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Traditional Food Network to improve the transfer of knowledge for innovation



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1. Statement

Deliverable completed

2. Use and Verification of Deliverable in TRAF00N

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1. Introduction

In the European Union, Small and Medium Sized Enterprises (SMEs) in the food sector are increasingly under pressure due to the opening of markets, an increasing demand of standardized and price competitive food products by the consumers, the rising importance of large retailers, and the challenges of conforming to governmental regulations. These pressures put at risk many traditional foods as well as traditional processing techniques still available today. SMEs using locally sourced raw materials and century-old recipes and processing methods are a cornerstone of the cultural identity of European regions. In the urban centres, groups of consumers are increasingly demanding traditional, local and/or organic food productions, as food scandals and the dispute on GMO undermine public confidence in industrial food producing systems. To economically survive and to partake in these modern consumer markets, SMEs producing traditional foods must extend their skills, both in terms of business development and production techniques, to comply with existing European regulations and to promote the aspects of their products related to nutrition and health.

To support these traditional SMEs, the TRAF00N project has set sail in November 2013 to establish a knowledge transfer network with a focus on food products made of grains, fish, fruits, vegetables and mushrooms to support traditional food producing SMEs. The current report consists of a detailed overview of the US market on the following food product sectors:

- Foods made from freshwater fish;
- Traditional foods made of grains;
- Traditional foods made of fruits and olives;
- Traditional foods made of vegetables and mushrooms.

2. Trade overview

The United States (US) has been running consistent trade deficits over the last five decades due to high imports of computer and electronic products, oil and gas, transportation equipment, and apparel manufacturing products. Despite the trade deficits, in the food sector the US trade balance has been positive since 2006. Nevertheless, this positive balance has been decreasing over the last years, indicating that US demand for food products is growing. In 2015, the food trade balance was approximately +4.7 billion dollars, a trade surplus about three times lower than in 2013. This drop in the US food trade surplus was primarily a consequence of the increase of the trade surplus of meat products (+\$15.0bn to +\$8.5bn), grain and oilseed milling products (+\$5.0bn to +\$3.5bn) and dairy products (+\$4.4bn to +\$2.6bn); and the decrease of the trade deficits of fruit & vegetables preserves (-\$2.3bn to -\$3.0bn), bakery & tortilla (-\$1.9bn to -\$2.4bn), and sugar & confectionary goods (-\$3.8bn to -\$4.3bn).

Contrarily to the US world trade balance of food, the US trade balance of food products with the EU has been in deficit over more than one decade. Between 2013 and 2015, the food trade deficit with the EU increased 51% (-\$3.1bn to -\$4.7bn), as a result of a two-fold increase in the trade deficit of preserved fruit and vegetables (-\$346m to -\$716m), and a 30% increase in the trade deficit of dairy products (-\$1.0bn to -\$1.3bn). Food imports from the EU to the US (\$8.7bn, Figure 1) mostly consist in imports of grain and oilseed milling products (20%), dairy products (16%), preserved fruit and vegetables (15%), sugar and confectionary products (11%) and bakery and tortilla products (10%); whereas the majority of food exports from the US to the EU (\$4.0bn) correspond to exports of grain and oilseed milling products (28%), meat products (16%) and preserved fruit and vegetables (16%).

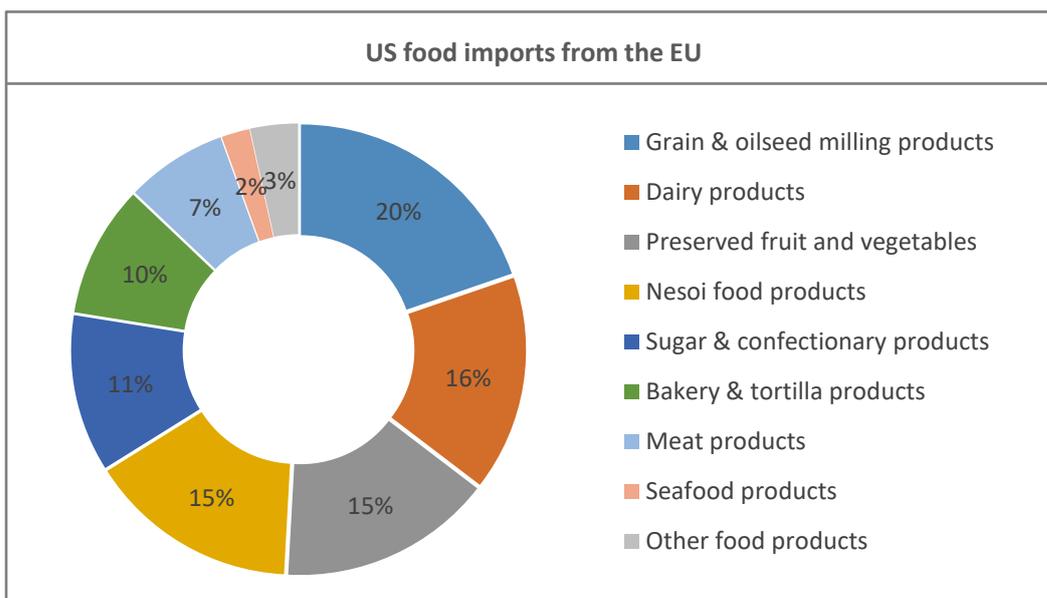
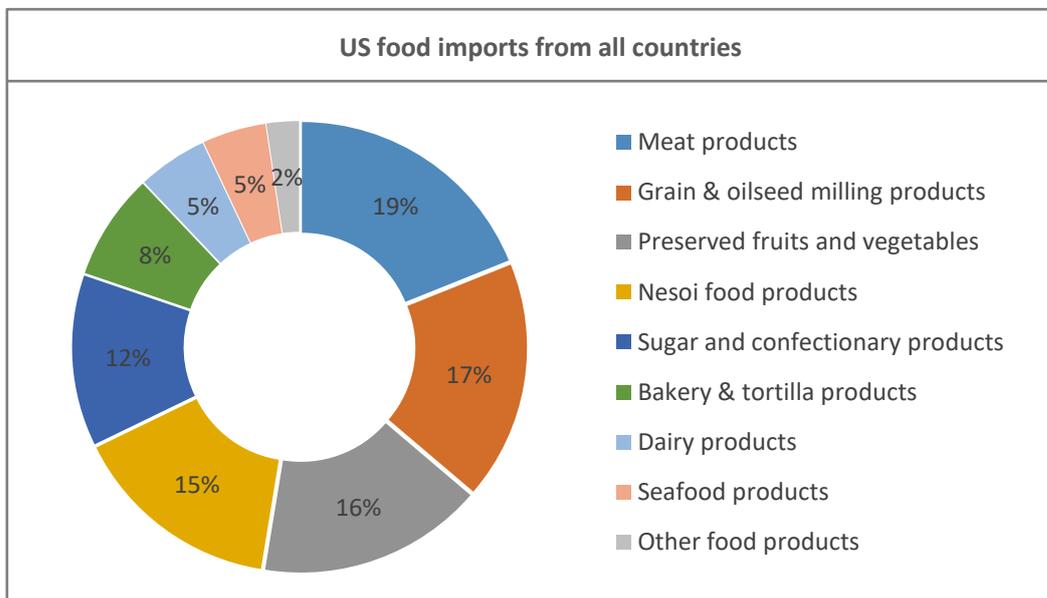


Figure 1 – US food imports from all countries and from the EU

3. Product Market Review

3.1. Foods Made from Freshwater Fish

3.1.1. Import/export trends 2013-2015

The US seafood trade deficit reached \$14.3 billion in 2014, making it one of the country's largest commodity trade deficits. Although both seafood imports and exports have been growing over the past decade, imports have grown at a quicker rate compared to exports. The rate of growth of seafood imports increased from approximately 3.4% over the 2005-2009 period to approximately 9.3% over the 2010-2015 period. Currently, the US is the second largest importer of seafood in the world¹, but only about 4% of seafood imports are from the European Union (2015).

The US trade balance of fresh or chilled fish with the world has been in deficit over the last years. Between 2013 and 2015, the trade deficit has increased 30% (-\$1.0bn to -\$1.3bn), mostly due to a 70% decrease in exports of fresh or chilled fish. The most pronounced decrease was seen for the exports of fresh or chilled salmon, since these have decreased from \$66m in 2013 to \$33m in 2015. Likewise, the US trade balance of fresh fish (cold or chilled) with the EU has also been in deficit over the last years (-\$90m in 2015). The balance has not changed significantly from 2013 to 2015, but some trends are observed for the imports and exports of some fish species. Between 2013 and 2015, imports of fresh salmon from the EU to the US, which account for 60% of all fresh fish imports, decreased by 20% (\$75m to \$60m); whereas imports of fresh and chilled trout fish more than doubled (\$1.7m to \$4.0m). In terms of exports, exports of fresh rays and skates decreased by almost half (\$4.7m to \$2.6m), and in contrast, exports of fresh salmon increased more than four times (\$0.7m to \$2.9m).

Contrarily to the US trade balances of fresh or chilled fish, both US trade balances of frozen fish with the world and the EU have been positive over the last few years (+\$1.4bn and +\$216m in 2015, respectively). Several trends in the imports of frozen fish from the EU to the US are observed. Between 2013 and 2015, imports of frozen tooth fish, accounting for nearly 50% of all imports of frozen fish from the EU, almost doubled (from \$5.3 to \$10.2) and imports of frozen swordfish, representing about 14% of frozen fish imports from the EU, have grown almost four times (\$0.8m to \$3.0m). In opposition, imports of frozen sole dropped more than three times over the same period (\$8.2m to \$2.5m). In terms of exports, a positive trend is observed for the exports of sockeye salmon from US to EU; these more than doubled from 2013 to 2015 (\$98m to \$202m).

¹ https://www.islandsbanki.is/library/Skrar/Seafood-Reports/International_Seafood_Report_low.pdf

The US trade balance of fish fillets with the world has been in deficit over the past decade (-\$3.9bn), as imports have been about four times superior to exports (\$5.0bn versus \$1.2bn). In opposition, the US trade balance of fish fillets with the EU has been positive over the past years (+\$355m) because imports have been about four times lower than exports (\$101m versus \$456). Imports of fish fillets from EU to US have grown by 20% between 2013 and 2015, as imports of fresh or chilled salmon fillets, representing around 60% of these imports, expanded 40% (\$45m to \$63m) over this period. Despite only accounting for 4% of fish fillets from EU, imports of tuna fillets have also grown more than four times: from \$0.9m in 2013 to \$3.9m in 2015. In contrast, imports of cod fillets from EU decreased by almost half between 2013 and 2015 (\$5.9m to \$3.1m). Most exports of fish fillets from US to EU which mostly consist in exports of Alaska Pollock fillets (\$307 out of \$456m) did not vary significantly over the last years.

Both US trade balances of dried or salted fish with the world and the EU have been in deficit and continuously decreasing over the past years. The US trade deficit of dried or salted fish with the world has increased from -\$233m in 2013 to -\$267m in 2015 and the US trade deficit of dried or salted fish with the EU has increased from -\$55m in 2013 to -\$76m in 2015. The 38% increase in the trade deficit of dried or salted fish with the EU was mostly because imports increased by 28% (\$65m to \$81m) and exports decreased by nearly half (\$9.9m to \$4.7m). This 28% growth in imports between 2013 and 2015 was mostly because smoked salmon imports, representing more than 95% of imports of dried or salted fish from the EU, expanded by 28%; whereas the pronounced decrease in exports was mostly due to the three-fold decrease in dried or smoked fish liver and roe exports, which account for more than half of the dried or salted fish exports to the EU.

The US trade balance of prepared or preserved fish with the world has been negative over the past decade (-\$1.1bn in 2015). In 2015, imports totalled \$1.5bn, a value more than three times higher than exports. Within imports, a positive trend is observed for prepared or preserved eels. Imports of prepared or preserved eels to the US more than doubled from 2013 to 2015 (\$26m to \$59m). Contrarily to the US trade balance of prepared or preserved fish with the world, the US trade balance of prepared or preserved fish with the EU has been positive over the past years (\$14m). In 2015, the exports were slightly higher than imports (\$90.6m versus \$76.6m in 2015). Some trends in the imports and exports of some categories of prepared or preserved fish are observed. From 2013 to 2015, imports of prepared or preserved sardines, accounting for 36% of total imports from the EU to the US, dropped by 23%; while exports of prepared or preserved anchovies representing about 12% of total imports from the US to the EU have grown 20%. On the other hand, exports of caviar or caviar substitutes from fish eggs to the US expanded by 80% over the same period of time (\$9.3m to \$16.1).

3.1.2. Market Potential Barriers and Opportunities

The US is experiencing an increasing demand for fish, mostly due to three factors. The first factor is a change in consumer behaviour. US consumers are eating more fish because there is a growing interest for healthy lifestyles which emphasize the importance of choosing seafood as a protein source during meals². The second factor is the change of the US consumer demographics. Since low-income householders (under \$10,000) are typically less likely to consume high amounts of fish³, the improvement per capita disposable income over the last decade has resulted in an increase of fish consumption⁴. The third factor is the fish domestic supply. Currently, US seafood supply can only meet about 10% of its demand, and this supply has been decreasing over the time⁵. One of the main reasons underlying the decrease in the seafood supply is the temperature increase of the Pacific Ocean seawater which makes the plankton a less efficient energy source for fish. According to National Oceanic and Atmospheric Administration (NOAA), the catch numbers of Alaskan Pollock, the number one fished seafood in the US, declined by about 40% over the last 4 years due to the temperature increase of the seawater⁶.

Accompanying the high and increasing US demand for fish, companies are great in number with widely varying business models across the US industry. In the crowded market of seafood, strong branding and marketing have been the main differentiators, whether it is a vertically integrated company or a market-facing company⁷. Since there is a market pressure for companies to reduce their products price due to the severe competition, the required branding and marketing support needs to be balanced with a reduction of production costs. As a result, the biggest challenge fish companies are currently facing is the need of a reduction of costs without compromising quality and reliability of their products⁸.

Apart from the referred market barriers, there are also some legal requirements for the importation of fish. The importation of fish is regulated by three federal government agencies: Food and Drug Administration (FDA), the National Marine Fisheries Service (NMFS) and the Fish and Wildlife Service

² The new U.S. Dietary Guidelines include a recommendation to choose seafood as the protein choice in meals: "Shifts are needed within the protein foods group to increase seafood intake. (...) Strategies to increase the variety of protein foods include incorporating seafood as the protein foods choice in meals twice per week in place of meat, poultry, or eggs." <https://health.gov/dietaryguidelines/2015/guidelines/chapter-2/a-closer-look-at-current-intakes-and-recommended-shifts/#food-groups>

³ <http://www5.agr.gc.ca/resources/prod/Internet-Internet/MISB-DGSIM/ATS-SEA/PDF/6096-eng.pdf>

⁴ <http://www.ibisworld.com/industry/default.aspx?indid=1044>

⁵ <http://www.thefishsite.com/fishnews/25541/new-report-highlights-trends-insights-in-the-us-seafood-industry/>

⁶ <https://www.qsrmagazine.com/reports/sea-change>

⁷ <http://seafoodbusiness.epubxp.com/i/300651-may-2014/22>

⁸ <http://www.trimarinegroup.com/solutions/brands.html>

(FWS)⁹. The FDA, aiming at protecting and promoting public health, is responsible for ensuring that the nation's fish supply, both domestic and imported, is safe, sanitary, wholesome, and honestly labelled¹⁰. The NMFS, which manages the nation's living marine resources and their habitat, has the NOAA Seafood Inspection Program which provides international inspection services to foreign processors and importers to assist industry in meeting U.S. regulations and requirements¹¹. Finally, the FWS, dedicated to the management of fish, wildlife, and natural habitats, restricts the quantity of caviar imported to US¹².

3.1.3. Market Trends

In the US, fish is estimated to make only a tenth of overall protein purchase. However, the growth in fish consumption over the last years (see section 3.1.1) presents an opportunity for industry to target new consumers. Currently, the most significant segment of fish consumers consist in households with an annual income between \$20,000 and \$60,000, although single-person households and households of three to four people also represent important consumer segments. The Americans who live in the Southern or Western US have a higher preference for fish compared to other regions and consumers who are aged 55 and over also consume higher amounts of fish compared to the younger consumers. Almost all US consumers (97%) eat fish at home (rather than carried from home and eaten elsewhere) and primarily as a main dish (90%) and during dinner (77%). Fish is mainly consumed on weekdays and, during the week, Friday is the most popular day for the consumption of fish. US consumers also eat more often fish during winter and spring than during other seasons¹³.

In order to adapt to the consumer behaviour, fish companies have invested significantly in the development of new products. Between January 2008 and November 2011, one third of all fish launches consisted in completely new products, mostly as a response to new consumer trends. Currently, US consumers are primarily looking for fish products which are healthy and convenient. Since US consumers see fish as a healthy alternative to other proteins. They also look for fish products which have healthy attributes such as organic, no additives, no preservatives, no antibiotics/hormones and low, no, or reduced sodium. In addition, because US consumers spend the least amount of time cooking, compared to others in the world, they look for fish which can be easily prepared and consumed. US consumers prefer fish packages which are resalable, "ready-to-cook" or that contain on-package recipe

⁹ https://help.cbp.gov/app/answers/detail/a_id/204/~regulations-for-importing-seafood

¹⁰ <http://www.fda.gov/Food/PopularTopics/ucm341987.htm>

¹¹ http://www.seafood.nmfs.noaa.gov/program_services/program_services.html

¹² https://help.cbp.gov/app/answers/detail/a_id/204/~regulations-for-importing-seafood

¹³ <http://www5.agr.gc.ca/resources/prod/Internet-Internet/MISB-DGSIM/ATS-SEA/PDF/6096-eng.pdf>

ideas^{14,15}. Apart from the fish attributes, US consumers are also concerned about healthy stocks and sustainability when it comes to their fish choices. According to a 2012 Mintel survey, almost all US consumers (86%) are concerned about the stock status of the seafood they consume and more than half of them would like to see information about sustainability on packaging¹⁶.

3.1.4. Sample Key Market Stakeholders

The top fish companies in terms of US sales develop and provide products to US consumers taking into account their latest needs and preferences, as well as by considering the global sustainability of the stocks. Table 1 indicates some innovative products that have been recently launched by some of these companies, as well as their initiatives to promote fish sustainability.

¹⁴ <http://www.preparedfoods.com/articles/115138-top-seafood-trends-in-2015>

¹⁵ <http://www.technavio.com/report/global-food-fish-and-seafood-market>

¹⁶ http://wwf.panda.org/wwf_news/?217632/Seafood-consumption-trends-in-the-US-and-the-Coral-Triangle-connection

Table 1 – Sustainability initiatives and recent launches of some US seafood fresh water fish companies

Supplier name	Supplier Profile	North America Sales in 2015 ¹⁷	Sustainability programs	Recent launches
Tri Marine International ¹⁷	Tri Marine International is one of the world’s leading raw material suppliers for the tuna industry. Based in Bellevue, Wash., Tri Marine owns several freshwater tuna fisheries and supplies leading tuna brands worldwide, operating its own 14 purse seiners among other vessels and carrier ships, as well as processing plants at strategic sites like San Pedro, Calif.; Port Louis, Mauritius; the Solomon Islands; the Marshall Islands; Ningbo, China; Barranquilla, Colombia; and Manta, Ecuador.	\$1.3bn	Responsibly caught products: Tri Marine’s own brand, Ocean Naturals, uses only these sources for their premium, responsibly caught products. Rated by Monterey Bay Aquarium’s Seafood Watch Green or Yellow, and/or certified to the Marine Stewardship Council’s (MSC) standards for sustainable seafood ¹⁸ .	Ultra Low Temperature (ULT) yellowfin tuna: the new ULT tuna is caught both by long-line vessels in the Solomon Islands and by hand line in small fisheries in North Sulawesi, Indonesia. The long-line tuna is immediately frozen on the vessel and stored at minus 76 degrees Fahrenheit. The process of freezing and defrosting was developed after 10 years of research. The process reproduces the traditional Japanese method for thawing sashimi tuna on a commercial scale. The result is an artisan-quality product with important health benefits. Freezing tuna at ultra low temperatures suspends bacterial actions, kills parasites and drastically reduces the risk of histamine. Tri Marine thawing technology ensures the freshest-tasting tuna by preserving its natural colour and texture without the use of any chemical preservatives or enhancers ¹⁹ .

¹⁷ <http://www.trimarinegroup.com/>

¹⁸ http://www.trimarinegroup.com/activities/sustainability.html#_SUB_2

¹⁹ <https://www.linkedin.com/pulse/tri-marine-returns-seafood-expo-north-america-after-nearly-orsini>



<p>High Liner Foods²⁰</p>	<p>High Liner Foods (HLF) is the largest seafood company in Canada, and has been growing a steady pace for several years (2009 sales were \$592.5 million)²¹. The publicly traded company, based in Lunenburg in Canada and with US headquarters in Portsmouth, processes and markets frozen seafood products including fresh water fish, aquaculture fish, battered fish, fish appetizers, breaded fish, scallops and wild harvested fish²².</p> <p>It is a global leader in driving best practice improvements in wild fisheries and aquaculture and has achieved 99% of our strategic goal to sustainably source all of our seafood¹⁸.</p>	<p>\$1.1bn</p>	<p>Sustainable Fisheries Partnership (SFP): High Liner Foods work in conjunction with the Sustainable Fisheries Partnership (SFP) to survey all of its source fisheries and aquaculture operations to determine which were already sustainable, which could be improved and which should be avoided because they did not engage in responsible business practices. From there, HLF develops programs and strategies to take a proactive role in improving fisheries and aquaculture programs worldwide²³.</p>	<p>Fresh Water Walleye: A full fillet of a fresh water specie with the skin-on - ideal for grilling and boasts a striking appearance with its uniquely coloured skin; it is individually quick-frozen to assist with portion control, packed in convenient, pre-portioned fillets²⁴.</p>
<p>Bumble Bee²⁵</p>	<p>Bumble Bee Foods made headlines in December when news broke that it had been acquired by Thai Union Frozen Products, a massive deal that has been finalized in December of last year. The San Diego-based company is known for canned tuna, but also has a wide range of canned salmon, sardines, shrimp, clams, crab and oysters. With a strong focus on convenience and health, Bumble Bee posted \$1 billion in sales for the third straight</p>	<p>\$1.0bn</p>	<p>Trace My Catch: a new online tool to allow customers to trace where their tuna products come from. The tool informs the consumer about information such as species, fishing method, what ocean it was caught in, the name and flag of the vessel that caught it and where it was processed²⁷.</p>	<p>Bumble Bee Skinless and Boneless Smoked Salmon in Oil and the Bumble Bee Atlantic Salmon: (which has very limited distribution) packed with farm-raised salmon.</p> <p>Bumble Bee® Premium Albacore Tuna in Water Pouches: a new version of an existing products, the premium Albacore Tuna product; in this new product, the</p>

²⁰ <http://www.highlinerfoods.com/en/home/default.aspx>

²¹ <http://www.seafoodsource.com/news/supply-trade/the-top-25-north-american-seafood-suppliers?start=11>

²² <https://www.thedrinksbusiness.com/dbreport/high-liner-foods-incorporated-company-profile-financial-analysis/>

²³ <http://highlinersustainability.com/our-commitment-to-sustainability/our-partnerships/>

²⁴ <http://www.highlinerfoodservice.com/en/product/Fresh-Water-Fish-Walleye-168.html>

²⁵ <http://www.bumblebee.com/>



	<p>year and, despite undulating raw material prices worldwide, its sales have never declined over the past decade. The Company also acquired Anova Food in late 2013²⁶.</p>			<p>premium Albacore Tuna is in a convenient vacuum-sealed pouch with a tear-open strip to facilitate the preparation of sandwiches, salads and seafood recipes. It has been developed to be an on-the-go ingredient for Summer meals²⁸.</p>
<p>Nippon Suisan USA²⁹</p>	<p>Nippon Suisan USA (Nissui) has a diverse seafood portfolio that includes Gorton’s and F.W. Bryce (Gloucester, Mass.), King & Prince Seafood (Brunswick, Ga.), Unisea (Redmond, Wash.) and Glacier Fish Co. (Seattle).</p> <p>Nissui also owns numerous companies around the world, including Salmones Antártica SA³⁰, a company of fish farming established in April of 1979 for the purpose of salmon farming under the name Domsea Pesquera Chile Limitada. Today, the Company uses seamless aquaculture system that starts with the production of feed for fish farming, goes on to the culturing of nursery fish, the raising of juvenile fish in freshwater, and farming of the fish in seawater. Using these aquaculture methods, the Company has become a five-star brand,</p>	<p>\$860m</p>	<p>ISO14001 certification: Nissui promotes the acquisition of ISO14001 certification, which is the international standard for environmental management. As of the end of July 2014, a total of 63 locations (offices, domestic consolidated subsidiaries, and Group companies combined) had acquired ISO14001 certification³².</p>	<p>Smoked freshwater salmon: Nissui will launch a line of smoked salmon. The salmon will come from the Salmones Antártica, a freshwater fish farm owned by Nippon Suisan³³.</p>

²⁷ <http://www.bumblebee.com/tracemycatch/>

²⁶ <http://www.seafoodsource.com/news/supply-trade/the-top-25-north-american-seafood-suppliers?start=11>

²⁸ <http://www.bumblebee.com/products/tuna/bumble-bee-premium-albacore-tuna-in-water-pouch/>

²⁹ <http://www.nissui.co.jp/english/index.html>

³⁰ <http://www.salmonesantartica.cl/>



producing safe salmon and trout of superb quality that it sells all over the world³¹.

³² <http://www.nissui.co.jp/english/social/environment/management.html>

³³ <http://www.intrafish.com/news/613236/nippon-suisan-launches-new-smoked-salmon-brand-through-chilean-affiliate>

³¹ <http://www.nissui.co.jp/english/business/network/world.html>

3.2. Traditional Foods Made of Grains

3.2.1. Import/export trends 2013-2015

Both US trade balances of cereal grains with the world and the EU have been in deficit over the past decade. In 2015, the cereal grains' deficit with the world was equal to $-\$1.9\text{bn}$, while the cereal grains' deficit with the EU corresponded to $-\$624\text{m}$. In both cases, the observed deficit is mostly a consequence of the high imports of bread, pastry, cakes, biscuits and other baker's wares (in 2015: $\$4\text{bn}$ from world to the US and $\$642\text{m}$ from the EU to the US).

The US trade balance of cereal grains with the EU has been in deficit over the last 5 years. Between 2013 and 2015, this deficit almost doubled ($-\$5.0\text{m}$ to $-\$11.9\text{m}$), as cereal grains imports from the EU to the US have significantly increased over this period ($\$6.5\text{m}$ to $\$14.1\text{m}$). The US deficit of cereals grains with the world also doubled from 2013 ($-\$49\text{m}$) to 2015 ($-\110m). This deficit increase was not only due to a growth in the imports of cereal grains from the world to the US ($\$167\text{m}$ to $\$197\text{m}$), but also a result of a drop in exports of cereal grains from the US to the world ($\$118\text{m}$ to $\$83\text{m}$).

The US trade balance of cereal groats with the EU has been in deficit over more than one decade because exports of cereal groats from the US to the EU have been very low ($\$213,000$ in 2015). In opposition with the US deficit of cereal groats with the world which more than doubled between 2013 and 2015 ($-\$32\text{m}$ to $-\$79\text{m}$), the US deficit of cereal groats with the EU has only increased by 30% over the same period ($-\$10\text{m}$ to $-\$13\text{m}$).

Despite still having a deficit in 2013 ($-\$0.9\text{m}$), the US trade balance of cereal flours with the EU is now positive ($\$1.4\text{m}$ in 2015). This change is mostly because cereal flours exports from the US to the EU have been increasing at a quicker growth rate compared to cereal flours imports from the EU to the US. From 2013 to 2015, cereal flours imports from the EU to the US almost doubled ($\$2.6\text{m}$ to $\$4.3\text{m}$), whereas US exports of cereal flours to the EU expanded almost four times ($\$1.6\text{m}$ to $\$5.7\text{m}$). The US trade balance of cereal flours with the world is also positive. In 2015, this trade balance was equal to $+\$5.8\text{m}$, as cereal flours exports from the US to world were slightly higher ($\$89\text{m}$) than cereal flours imports from the world to the US ($\$83\text{m}$).

The US trade balance of foods prepared by swell cereals (FSC) with the EU have been in deficit ($-\$33\text{m}$ in 2015) over the past decade, as imports have been about 3 times higher than exports ($\$45\text{m}$ versus $\$12\text{m}$ in 2015). In contrast, the US trade balance of FSC with the world has been positive over the same period. Just between 2013 and 2015, this trade balance almost doubled ($+\$130\text{m}$ to $+\$215\text{m}$) mostly because imports from the world to the US decreased by 8% ($\$583\text{m}$ to $\$539\text{m}$).

Both US trade balances of bread, pastry, cakes, biscuits and other baker's wares (BCBO) with the world and with the EU have been in deficit over the past decade (-\$2.0bn and -\$568m, respectively). In the case of the US trade with the world, the deficit of BCBO has increased by 43% between 2013 and 2015 (-\$1.4bn to -\$2.0bn). This deficit increase has been mostly a consequence of an expansion of BCBO imports from the world to the US over this period of time (\$3.4bn in 2013 to \$4.0bn in 2015).

3.2.2. Market Potential Barriers and Opportunities

The US Grain Industry has an important production potential, even when evaluated on a global scale. The US is currently the world's largest wheat, corn and sorghum exporter. The country is estimated to export annually: 55-60 million tons of wheat, 35-40 million tons of corn and 3-4 million tons of sorghum. According to a study titled "American Flour Milling" by John C. Miller, the former Chairman and CEO of the North American Millers' Association, there are 170 mills belonging to 45 companies with a daily 80 thousand-ton capacity. When the milling companies are evaluated in terms of capacity, 40% have daily processing capacity over 454 tons, 26% between 228 and 453 tons, 19% between 46 and 227 tons, 6% between 19 and 45 tons and 14% under 18 tons.

Although the US is the world's largest exporter of some grain categories, the US grain market still present an opportunity for companies from both developed and developing countries. This is because most grains produced in the US become either animal feed or processed into sweeteners, corn oil, and industrial products like ethanol fuel. In addition, since almost all grains produced in the US are genetically modified, the US relies in the importation of non-GMO grains in order to respond to the high and growing demand of non-GMO grains among consumers (details in section 3.2.3)³⁴.

In the US, the grain market is greatly influenced by the fluctuation in the price of grain commodities. There are four factors influencing the price level of grain commodities that deserve particular attention (Table 2). The first corresponds to the weather changes. The grains' price rises due to shortfalls, which are often a result of natural disasters such as the El Nino tornadoes. The second consists in the GMO farming. Although the demand for GMO grain products has been decreasing in the US due to its unhealthy perception, GMO seeds in farming are still popular among US farmers due to the more competitive yields. Since the introduction of GMO seeds in the US farming, price of GMO grain commodities have been dropping as a consequence of the pronounced increase of grains supply³⁵. The third corresponds to the strength of the US dollar. The strength of the US dollar against other

³⁴ <https://munchies.vice.com/en/articles/the-us-is-the-worlds-largest-producer-of-corn-so-why-are-we-importing-more>

³⁵ <https://www.geneticliteracyproject.org/2015/02/04/money-talks-some-farmers-go-non-gmo-because-of-price-premiums-not-rejection-of-biotech/>

currencies, particularly against emerging market currencies, greatly influences the grain price in the US. As the US dollar currency gains strength compared to other currencies, grains get more expensive in a global scale³⁶. The fourth factor is the increasing use of grains in the production of industrial bioethanol. In the US, bioethanol production, mostly from corn, increased from 6.2 billion liters in 2000 to 50 billion liters in 2010. This application of grain commodities causes a rise in the price of grain commodities, as a result of the increased demand of grains for bioethanol production³⁷.

Table 2 – Factors determining the price of grain commodities in the US.

Factor	Consequence	Effect in price
Natural disasters	Decrease in supply	Increase
GMO farming	Increase in supply	Decrease
Strength of US dollar currency	-	Increase
Bioethanol production	Increase in demand	Increase

There are no particular legal barriers to export grain products to the US, besides the standard US requirements for imported food. Similar to other food imports, companies intending to import grain products should be “responsible for ensuring that the products are safe, sanitary, and labelled according to US requirements”. Imported food products are subject to FDA inspection when offered for import at US ports of entry. The FDA may detain shipments of products offered for import if the shipments are found not to be in compliance with US requirements³⁸.

3.2.3. Market Trends

The US consumption of grains increased between the 70’s and the 90’s due to the rising population and incomes. However, the switch from low-fat diets to low-carbohydrate diets (such as the Dr. Atkins Diet Revolution and the South Beach Diet) at the beginning of the 21st century led to a drop in the US consumption of grains. For example, the US wheat consumption has increased from 110 pounds per person in 1970 to 147 pounds per person in 1998, but it has dropped to 134 pounds per person in 2012³⁹.

The 2005 Dietary Guidelines for Americans recommend “the consumption of 6 equivalents (oz-eq) of grains per day with whole grains accounting for at least half of this amount (for those on a 2000-calorie-

³⁶ <http://www.ft.com/cms/s/0/cf841d5c-58d3-11e6-9f70-badea1b336d4.html#axzz4JaSW3Edf>

³⁷ <http://pubs.acs.org/doi/pdf/10.1021/bk-2011-1089.ch001>

³⁸ <http://www.fda.gov/Food/GuidanceRegulation/ImportsExports/Importing/>

³⁹ <http://scitechconnect.elsevier.com/wp-content/uploads/2015/12/Consumer-Trends-in-Grain-Consumption-1.pdf>

per-day diet)". However, it is believed that US consumers are eating on average about two more grain servings than recommended (8.1 oz-eq of grains per person per day versus the 6 recommended) and that only 10% of these servings consist in whole grains³¹. Despite the misalignment between the recommended consumption and the actual consumption of whole grains, the US still represents the world's largest market of whole grain and high fibre foods due to its large population and high GDP. A growing demand for whole grain foods has been particularly observed among people with sensitive digestive system, as these foods are low in glycaemic levels, have lower calories and a higher nutritional value⁴⁰.

There are other trends observed in the consumption of grain foods among US consumers. The first corresponds to the decreasing consumption of bread over the past few years, which is mostly a consequence of the unhealthy perception consumers have in regards to bread, as well as a result of the consumer switch to easy to carry and easy to prepare foods. The consumption of one bread category, the whole grain bread, has been however growing since 2006 as a result of its perceived high nutritive level, good taste and uniqueness. In opposition with the decreased consumption of bread, pasta consumption has continued to be popular among US consumers over the past decade. The main reasons for its continuing popularity are its low price, quick time of preparation and multiple applications. Like in the case of bread, there has been also an increasing demand for the wholegrain category. Although wholegrain pasta is still only holding about 7% share of the dry pasta market, whose market has an annual growth rate of about 16%. Wholegrain pasta consumers explain their preference by its high nutritive level, good taste and appealing appearance and texture⁴¹.

In the particular case of baker wares, such as pastry cakes and biscuits, US consumers are no longer looking for the "no words" in the package label, as "reduced", "low", "free" or "aren't". Currently, the consumer perception of health has been switched from focusing on what the food is missing (e.g. "reduced fat", "low calories" and "sugar-free") to what the food itself is (e.g. "non-GMO", "clean label", "simple" and "wholesome ingredients"). As a result of this consumer switch, transparency, clean label and adventurous but not artificial flavours are the major bakery trends in the US market⁴².

Besides the growing demand for the wholegrain bread, pasta and bakery with a clean label and wholesome ingredients, an increasing demand for gluten-free specialty has also been observed among

⁴⁰ http://www.nutraceuticalsworld.com/contents/view_breaking-news/2014-09-25/whole-grain-high-fiber-foods-market-to-reach-295-billion-by-2020

⁴¹ [http://www.uswheat.org/meetingsEvents.nsf/8a606fec2e9cb09f8525763900652ea9/b4b96c17b78ef7b985257a4b0061e917/\\$FILE/Aportando%20Valor%20Agregado%20a%20sus%20Productos%20-%20Mike%20Veal.pdf](http://www.uswheat.org/meetingsEvents.nsf/8a606fec2e9cb09f8525763900652ea9/b4b96c17b78ef7b985257a4b0061e917/$FILE/Aportando%20Valor%20Agregado%20a%20sus%20Productos%20-%20Mike%20Veal.pdf)

⁴² http://www.world-grain.com/articles/news_home/World_Grain_News/2016/06/Trends_to_watch_in_the_baked_f.aspx?ID={032353F8-25FD-4E25-A6B3-32360F738B29}

US consumers. Although the demand is expected to continue growing in the future for those diagnosed with Celiac Disease, it is uncertain how demand of gluten-free grain products will evolve for those who are following for diet or health reasons. Although US consumers are in general seeking more convenient ways to include grains in their diet (e.g. by buying ready-to-eat pasta, ready-to-eat rice and pizza crusts)⁴³, this particular group of US consumers (with celiac disease) looks for convenient gluten-free solutions, such as frozen meals and ready-to-eat-meals, that have a good taste and are affordable⁴⁴.

3.2.4. Sample Key Market Stakeholders

Besides the continuing interest in providing cereal foods which are easy to prepare and consume, US grain companies have been focused in the development of speciality products with a growing demand, such as the whole grain, non-GMO and gluten-free foods. Table 3 indicates recent launches by some of these companies.

⁴³ <http://www2.ca.uky.edu/agcomm/pubs/ip/ip58b/ip58b.htm>

⁴⁴ [http://www.uswheat.org/meetingsEvents.nsf/8a606fec2e9cb09f8525763900652ea9/b4b96c17b78ef7b985257a4b0061e917/\\$FILE/Aportando%20Valor%20Agregado%20a%20sus%20Productos%20-%20Mike%20Veal.pdf](http://www.uswheat.org/meetingsEvents.nsf/8a606fec2e9cb09f8525763900652ea9/b4b96c17b78ef7b985257a4b0061e917/$FILE/Aportando%20Valor%20Agregado%20a%20sus%20Productos%20-%20Mike%20Veal.pdf)

Table 3 – Some snacks and meals containing grains recently launched in the US

Company name ⁴⁵	Company Profile	Annual Sales	Recent launches
Ardent Mills	Ardent Mills is a recent company, born from two industry pioneers, ConAgra Mills and Horizon Mills , which themselves were jointly ventures of Cargill and CHS . The company, based in Denver, state of Colorado, offers the industry's broadest range of flours, mixes, blends and specialty products, customized to meet its customer needs and backed by unrivalled technical support, customer service and the supply assurance of a coast-to-coast network. Ardent Mills' operations and services are supported by more than 40 flour mills and bakery-mix facilities along with a specialty bakery and Mobile Innovation Center, all located in the U.S., Canada and Puerto Rico ⁴⁶ .	ConAgra Mills: \$9bn (2015) ⁴⁷ Horizon Mills: \$2.5bn (2012) ⁴⁸	Sustagrain: Snack foods developed to satisfy consumers who are asking for healthier options that do not compromise the snacking experience. Sustagrain, made of highest-fibre whole grains, delivers a host of fibre and whole grain benefits, even in extruded snacks. Sustagrain has over 3 times the dietary fibre of oats and corn flour, and at least 10 times the fibre of brown rice. This proprietary variety of barley has a balanced blend of insoluble and soluble fibres, with the highest level of beta-glucan and the lowest glycemic index of any grain. Truly a superfood, all-natural Sustagrain promotes sustained energy, satiety and digestive and heart health. It is available in flour and flakes, making it the perfect addition to extruded snacks, chips, cereals, crackers and more ⁴⁹ .
Archer Daniels Midland	The Archer Daniels Midland (ADM) Company is an American global food processing and commodities trading corporation, headquartered in Chicago, Illinois. The company is one of the largest agricultural processors in the world. It serves as a vital link between farmers and consumers. The take crops and process them to make food ingredients, animal feed ingredients, renewable fuels	\$63bn (2011)	Confectionery Moulding Starch product line: a new line of starches that offers food-grade moulding capabilities to confectionery and gum customers. The Confectionery Moulding Starch products are starch-based with added mineral or high-stability vegetable oil to allow the product to accept and hold impressions. Advantages for customers include high food-grade quality, decreased drying times and an ability to accept high-

⁴⁵ <http://www.independent.co.uk/news/uk/home-news/the-big-five-companies-that-control-the-worlds-grain-trade-8462266.html>

⁴⁶ Adapted from: <http://www.ardentmills.com/>

⁴⁷ http://www.bakingbusiness.com/articles/news_home/Business/2015/11/Ardent_Mills_stake_to_stay_wit.aspx?ID=%7B1D4F6287-9114-4B58-AAEF-1321E847947E%7D

⁴⁸ <http://finance.yahoo.com/news/conagra-forms-co-ardent-mills-173835375.html>

⁴⁹ <http://www.ardentmills.com/sustagrain.html>

	and naturally derived alternatives to industrial chemicals ⁵⁰ .		quality implantation including shapes and letters. They are also non-GMO ⁵¹ .
Bunge	Bunge is a leading agribusiness and food company with integrated operations that circle the globe, stretching from the farm field to the retail shelf. It operates a global network of facilities, including grain elevators, oilseed processing plants and port terminals that are located in the world's largest agricultural production regions, in areas of fast-growing food consumption and close to major transportation systems. These industrial facilities are complemented by marketing and trading offices, as well as joint venture operations, on six continents ⁵² . In the US, the Company sells dry milled corn ingredients, including conventional, whole grain, and fibre-enhanced corn meals and flours, and corn fibres. It also sells milled conventional and whole grain Calrose medium grain rice.	\$58bn (2014) ⁵³	Non-GMO corn product line: A genetically modified (GMO) free product line developed to meet the request of customers for more non-GMO products. To ensure Bunge will be offering milled corn products that may be labelled as non-MO, Bunge has certified its operation to ensure products will be operating within Non-GMO Project verified standards. An initiative dating back to 2007, products approved under the standard first appeared on supermarket shelves in 2010 ⁵⁴ .
The General Mills⁵⁵	General Mills is a manufacturer and marketer of branded consumer foods sold through retail stores. The Company is a supplier of branded and unbranded food products to the North American foodservice and commercial baking industries. The Company offers a range of food products with a focus on categories, including ready-to-eat cereal; convenient meals, including meal kits, ethnic meals, pizza, soup, side dish mixes, frozen breakfast and frozen	\$10bn (US, 2015) \$4.6bn (international, 2015)	Guten-free Cheerios: The gluten-free Cheerios will continue to include oats, which are gluten-free but must be handled properly to avoid mixing in with gluten-containing grains such as wheat. The gluten-free Cheerios meet the Food and Drug Administration's rule for gluten-free labelling, according to General Mills. Only Multi-grain Cheerios needed reformulation. Sorghum and millet, both gluten-free, replaced wheat and barley. According to the Company CEO, the launch of these

⁵⁰ Adapted from: <http://www.adm.com/en-US/company/Pages/default.aspx>

⁵¹ <http://www.foodbev.com/news/adm-creates-new-line-of-starches-for-confectionery-companies/>

⁵² Adapted from: <http://www.bunge.com/About-Bunge>

⁵³ <http://www.petromax.biz/bunge/>

⁵⁴ http://www.foodbusinessnews.net/articles/news_home/Supplier-Innovations/2016/05/Bunge_launches_nonGMO_corn_pro.aspx?ID=%7B28DA4A79-61B0-4533-9710-0E1350B4D3A9%7D

⁵⁵ <https://www.generalmills.com/en/Company/Businesses>



entrees; snacks, including grain, fruit and savoury snacks, nutrition bars and frozen hot snacks; yogurt, and super-premium ice cream. The Company's other product categories include baking mixes and ingredients, and refrigerated and frozen dough. The Company's products are marketed under various brands, which include Annie's, Betty Crocker, Bisquick, Bugles, Cascadian Farm, Cheerios, Food Should Taste Good, Golden Grahams, Haagen-Dazs, Nature Valley, Oatmeal Crisp, Old El Paso, Pillsbury, and Yoplait⁵⁶.

products represents “a first step in a broad investment plan designed to renovate the basic portfolio of Cheerios for today’s wellness oriented consumer⁵⁷.”

⁵⁶ Taken from: <http://www.reuters.com/finance/stocks/companyProfile?symbol=GIS.N>

⁵⁷ http://www.bakingbusiness.com/articles/news_home/New_Products/2015/02/Coming_soon_to_retail_shelves.aspx?ID=%7BC9D86198-AFAE-40AC-9392-D9EA2B1335AB%7D

3.3. Traditional Foods Made of Fruits and Olives

3.3.1. Import/export trends 2013-2015

Overall, there has been a growing US trade deficit in fresh and processed fruits over the last decade, as fruit imports have been increasing at a higher rate than fruit exports. However, the trade balance of fruits with the EU has been positive across almost all fruit categories because fruit exports from the US to the EU have been much higher than fruit imports from the EU to the US.

The US trade balance of fresh or dried fruits with the EU has been positive over more than one decade, as exports of fresh or dried fruits from the US to the EU have been more than ten times that of imports of fresh or dried fruits from the EU to the US (\$3.1bn versus \$244m in 2015). Almost all fresh or dried fruits exports from the US to the EU consist in exports of fresh or dried nuts (\$2.8bn out of \$3.1bn in 2015), whereas the most significant fraction of edible fruits imports from the EU to the US corresponds to imports of fresh or dried nuts (38% in 2015) and fresh or dried citrus fruits (9% in 2015). Likewise, the US trade balance of fresh or dried fruits with the world has been positive since the beginning of the 21st century. However, some fluctuations of this trade balance are observed. The US trade balance of fresh or dried with the world increased from +\$855m in 2009 to +\$3.34bn in 2013, but it has then dropped to +\$438m in 2015. This drop is mostly because imports of fresh or dried fruits have expanded by 25% between 2013 and 2015 (\$11.2bn in 2013 to \$14.0bn in 2015). Among the imports of all types of fresh or dried fruits from the world to the US, the more pronounced growth from 2013 to 2015 (between 25% and 35%) is observed for the imports of fresh or dried dates, figs, pineapples, coconuts, Brazil nuts and cashew nuts.

The US trade balance of preserved fruits⁵⁸ with the EU has been also positive over more than one decade. In 2015, this trade surplus was equal to +\$56m because exports of preserved fruits from the US to the EU were slightly higher than imports of preserved fruits from the EU to the US (\$334m versus \$278m). More than 98% of preserved fruits exports from the US to the EU consist in exports of fruits preserved in a liquid not made of vinegar or sugar; although, more than half of imports of preserved fruits from the EU to the US also consist in imports of fruits preserved in a liquid not made of vinegar or sugar. A significant part of the preserved fruits imports correspond to imports of jams, fruit jellies and marmalades (28% in 2015) and imports of fruits preserved in vinegar (18%). Both imports of jams and fruits preserved in a liquid not made of vinegar or sugar have expanded about 30% from 2013 to 2015. In opposition with the US trade balance of preserved fruits with the EU, the US trade balance of

⁵⁸ Preserved fruits include fruits preserved in vinegar, fruits preserved in sugar, fruits preserved in other preservative rather than vinegar and sugar and fruit jams/jellies.

preserved fruits with the world has been in deficit over the past decade (-\$1.3bn in 2015). Similarly to the preserved fruits trading from the EU to the US, both imports of preserved fruits from the world to the US and exports of preserved fruits from the US to the world primarily consist in imports of fruits preserved in a liquid not made of vinegar or sugar (about 80% in 2015).

Although the US trade balance of fruit juices with the EU was positive over the past decade, the trade surplus has been continuously decreasing since 2011, as a result of the increasing imports of fruit juices from the EU to the US (\$72m in 2013 to \$161m in 2015) and the decreasing exports of fruit juices from the US to the EU (\$179m in 2013 to \$128m in 2015). The 2-fold increase in fruit juices imports from the EU to the US between 2013 and 2015 is mostly because imports of apple juice increased about four times (\$21m to \$76m); whereas the 30% decrease in fruit juices exports from the US to the EU over the same period is mostly a consequence of the pronounced drop in exports of frozen orange juice (\$79m to \$46m) and cranberry juice (\$52m to \$39m). Contrary to the US trade balance of fruit juices with the EU, the US trade balance of fruit juices with the world has been negative over the past decade (-\$695m) and did not vary much over the past 5 years (between 2011 and 2015). However, some trends are observed for the imports of juices of some fruits from the world to the US. Over the past 3 years (since 2013), a positive trend is observed in imports of orange and citrus juices, and in opposition, a negative trend is observed in imports of grape and apple juices.

3.3.2. Market Potential Barriers and Opportunities

Although fruit consumption is low and has been continuously decreasing in the US over the past decade (more details in section 3.3.3), the US has a trade deficit of fruits as fruit imports are significantly higher than fruit exports (more details in section 3.3.1). The high imports of fruits to the US can be attributed to a number of factors shaping the current competitive market conditions, including:

- the relatively open domestic import regime and lower average import tariffs, with products from most leading suppliers entering the US duty free or at preferential duty rates;
- the increased competition from low-cost or government-subsidized production;
- the continued non-tariff trade barriers to US exports in some countries, such as the import and inspection requirements, technical product standards, and sanitary and phytosanitary requirements;
- the opportunities for counter-seasonal supplies, partly driven by increased domestic and year-round demand for fruits; and

- the increased US overseas investment and diversification in market sourcing by US companies⁵⁹.

3.3.3. Market Trends

In the US, fruit consumption decreased 6% from 2011 to 2016, primarily due to a 14% drop in the consumption of fruit juice. Indeed, if fruit juice (representing about one third of fruit consumption) is excluded from the fruit total, there was only a 2% drop in fruit consumption over the past 5 years. The overall drop in fruit consumption is driven by double digit declines among adults who are 45 and older, particularly among 65 and older adults who have been eating less fruit “as is”, particularly bananas; whereas the decreasing popularity of fruit juice among US consumers is mostly driven by the ongoing interest in consuming low-carbohydrate foods and the increasing competitive set of beverages available to consumers, such as the flavoured waters. Interestingly, fruit juice is believed to be complementary and not competitive with fruit, since several studies have demonstrated that fruit juice drinkers have higher intakes of whole fruit compared to non-fruit juice drinkers⁶⁰.

Although almost all US age and life stage groups are consuming less fruit, some segments have been increasing their intakes of fruit between 2009 and 2015, particularly: children who have been consuming more fruit “as is”, especially more berries, bananas, apples and oranges; adults ages 18-44 who have been eating more fruit at breakfast, particularly berries and bananas; traditional families or working women households who have been consuming more fruit “as is”; African Americans and Hispanics; those in the west north central, mountain, and pacific coastal regions; and households with annual incomes of either \$20,000-\$40,000 or of \$60,000 or more⁵⁷.

Despite the overall decrease in fruit consumption, there has been a growth in the consumption of fruit as a snack, particularly during the morning. This seems to be a consequence of the increasing habit of snacking among US consumers, in 1990 72% of consumers said they to try to avoid snacking entirely, compared to only 39% in 2014. Among all fruits, US consumers prefer to eat berries and bananas as a snack because of their versatility for consumption “as is”, as a topping for cereal or yogurt, or as an ingredient to a smoothie or hot cereal⁵⁷. Even though bananas and berries are together with apples the country’s most popular fruits, there has been an increasing interest in tropical fruits, such as mango, coconut and pineapple^{61,62}.

⁵⁹ <https://www.fas.org/sgp/crs/misc/RL34468.pdf>

⁶⁰ http://www.pbhfoundation.org/pdfs/about/res/pbh_res/State_of_the_Plate_2015_WEB_Bookmarked.pdf

⁶¹ http://nrm.com/food-trends/top-5-fruit-and-vegetable-trends-2015#slide-0-field_images-130141

⁶² <http://www.foodnavigator-usa.com/Markets/How-mango-hit-the-mainstream-Trend-mapping-with-fruit>

Almost all fruit (90%) consumed in the US is sourced from or prepared at home. The low percentage of the consumption of away-from-home fruit is mostly likely due to the low supply on the marketplace. Many US consumers eat at fast food establishments and coffee shops and most of these establishments do not offer fruit in their menus⁶³.

Fruit consumption, excluding juice, is expected to grow by 9% over the next 5 years, primarily due to the aging of the population. The consumption of fruit snacking is expected to continue growing, but in its pure form, without preservative or additives⁶⁴. According to Johnathan Brownbill, North America sales director for Paradise Fruits: “The demand for pure fruit is becoming higher and higher and we found it necessary to come to the marketplace with our pure fruits because the impure fruits on the marketplace, we feel, don’t represent value for money and quality that the general public deserves. They have got filters, additive; they have got fortifications in some way, shape or form that we do not agree with”⁶⁵.

3.3.4. Sample Key Market Stakeholders

The largest US companies manufacturing and selling fruit-based foods are focused in the development of fruit-based foods which have no additives and are convenient to store and consume. Table 4 indicates some of these products.

⁶³http://www.pbhfoundation.org/pdfs/about/res/pbh_res/State_of_the_Plate_2015_WEB_Bookmarked.pdf

⁶⁴<http://www.foodnavigator-usa.com/Manufacturers/Explosive-growth-for-That-s-It-bars-as-snackers-seek-simplicity>

⁶⁵<http://www.bakeryandsnacks.com/Markets/Fruit-snacking-Future-trends-and-challenges>

Table 4 - Some fruit-based products recently launched in the US

Company name ⁶⁶	Company Profile	Annual revenue	Recent launches
Dole	Dole is a multinational company headquartered in Westlake Village, California. It is the world's largest producer and marketer of fresh fruit and vegetables ⁶⁷ .	\$7.2bn (2011)	Mixations fruit snacks: line of four varieties: apple-strawberry sauce with diced apple, pineapple-mango sauce with pineapple pieces, peach-apple sauce with pineapple pieces and apple-raspberry sauce with diced apple. The range features non-GMO fruit, no high fructose corn syrup and is free from artificial flavours and gluten. ⁶⁸
Peeled snacks	Peeled snacks is a health food snack company in the US offering organic dried fruits. Based in Gowanus, the company was founded in 2004 by Noha Waibsnider, who also co-founded the Global Social Venture Competition ⁶⁹ .	\$4.8m (2013)	Much-Ado-About-Mango: Gently dried mango without any added sugar, preservative or fillers provided in a multi-serving resalable pouch ⁷⁰ .
That's It	That's It is a food processing company based in Scottsdale, in the state of Arizona. It was founded in 2010 to provide products that can improve, protect and restore the body ⁷¹ .	\$4.4m ⁷²	Zesty fruit bars: consist in three bars with 100% real fruit – apple, pear and ginger; and apple, mango and chilli – in an on-the-go package ⁷³ .
Bare	Bare Snacks (Bare Foods Co.), originally known as Bare Fruit, was founded by Eric Strandberg. Bare has been providing healthy snacks for more than ten years. As the leading apple chip brand Bare takes pride in offering the	\$3.8m	Organic Coconut chips: coconut chips made using Bare's proprietary slow-baking process that results in a crunchy texture using simple ingredients. They are available in three individual flavours: "savoury-sweet" toasted coconut, "refreshingly zingy" sweet ginger and

⁶⁶ <http://www.independent.co.uk/news/uk/home-news/the-big-five-companies-that-control-the-worlds-grain-trade-8462266.html>

⁶⁷ <http://www.dole.com/>

⁶⁸ http://www.just-food.com/news/dole-launches-mixations-fruit-snacks-in-us_id134163.aspx

⁶⁹ <http://peeledsnacks.com/>

⁷⁰ <http://peeledsnacks.com/snack/much-ado-about-mango/>

⁷¹ <http://www.thatfruit.com/>

⁷² <https://www.owler.com/iaApp/868815/that-s-it-company-profile>

⁷³ <http://www.bakeryandsnacks.com/Markets/That-s-It-expands-line-up-with-Zesty-flavors-and-new-Bites-format>



	highest quality products. Since 2013 Bare has been one of the fastest growing healthy snack brands in the US ⁷⁴ .		“robust” coffee bean ⁷⁵ .
Crunchies	Crunchies Food Company was founded in 2006 and is based in Westlake Village, California. The company produces freeze dried fruits and vegetables, and then sells its products through stores. As of October 24, 2014, Crunchies Food Company operates as a subsidiary of Chaucer Foods, Ltd ⁷⁶ .	-	All-Natural, Freeze-Dried Fruit Snacks: After harvesting, fresh fruits are frozen almost immediately, undergoing a low-pressure drying process to remove frozen water as directly as steam, bypassing the liquid state and allowing the product to retain almost the same nutritional value as whole fruits ⁷⁷ .

⁷⁴ <https://www.crunchbase.com/organization/bare-fruit#/entity>

⁷⁵ <http://www.foodbev.com/news/bare-snacks-launches-new-line-of-organic-baked-coconut-chips/>

⁷⁶ <http://www.bloomberg.com/research/stocks/private/snapshot.asp?privcapId=270209272>

⁷⁷ <http://www.andnowuknow.com/shop-talk/crunchies-launches-all-natural-freeze-dried-fruit-snacks/jordan-okumura/47578#.V9aUIPorLIU>

3.4. Traditional Foods Made of Vegetables and Mushrooms

3.4.1. Import/export trends 2013-2015

The US trade balance of edible vegetables with the EU has been positive over the past decade. In 2015, it was equal to +\$83m, since the trade deficit of edible vegetables⁷⁸ (frozen: -\$75m; fresh or chilled: -\$57m; temporarily preserved: -\$18m) was offset by the trade surplus of edible leguminous vegetables (+\$140m) and vegetable roots, such as cassava, arrowroot, salep, Jerusalem artichokes and sweet potatoes (+\$94m). In opposition, the US trade balance of edible vegetables with the world has been negative over more than one decade (-\$4.3bn in 2015) because imports of edible vegetables (\$8.7bn in 2015) have been about twice the exports of edible vegetables (\$4.4bn in 2015). The most significant fraction of imports of edible vegetables consist in imports of fresh or chilled vegetables (all except roots) and tomatoes; in 2015, these respectively represented about one third and one fifth of all the imports of edible vegetables from the world to the US.

The US trade balance of prepared or preserved (PP) vegetables and mushrooms with the EU has been negative over more than one decade (-\$454m) because imports of PP vegetables and mushrooms from the EU to the US have been about four times higher than exports of PP vegetables and mushrooms from the US to the EU (\$574m versus \$120m). Imports of PP vegetables and mushrooms from the EU to the US primarily consist in imports of non-frozen vegetables (excluding tomatoes, 77%) and mushrooms (15%); whereas almost all the PP vegetable and mushrooms exports from the US to the EU corresponded to imports of prepared or preserved tomatoes (86%). Contrarily to the US trade balance of PP vegetables and mushrooms with the EU, the US trade balance of PP vegetables with the world has been positive over the past decade. In 2015, it was equal to +\$200m, since exports of PP vegetables and mushrooms from the US to the world (\$2.3bn) were slightly higher than imports of PP vegetables and mushrooms from the world to the US (\$2.1bn).

3.4.2. Market Potential Barriers and Opportunities

Although the consumption of vegetables has been dropping over the past 5 years (details in section 3.4.3), the US trade balance of vegetables has remained a deficit over this period (details in section 3.4.1) due to the high imports of vegetables. The high level of vegetables imports to the US, mostly from Mexico, South America and China, are explained by several factors shaping the current US market⁷⁹.

⁷⁸ All excepting tomatoes and vegetable roots.

⁷⁹ The same factors responsible for the high imports of fruit, indicated in section 3.3.2.

The US domestic supply of vegetables primarily derives from the production of vegetables in the state of California due to its climate and fertile soil. No other state, or even a combination of states, produces as much vegetables as California: 99% of artichokes, 95% of celery, 95% of garlic, 89% of cauliflower, 71% of spinach, and 69% of carrots are currently being produced in the state of California⁸⁰. Because almost all vegetables are grown in California, minor problems with the distribution chain can cause ripple effects in the vegetables supply throughout the country⁸¹. In 2006, for example, an *E. coli* contamination in pre-cut spinach shipped from California, which caused food poisoning outbreaks in 26 states, significantly diminished the US supply of spinach over that particular year⁸².

As a result of the growing interest in organic vegetables (see details in section 3.4.3), there is a consumer shift from the consumption of industrially-produced vegetables to the consumption of organic vegetables sold at farmers markets and organic producers. Although the “organic” business is often as mechanized and industrialized as the “conventional” branch of the business in the US, there are some artisanal growers in every US state and region⁷⁸.

3.4.3. Market Trends

In the US, consumption of vegetables has been dropping over the past 5 years (1 fewer eating a week per capita) mostly due to the decreasing popularity of vegetables at the dinner table. US consumers are eating less vegetables as a side dish during dinner because they are seeking more convenient meals in the evening; as a result, they are eating fewer side dishes, including vegetables, as well as eating them less often⁸³.

Over the past 5 years, the consumption of vegetables have particularly declined among certain groups of US consumers, namely: consumers with incomes lower than \$20k; 1-2 member households without children present; females over 65; Asian and African American consumers; retired female or household head; and consumers living in the east and west south central and mid-Atlantic US regions. Although there has been a decline in the consumption of vegetables among females over 65, this age group is still the unique demographic segment in the US that consumes more vegetables than the average of consumers⁷⁷.

Most vegetables are sourced from or prepared at home (82%) and commonly not consumed “as is”. US consumers often add rich dressings and croutons (flavoured fried bread cubes) to vegetables and, in

⁸⁰http://www.slate.com/articles/health_and_science/explainer/2013/07/california_grows_all_of_our_fruits_and_vegetables_what_would_we_eat_without.html

⁸¹<http://www.lifeintheusa.com/food/vegetables.htm>

⁸²https://www.cdc.gov/nceh/ehs/docs/investigation_of_an_e_coli_outbreak_associated_with_dole_pre-packaged_spinach.pdf

⁸³http://www.pbhfoundation.org/pdfs/about/res/pbh_res/State_of_the_Plate_2015_WEB_Bookmarked.pdf

most cases, the ready-to-eat vegetables they buy come pre-flavoured in rich sauces⁸⁴. Potato is still the country most popular vegetable, followed by lettuce, onions, tomatoes, carrots and corn. There has been a growing consumption of broccoli (+2%), whereas leaf salads (-9%), green beans (-4%), corn (-4%), onions (-3%) and mixed vegetables (-3%) have been less consumed since 2009⁷⁷.

Although traditionally US consumers seek convenience and taste in vegetables, there has been a growing interest in vegetables which are organic and locally produced. US consumers are looking more for vegetables which are raised without artificial pesticides or fertilizers, as well as for vegetables that are locally grown. The increasing popularity of locally produced vegetables is not only because consumers aim to support the local community, but also a consequence of their increasing appreciation for food seasonality⁸⁵.

Over the next 5 years, consumption of vegetables is estimated to grow 8% in the US. If the 4% anticipated growth due to the expansion of the total US population is subtracted, the growth in fresh vegetables is then expected to be only 4% (per capita). Similarly to the consumption of fruits, this increasing consumption of vegetables is a consequence of the aging of the US population. Although US consumers of 50 and over are now consuming fewer vegetables than their counterparts 10 years ago, US consumers under 40 are consuming more vegetables than their counterparts 10 years ago⁷⁷.

3.4.4. Sample Key Market Stakeholders

The largest US companies manufacturing and selling vegetables in terms of sales develop their products taking in consideration the three main characteristics US consumers seek in vegetables: convenience, taste and organic production. Table 5 indicates some of their recent launches.

⁸⁴ <http://www.lifeintheusa.com/food/vegetables.htm>

⁸⁵ http://nrm.com/food-trends/top-5-fruit-and-vegetable-trends-2015#slide-0-field_images-130141

Table 5 – Some snacks and meals containing vegetables recently launched in the US

Company name	Company Profile	Annual revenue	Recent launches
<p>The Green Giant⁸⁶</p>	<p>First founded in 1903 as the Minnesota Valley Canning Company (MVCC), the Green Giant Company, as it was later known, became one of the largest producers of canned corn and peas in the United States. From its base in Le Sueur, the company developed new ways of growing, manufacturing, and marketing canned vegetables. Its mascot, the Jolly Green Giant, can be found in grocery stores around the United States⁸⁷. In November 2015, it was acquired by B&G Foods⁸⁸.</p>	<p>\$550m</p>	<p>Veggie Tots: The kid-friendly alternative to potato tots and French fries, they are filled with vegetables such as cauliflower or broccoli instead of potatoes.</p> <p>Riced Veggies: Made from 100% vegetables and with no sauce or seasoning, these veggie alternatives to traditional rice have 70% to 85% fewer calories per serving than the leading brand of prepared white rice. The available varieties are: cauliflower, cauliflower & broccoli, cauliflower & sweet potato and cauliflower medley.</p> <p>Mashed Cauliflower: An alternative to the typical potato side dish. Each half-cup serving contains one full serving of cauliflower and 40% to 45% fewer calories than the leading brand of prepared mashed potatoes. The available varieties are: original with olive oil & sea salt, cheddar & bacon, and garlic & herb.</p> <p>Roasted Veggies: Offering the taste of roasted vegetables without the hassle of roasting and cleaning up. These items contain no sauce or seasoning. Simply heat and pair with your favourite entrée. The available varieties are: corn, Brussels sprouts, broccoli, cauliflower, and carrots⁸⁹.</p>

⁸⁶ <http://www.greengiant.com/>

⁸⁷ <http://www.mnopedia.org/thing/green-giant-company>

⁸⁸ <http://www.businesswire.com/news/home/20151102006500/en/BG%C2%A0Foods-Completes-Acquisition-Iconic-Green-Giant%C2%AE-Brand>

⁸⁹ <http://www.prnewswire.com/news-releases/green-giant-returns-with-a-purpose----to-help-america-swap-in-more-veggies-300323000.html>



Eastbound Farm	Earthbound Farm is a farm located near San Juan Bautista, in the state of California. It is the largest producer of organic salads in the US. It was also the first company to produce prewashed, packaged salad greens on an industrial scale. It is a subsidiary of the WhiteWave company.	\$460m (2012) ⁹⁰	<p>New products include new cooking vegetable blends, slaw blends and flavourful salad blends⁹¹, such as:</p> <p>Americana blend, Organic crunchy slaws: Crunchy shreds of organic red and green cabbage and sweet carrots, ready to make a super slaw or add fresh texture to dishes hot and cold⁹².</p> <p>Organic Flavour Blends, Sweet Kale: Crisp, tender organic butter lettuce and organic earthy baby kale with balanced flavours and a bit of crunch⁹³.</p>
Mann Packing	Mann Packing Company, formerly known as H.W. Mann, was founded in 1939 and is based in Salinas, in the state of California. The Company provides fresh-cut and commodity vegetables for retail, wholesale, and foodservice marketplaces. The Company offers its products through national and local foodservice distributors in North America ⁹⁴ .	\$100-500m ⁹⁵	Mann's Culinary Cuts: a line of fresh cut vegetables cut into distinctive shapes. The veggies are washed and ready-to-eat and versatile enough for multiple uses such as side dishes, stir-fry's, appetizers, desserts and casseroles. These convenient vegetables are uniquely cut and are all natural, preservative-free and gluten-free. Each package contains four to five, 1-cup servings and can be prepared in four minutes or less in the microwave, sautéed, steamed or on the stovetop. Detailed cooking instructions are included in each package ⁹⁶ .
Beyond meat⁹⁷	Beyond Meat is located in Manhattan Beach, state of California, and was founded in 2009. It produces faux-chicken and faux-beef products from plant proteins and meat-free plant-based food products. Some of Beyond Meat's	\$20m ⁹⁴	Beyond Meat Burger: a 100% vegan, GMO, soy, and gluten-free patties primarily comprised of pea protein. The burger is being sold as double or single, dressed in standard burger attire, with the addition of Ninja Squirrel Sriracha and an optional cheese slice care of crowd-favourite "Chao" by Field Roast ⁹⁹

⁹⁰ <http://www.thepacker.com/fruit-vegetable-news/Earthbound-Farm-may-be-sold-206465931.html>

⁹¹ http://www.foodbusinessnews.net/articles/news_home/Business_News/2016/02/WhiteWave_in_the_sweet_spot.aspx?ID=%7B3E348654-AB23-4ECF-8C06-EBD17CAE0BE3%7D&cck=1

⁹² <http://www.earthboundfarm.com/products/salads/americana-blend>

⁹³ https://www.freshdirect.com/pdp.jsp?productId=veg_pid_2302033&catId=cut_veg

⁹⁴ <http://www.bloomberg.com/Research/stocks/private/snapshot.asp?privcapId=4044594>

⁹⁵ <http://www.manta.com/c/mr5z6w3/mann-packing-co>

⁹⁶ <http://www.freshplaza.com/article/154758/Fresh-cut-vegetable-line-gets-bigger>

⁹⁷ <http://beyondmeat.com/products>



	investors include Kleiner Perkins, Obvious Ventures and DNS Capital ⁹⁸ .		
Tozer Seeds	Tozer Seeds is a company based in the UK that develops and breeds vegetable products and seeds in the agriculture industry. The Company provides a wide range of seeds suited for different climates and growing regimes. Tozer offers trial programs and sells seeds online ¹⁰⁰ .	-	<p>Tozer Seeds has an exclusive agreement with six US producers to grow and market its kale and Brussels sprouts hybrid known as ‘kalettes’, and believes it will ‘take off quickly’ with consumers. The six companies are 4Earth Farms, Classic Salads, Mann Packing, Ocean Mist Farms, Southern Specialties and WP Rawl. As part of the agreement, Johnny’s Select Seeds will also sell the seeds to small farmers and home growers.</p> <p>Kalettes: a non-genetically-modified vegetable, originated from a cross between kale and Brussels sprouts, which took 15 years to be produced. Its development has been inspired from the desire to create a kale type vegetable that was versatile, easy to prepare and looked great. Kalettes, like many dark leafy greens, are very high in vitamin C and vitamin K.¹⁰¹</p>

⁹⁹ <http://www.ecorazzi.com/2016/07/15/whole-foods-launches-a-100-vegan-burger-bar-with-beyond-meat/#sthash.TKXNRysl.dpuf>

⁹⁸ <https://www.owler.com/iaApp/poll/53d935c5e4b01f165b948bec/beyond-meat/what-is-beyond-meats-annual-revenue-.htm>

¹⁰⁰ <http://www.bloomberg.com/profiles/companies/1815946Z:LN-tozer-seeds-ltd>

¹⁰¹ <http://time.com/3618395/kalettes-new-vegetable-healthy/>

4. Observations & Conclusions

- The US trade deficit in regard to food with the EU has been increasing over the past 5 years, mostly due to an expansion in imports of fruit and vegetables from the EU to the US. Indeed, although the consumption of fruit and vegetables is low among US consumers, imports of fruit and vegetables from the EU to the US are high. There are several factors underlying the high imports of fruit and vegetables, not only from the EU, but from other regions of the world. These include the low average import tariffs and the absence of some inspection requirements for fruits and vegetables coming from some regions, including the EU.
- Even though the US is the world's largest exporter of some grains categories, the US grain market still presents an opportunity for EU companies. This is mainly because most grains produced in the US become either animal feed or processed into sweeteners, corn oil and industrial products.
- Although fish demand is high in the US, fish companies are also great in number with widely varying business models. In the US fish market, the main differentiators are the branding and marketing. Since there is a market pressure to reduce the price of the fish products due to the crowded market, fish companies need to reduce the costs of production to compensate the high spending in branding and marketing.
- Due to the increasing interest in more healthy lifestyles, US consumers are seeking more healthy food. As a result, there has been a growing demand for healthy fish meals, whole grain food, fruit "as is" and organic vegetables. Overall, the consumption of vegetables and fruit is expected to grow in the next decade, as a result of the aging of the US consumers between 40 and 50 years old who are currently eating more fruit and vegetable than their counterparts one decade ago.
- US consumers are also increasingly interested in knowing how the food they eat is produced. They are concerned about the sustainability of the fish supply, as well as interested in knowing if pesticides and herbicides have been used in the production of the grains, fruit and vegetables they eat. In the US, consumers now prefer to eat fish of which supply is sustainable and to consume non-GMO grains, as well as organic fruit and vegetables.