at the same time extremely raw material that can be used to make a huge range of high-value products. As a result the processing industry is very relevant to the dairy farming sector. The great majority of dairy farmers are small-scale producers with a weak and vulnerable position in the market due to their low level of production of fixed costs with adjustment to changing markets only possible gradually. [7]

Due to the fact that even the largest dairy farms cannot provide suitable quantities to supply a processing plant but each single dairy farm only supplies a small share of the total milk processed, the dairy industries in many countries are organized along co-operative lines. Milk producer co-operatives tie to the interest and supply of a large number of dairy farmers and strengthen their bargaining power towards processors or even run their own processing plants. Even in developed countries, co-operatives still hold powerful positions in milk treatment with producer cooperatives (such as Dairy Farmers of America (DFA) or Fonterra) marketing the major share of milk from farms. [7]

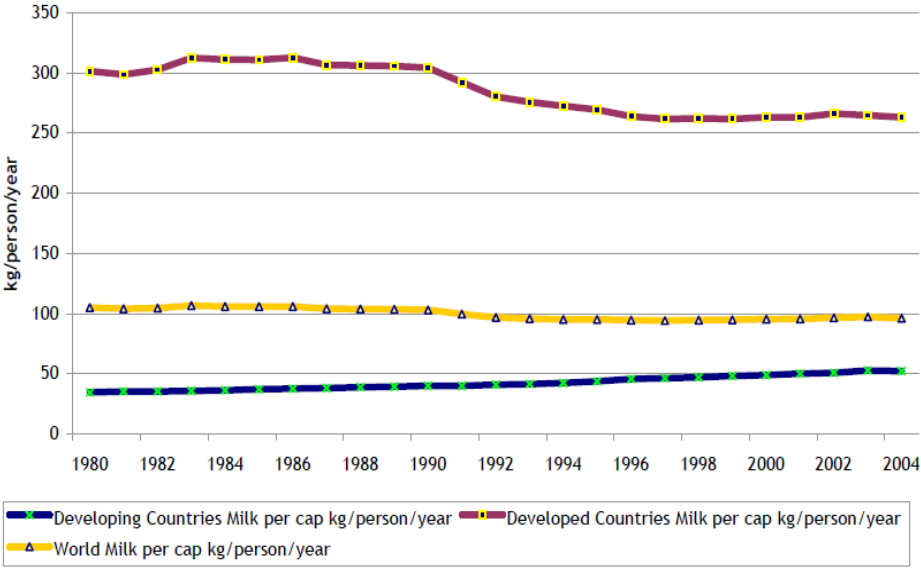
The dairy sector plays an economically important part in the agriculture branch in most industrialized and also many developing countries. In majority of OECD countries milk production generates more than 20% of farm cash receipts. [6]

Over the 24 years, total milk production has increased by 32% from 466 million tons in 1980 to 613 million tons in 2004, whereas per capita world milk production has declined from 105 kg per capita per year in 1980 to 96 kg per capita per year in 2004 – a decrease of 9%. These



figures indicate that world milk production has not kept up with the increase in world population. The fall in global milk production per capita can be attributable to decreasing production in the developed countries while the per capita milk production in the developing countries has gently risen over the last 24 years. [7] (Figure 6 below)

**Figure 7:** World milk production\* per capita, 1980-2004



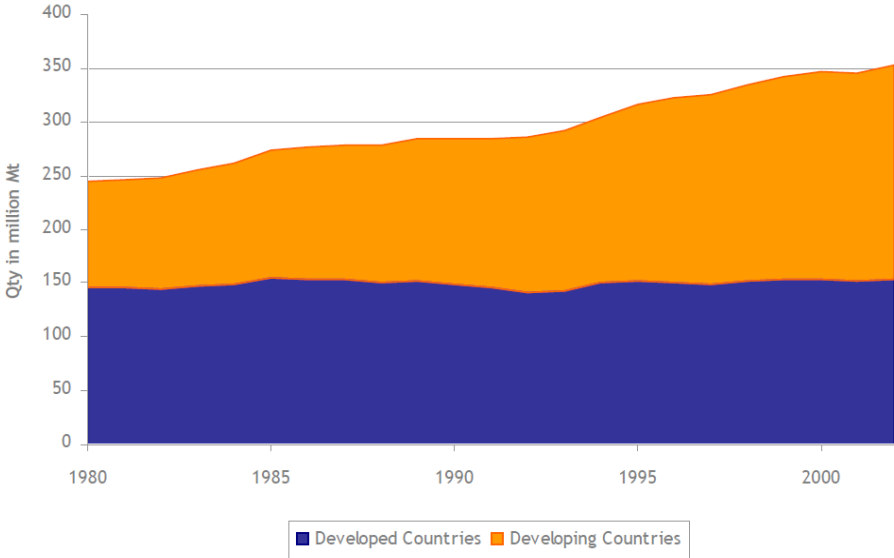
\*total milk production: Cow = 84%, Buffalo = 12%, Sheep = 1%, goat = 2%, camel = 0, 2%

Source of Figure no. 7: [7]

## 5.2 Dairy Consumption

Total milk consumption in developed countries is still more or less constant over the last twenty years. Significant increases in global milk consumption are due to population growth and per capita income growth in developing countries. [7]

**Figure 8:** Milk Consumption in Developed and Developing Countries



Source of Figure no. 8: [7]

The latter has led to the emergence of a prosperous middle-class in many low and middle income countries in Southeast Asia, Latin America and Central and Eastern Europe. Additional “westernization” trends leading to increasing preferences for new value-added products in many of these economies generate additional dairy market growth. [7]

The structure of dairy product consumption differs across various regions with fluid milk as the overall most important product by volume. However, processed dairy products become more relevant with growing incomes and living standards, and in developed countries the trend goes more and more towards high value functional foods that require significant research investments and sophisticated processing. [7]

### 5.3 Dairy Trade

The dairy sector is highly localised, as milk is a bulky and perishable product, and dairy products are commonly consumed in the country or region where they are produced. Only a small fraction of global production is traded internationally. Despite the technological developments in refrigeration and transportation only 7% of the milk produced is traded internationally if intra-EU trade is excluded. [7]

Trade in dairy products is very floating and unstable, as dairy trade flow can be affected by overall economic situation in a country, fluctuations in supply and demand, changing exchange rates and political measures. Supplementary volatility is introduced by the fact that the global dairy market is enormously concentrated in terms of buyers and sellers therefore supply or demand shocks are not easily absorbed. [7]

With demand for dairy products most rapidly rising in region that are not self-sufficient in milk production, volumes of dairy trade are still increasing. Also the share of global dairy production that is traded will rise as trade will grow at a faster pace than milk production. [7]

Since 1990 a shift in world dairy exports from high export subsidizing countries, e.g. EU and US toward non-subsidizing countries, e.g. New Zealand and Australia has been taking place. The developed countries account for 62% of the world's dairy imports and 93% of the exports, showing clearly that the major part of the global dairy trade is held among developed countries. [7]

## 5.4 Dairy Policies

Predominantly in developed countries, the dairy market is one of the most heavily regulated agricultural markets. Government interventions in the domestic dairy market are most commonly aimed at controlling quantities of production, establishing minimum prices and guaranteeing farmers' incomes. Government also interfere through public purchases and storage of abundance or apply policies to encourage dairy consumption. [7]

In countries where domestic prices for dairy products are supported well above world market prices, as a consequence, the domestic market has to be protected against foreign competition in order to ensure the market payment for domestic farmers who would otherwise have difficulties to sell their overcharged products. The principal policies countries put in place to limit imports are tariffs and tariff rate quotas and other non-tariff barriers. Globally dairy products are among the agricultural commodities with the highest tariff protection with an average protection level of over 80%. (The average over all agricultural commodities being 62%) [7]

The most important measure promoting exports are export subsidies. Under the WTO Agreement on Agriculture, countries that used export subsidies on agricultural products were required to set commitment levels on the volume and value of export subsidies that could be provided. The most considerable user of export subsidies on dairy is the European Union, accounting for over 80% of the total value of export subsidies on dairy granted during the period 1995-2001. [7]

## **5.5 International Standards for Dairy Products**

Even though these standards were initially developed by the public sector to reduce transaction costs and ensure product quality and safety, they have become a strategic instrument of competition of distinguished product markets. Especially in developing countries but not entirely there, it can be very difficult for farmers to meet private standards for milk quality and safety which might require investment in mechanical milking, on farm cooling, new feeds and genetic improvement. Separately from the opening investment cost a dairy farmer faces to meet those standards and also high operating costs might provide small and even medium-scale units unprofitable in the long run. [7]

## **5.6 Conclusion of Dairy Sector**

Different developments are occurring in the global sector at the moment: Production in developed countries is decreasing, while productivity is increasing. Simultaneously milk production in developing countries is growing strongly and numbers of cows are increasing. This development is mirrored in consumption. Dairy consumption levels in developed countries are constant or shooting, while in many developing countries, mostly in East and Southeast Asia and driven by population growth and growing per capita incomes, dairy consumption is rapidly increasing. With consumer demand in developing countries rising faster than domestic production, global dairy trade volumes are increasing as well with import demand of developing countries being the major controller. [7]

Organisation for Economic Co-operation and Development dairy policies mainly result in a financial transfer from consumers in OECD countries to producer and processors. Actually, some benefits of the OECD dairy policies, through the depressed world market prices to which they lead, probably also accrue to consumers in developing countries in terms of increased supply of dairy products primarily in urban centres. Especially considering that many developing countries are not expected to be self-sufficient in dairy production in the future and thus will have to import increasing amounts of dairy commodities. Although, the artificially low world market price for dairy products and here especially milk powder, might have negative impacts on dairy farmers in developing countries who have to compete on their

local markets with imported milk powder. The extent to which this is the case will be examined in detail in a companion paper by means of dairy sector country studies for Bangladesh, Jamaica, Peru, Senegal, Tanzania and Thailand. [7]

## **6 China Milk Powder Market**

Milk powder was the most important dairy product before the early half of 1990s. However, as Tetra Pak's sterile filling products powdered into the Chinese dairy industry, UHT milk retained a sustainable and speedy development with an annual average increasing rate of 89.37% between 1999 and 2004. [10]

Thus it has changed the major consumption pattern of the Chinese dairy market from milk powder to liquid milk. Currently liquid milk occupies the main part of Chinese residents' dairy consumption, e.g., per capita dairy consumption of Chinese urban residents was 22.54 kilograms, in which fluid milk in the amount of 22.04 kilograms (fresh liquid dairy products were 18.32 kg and yogurt was 3.72 kg) and milk powder was only 0.50 kg. [10]

In China, milk powder is usually divided into two categories. The first category is packet milk powder which takes up 60% of the total amount of milk powder, while the second type is industrial milk powder which is generally called big package milk powder and took up 40% of the total amount in 2006. Industrial powdered milk is usually used as important raw material of dairy product (milk formula, reconstituted milk, yogurt, ice cream, etc.) and dairy food (bread, cake, biscuit, milk chocolate, dairy drink, etc.), it is lower than packet milk powder in many aspects. For example deep processing degree, technological level, packing form, packing material and so on. [10]

According to the China Dairy Industry Association, currently milk powder is the most important solid dairy product which takes up more than 86% share of Chinese solid dairy products. There are several hundred milk powder processing enterprises in the Chinese market with various scales and standards. In 2004 there were only 30 safe milk powder enterprises published by the State Bureau of Quality Supervision which was less than one tenth of the total number. The concentration ratio of powdered milk is much lower than the fluid milk market. In 2006, the production of ten largest Chinese milk powder processing

enterprises occupied approximately 53% of the total amount of milk powder. A lot of changes occurred in the milk powder market. [10]

At present, the Chinese milk powder market represents increasing international opportunities. With the decrease of import duty, China retains good relations with main world trade economies, e.g., China is the second largest market for New Zealand exports, next to the US and the largest milk powder export market. China is one of the most relevant and whey product markets for the US. The European Union is the most important supplier of non fat milk powder and whey product for China. The US and EU also saw some changes which will have great impact on the imports of dairy products, including milk powder in China. [10]

From the perspective of exports, Chinese milk powder export will have new opportunities. For example China entered a free trade convention with the ASEAN with no duties on milk powder exports to Southeast Asia countries. China also reached free trade agreement with Chile, enjoying preferential policies on milk powder export. In addition, due to the reduction of powdered milk production and supply capacity in major export areas, the traditional markets provide a chance for Chinese milk powder exports. However, in recent years, the RMB stayed firm against the dollar which brought a certain negative effect on China's milk powder trade. [10]

In the following chapter there is one example of famous company in China which deals with various dairy products and its exports and imports.

## 6.1 Qingdao Top Dairy Import & Export

This enterprise professionally deals with dairy ingredients import and export business. This business divides into two parts: [12]

**Part 1:** export department, mainly export full range milk powder, butter and condensed milk to Southeast Asia countries and areas, South America, Middle East and Africa countries. [12]

**Part 2:** mainly import lactose from foreign country dairy manufactories directly then distribute to China food factories. [12]

At present they have two production bases for milk powder, butter and condensed milk individually. One production base for milk powder and butter is located in internal Mongolia with the best fresh milk resource in China. Another production base for condensed milk is located in Guangdong province with convenient ocean shipping from Shenzhen port to destination ports. The best quality, competitive price and professionally service is the essential principle for this company stable and long term development. [12]

### **This company mainly deal with:**

- Regular FCMP (fully meet with China national standard)
- Instant FCMP (can dissolve in cold water quickly without any caking)
- Non-antibiotic FCMP (absolutely free from antibiotics)
- Goat milk powder (made from 100% high quality fresh goat milk)
- Skimmed milk powder
- Butter, 82% fat
- Anhydrous butter oil, 98% fat
- Sweetened condensed milk
- Condensed milk in different flavours [12]



## **7 SWOT Analysis – Nestle India Limited**

I will set the company Nestle India Limited into SWOT analysis and analyse its stipulations to understand this enterprise. This analysis will be used fully describe the environmental of this business.

The SWOT analysis in this case is one of the most used and useful manager's tools. This kind of analysis depicts in detail the strengths, weaknesses, opportunities and threats of the firm and it expresses the manager's real value and risk in the firm. The goal of any SWOT analysis is to recognize the key internal and external factors which are relevant to achieving the objective. It was found that with using SWOT analysis there might appear a risk of harming the performance. [8]

### **Some basic information about Nestle India Limited:**

- It is the Indian arm of Nestle SA which holds a 51% stake in the company
- One of the leading branded processed food companies in the country with a large market share in products like instant coffee, weaning foods, milk products
- It has also a considerable share in the chocolates and other semi-processed food market
- Nestle leading brands include: Cerelac, Nestum, Nescafe, Maggie, Kitkat, Munch and Milkmaid.
- To strengthen its presence it has been the company's pursue to launch new products at a swift pace and has been kind successful in its starts. [9]

## 7.1 STRENGTHS

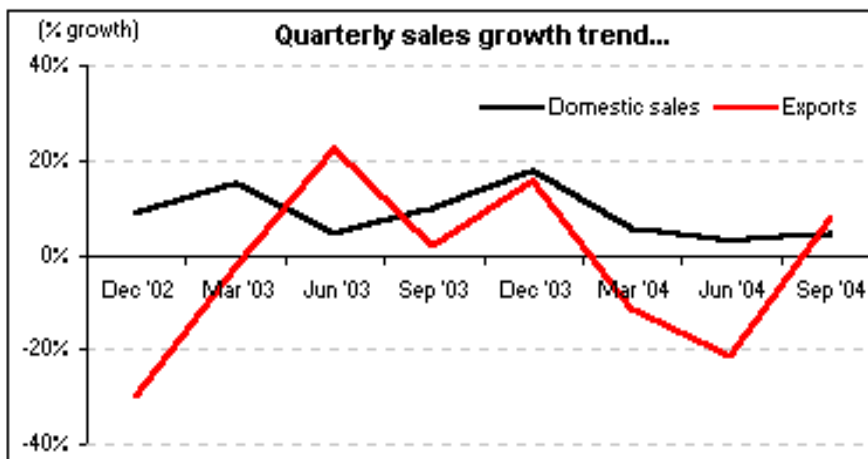
Nestle India has a strong support from its parental company which is the world's biggest processed food and beverage company with a presence in almost every country. The company has access to the parent's hugely successful global folio of commodities and brands.

In India, Nestle has some very powerful brands like Nescafe, Maggi and Cerelac. These brands are almost universal to their product categories. One of the best strength of this company is its product innovation. The company has been continuously introducing new products for its Indian patrons on a frequent basis, therefore expanding its product offerings.

## 7.2 WEAKNESS

Among weaknesses belong mainly exports. The exports of this company stood at Rs 2, 571 m at the end of 2003 (= 11% of revenues) and continue to grow at a decent pace. Major portion of this consists of Coffee. Approximately around 67% of the exports were that of Nescafe instant to Russia. And this represents a huge part of the total exports to a single location. Historically, Russia has been a very unstable market for Nestle and its whole performance intervenes in many cases due to this factor. [9]

**Figure 9:** Chart of Domestic Sales and Exports



Source of Figure no. 9: [9]

This company has a comprehensive supply chain management and the main issue for Nestle India is traceability. The food industry requires high standards of hygiene, quality of edible entrances and human resources. The fragmentation character of the Indian market place makes things more complicated. [9]

### **7.3 OPPORTUNITIES**

Expansion is one of the most convenient factors of this enterprise. The company has the force function to spread to minor cities and other geographical locations. Existing markets are not fully exploited and the company is able to increase inherence by diffusing thereunto. With demographic profile in India which is changing in favour of the consuming class, the per capita consumption of most FMCG products has tendency to grow. Nestle will have for sure the inseparable advantage of this trend.

The company has also the possibility to expand its commodity folio by introducing more brands which its parents are very noted for like breakfast cereals, Smarties Chocolates, Carnation, etc. Whereas manufacturing of some products is cheaper in India than in other South East Asian countries, Nestle India could have become an export facility for the parent in certain categories of products. [9]

### **7.4 THREATS**

The company is facing against a huge competition from the organized as well as the unorganized sectors. To liberalize its trade and investment policies to allow the country to improve position in the globalized economy, the Indian Government has declined the import obligation of food segments therefore intensification of the battle.

Another threat for this company is changing consumer trends. Increased consumer trend spends on consumer durables resulting in less spending on FMCG products. The performance of the FMCG sector has been neither cold nor hot in the last 2-3 years despite the fact economy is growing at a decent pace. Although, late the situation has been getting better and better, the dependence on monsoon is even greater.

Into branch sufferings include the following. Increase in prices of raw materials and fuels, increasing packaging and manufacturing costs.

## **7.5 Conclusion of SWOT Analysis**

The business in India for food processing is at a nascent stage. At present, only about 10% of the output is handled and consumed in packaged form therefore emphasizes a huge potential for expansion and growth. Traditionally, Indians believe in consuming fresh stuff rather than packed or frozen. But this trend is changing and the new fast food generation is gradually changing. Nestle is a leader in food processing in India. And it was given the opportunity of growth along with the parent's keen interest in developing its Indian subsidiary, the company is probably to continue being an intensive force in the Indian FMCG area.

## **7.6 Analysis of Milk Powder Price**

In the last years, milk powder prices in the Chinese market have shown an obvious increasing trend. Of course the prices of final products and the raw milk powder which are used as manufacturing material are both rising. There are three reasons for the price increasing of raw powdered milk.

At first it is cost increase. Because of just little profit margins, rising cost unavoidably causes gross margin decrease which is the direct consequence for the price rise.

Secondly it is changes in demand. For example the focal point of international financial crisis in 2008 led to reduced demand for milk in 2009. The prices at a low level were mainly reflected in New Zealand milk powder price decline. China raw milk powder prices have been affected by this and the prices were very low as well in New Zealand. Since the impacts of economic downturn reducing and as a consequence the price of raw milk powder began to rise from August 2009. [11]

Thirdly, the connections between the Chinese market and international markets have increased. Since China joined WTO, China has become largest powdered milk export market of New Zealand. Effects of the international market on the Chinese domestic market became

increasingly evident. The rising price in international market will unconditionally cause price rises in the domestic market.

Actually the price rise of final powder products in China is not directly caused by cost increase. In fact it is affected by many factors which are controlled by foreign funded enterprises. Therefore, foreign brands collectively attribute price rise to cost increase. However, the prices of China powder brand have some connection with the cost. If we compare it with foreign brands, the majority of domestic brands are on sale in low end markets which have small profit margins consequently the increase of raw material powder price, package, transportation and other costs can easily drive final product's price increases.

## 8 Conclusion

In my Bachelor Thesis I have tried to analyse milk powder process of manufacturing and various matters related to given topic. Such as for example topics associated with energy and environmental considerations, accurate packaging and storage and different applications of milk powder. Further there are characterized types of powdered milk such as agglomerated milk powder, instant whole milk powder, skim milk powder and non fat dry milk or powdered buttermilk. Subsequently this thesis deals with milk powder trade all over the world and discusses mainly export, import, consumption and prices.

In one chapter there is also mentioned about dairy sector in five parts. It is Dairy production, dairy consumption, dairy trade, dairy policies and international standards for dairy products. This work also includes Chinese market and one of the Chinese largest company which deals mainly with milk powder and various dairy products.

Subsequently there is one selected company which is very well known around the world and it is applied to the SWOT analysis. Reason why it is given just into this analysis is that it is one of the most used and useful manager tools. SWOT analysis depicts in detail given company' strengths, weaknesses, opportunities and threats and it expresses the manager's real value and risk in the firm.

In terms of milk powder predictions and options is milk powder indispensable and necessary for all of us, especially for third world countries. Milk powder is known for its storage longevity and its use in a range of products. Demand for this product in combination with price vulnerability due to fluctuations in production based enormously on weather changes and herd size variations make this a valuable hedging tool.

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## **10 Annexes**

### **10.1 List of Figures**

Figure no. 1: Schematic figure of manufacturing process

Figure no. 2: The biggest exporters of Skim Milk Powder

Figure no. 3: The biggest exporters of Whole Milk Powder

Figure no. 4: Overview of biggest exporters

Figure no. 5: Curve of the euro exchange rate to the dollar

Figure no. 6: Curve of the NZD exchange rate to the USD

Figure no. 7: World milk production\* per capita, 1980-2004

Figure no. 8: Milk Consumption in Developed and Developing Countries

Figure no. 9: Chart of Domestic Sales and Exports

### **10.2 List of Abbreviations**

WMP	Whole Milk Powder
SMP	Skim Milk Powder
USD	American Dollar
NZD	New Zealand Dollar
WTO	World Trade Organisation
OECD	Organisation for Economic Co-operation and Development
UHT	Ultra-high Temperature processing
ASEAN	Association of Southeast Asian Nations
RMB	Renminbi
FMCG	Fast Moving Consumer Goods