

# POLITECNICO DI TORINO

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Master's Thesis

## The Chocolate Industry in Italy

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## **ABSTRACT**

In this thesis, the chocolate market is analysed, with a specific focus on the Italian context, using data from the AIDA database and official statistical sources.

The first chapter reconstructs the history and origins of chocolate, describes the production process from cocoa beans to the final product, and examines the geography of cocoa cultivation and processing. In particular, it highlights how cocoa cultivation is predominantly concentrated in countries along the equatorial belt, characterised by favourable climatic conditions, while industrial processing takes place mainly in more developed countries, where the main processing companies are located. A further aspect addressed concerns the spread of fair trade programmes and certification schemes, aimed at promoting greater economic and social sustainability along the supply chain.

The second chapter is devoted to the analysis of the size of the chocolate market at both global and national level. At the international level, revenues, sales volumes, the main exporting and importing countries, and the largest players in the sector are considered. With regard to the Italian market, the same type of analysis conducted at the global level is replicated with a specific focus on Italy, in order to assess the size and main features of the domestic market.

The third chapter presents an empirical analysis of Italian firms operating in the sector, based on AIDA data and using the STATA software.

The empirical investigation is designed to address several key questions concerning the structure of the industry: where firms are geographically concentrated, whether the sector is mainly composed of small or large companies, how the market is structured in terms of concentration in the hands of a few firms, and whether potential economies of scale can be identified.

In conclusion, this work aims to contribute to a better understanding of the chocolate industry, which is considered not only for its economic relevance, but also for its strong symbolic and cultural value. Chocolate is a product deeply embedded in consumption habits, capable of crossing historical periods, social contexts, and generations, while preserving an emotional and affective dimension that goes beyond its nature as a simple food good. It is precisely this combination of economic significance and cultural relevance that has motivated the choice to focus the analysis on this specific market.

# CHAPTER 1

## CHOCOLATE AND ITS SUPPLY CHAIN

### 1.1. Origin and History of Chocolate

Chocolate, in the form we know it today, has its origins in ancient south-american civilizations. The cocoa plant, scientifically known as *Theobroma cacao*, is native to South America, particularly to the regions surrounding the Amazon and Orinoco rivers. Before the voyage of Columbus, cocoa was entirely unknown to Europe and the rest of the globe.

Evidence indicates that the consumption of chocolate may date back three to four thousand years, originating within the pre-Columbian civilizations of Mesoamerica, such as the Olmecs. Recent research conducted by anthropologists from the University of Pennsylvania has revealed traces of cacao on ceramic vessels discovered in Honduras, which may date to around 1400 BCE. It is believed that the sweet pulp surrounding the cacao beans was fermented to produce an alcoholic beverage during that early period.

The first example of a preparation comparable to modern chocolate can be traced to the Maya civilization, which initiated the cultivation of cocoa plants in the Yucatán Peninsula. The Maya produced a beverage by mixing ground cocoa beans with hot water and enhancing it with various ingredients such as hot chili peppers, corn, spices, vanilla and other components to enrich the flavor and the texture.

The process involved harvesting the cocoa pods, cutting them open, and fermenting the beans for several days. Occasionally, the beans were roasted over fire to develop a smoky aroma. Once peeled, they were ground into a thick, uniform paste. The Maya rarely used sweeteners, instead preferring to infuse the cocoa paste with edible flowers and natural spices. The tradition was passed down from the Maya to the Aztecs, who associated the cocoa plant with Xochiquetzal, the goddess of fertility, thereby attributing to it a religious significance. The beverage they prepared, called *xocoatl*, was consumed during sacred rituals and offered as a tribute to their gods. Unlike the Maya, the Aztecs drank it cold and enriched with flour or minerals to increase its density and nutritional value. The distinctive feature of this beverage was its foam, obtained by repeatedly transferring it from one vessel to another from a height. Because of its

theobromine content, *xocolatl* helped to reduce fatigue and was considered a luxury product throughout pre-Columbian Central America. For both the Maya and Aztec civilizations, cocoa represented not only a food but it possessed a profound spiritual and cultural significance. It was viewed as a sacred gift and known as the “Food of the Gods,” a meaning reflected in its scientific name *Theobroma*, which literally translates from Latin as “food of the gods.” This profound veneration for cocoa was so deeply embedded in their societies that both the Aztecs and Maya used cocoa beans as a form of currency, considering them even more valuable than gold. Furthermore, chocolate held an important place in religious and social ceremonies, including royal banquets and celebrations of military victories, where it was often offered as a reward for success in battle.

The first Europeans to encounter cocoa were the crew members of Christopher Columbus. On July 30, 1502, during his last voyage in search of gold, the Aztecs offered Columbus a cup of *xocolatl*. The intense and bitter taste of the beverage was not appreciated by the Europeans, and Columbus paid little attention to its potential significance.

Seventeen years later, in 1519, Hernán Cortés arrived from Spain with the aim of conquering the New World and visited the court of Emperor Montezuma. Mistaking Cortés for the returning god Quetzalcoatl, who, according to legend, was expected to return that very year, Montezuma welcomed him and offered the so-called “food of the gods”, a drink prepared with cocoa, corn flour, and spices. Cortés immediately understood the economic value of cocoa and brought a shipment of it back to Spain.

At first, due to its bitter taste, cocoa was used primarily as a remedy for certain health problems. Later, however, Jesuit monks, well known for their knowledge of infusions and mixtures, began replacing the original ingredients with cane sugar and vanilla. This transformation produced a sweet, pleasant beverage, the ancestor of today’s hot chocolate. With this innovation, chocolate began its journey across continents and cultures, evolving and adapting to the tastes of different peoples.

By the late 1500s, it had become a much-loved indulgence at the Spanish court, and Spain began importing cocoa in 1585. Throughout much of the 16th century, Cortés’s discovery remained a closely exclusive secret of the Spanish crown, which managed to keep the methods of chocolate production hidden while spreading its reputation and flavor throughout Europe.

When chocolate first reached the continent, it was considered a luxury reserved for the wealthy elite. In 1615, during the marriage of King Louis XIII of France to Anne of Austria, daughter of the Spanish monarch Philip III, chocolate made its official debut at the French court. As a symbolic gift and sign of sophistication, the young queen introduced this precious drink, quickly winning the admiration of the Parisian aristocracy. Following France's example, chocolate soon spread to Great Britain, where the first chocolate houses, elegant establishments frequented by the political and intellectual elite, began to appear.

As chocolate's popularity expanded across Europe and demand grew, several nations established their own cocoa plantations in equatorial regions to secure a steady supply of the prized raw material.

From France, cocoa beans also reached Italy, particularly the region of Piedmont, which soon became a key center of chocolate production and innovation.

By the late 17th century, Turin had established itself as Italy's chocolate capital, thanks to the work of numerous skilled artisans. The first official license to open a chocolate shop in Italy was granted in 1678 to Giò Battista Ari, who received authorization and a patent to practice the art of chocolate making. During this period, the first factories dedicated to chocolate production began to appear, gradually replacing monasteries and convents that had traditionally handled cocoa processing. It was in Turin's artisanal workshops that many young Swiss apprentices learned the craft, students who would later go on to found some of Europe's most celebrated chocolate brands.

In 1828, Dutch chemist Coenraad Johannes van Houten discovered a method for treating cocoa beans with alkaline salts, producing a powdered form of cocoa that could dissolve more easily in water. This innovation became known as "Dutch processing" and the resulting product was called "Dutch cocoa" or simply cocoa powder. Van Houten later invented the cocoa press, a device that separated cocoa butter from roasted cocoa beans, making it possible to produce cocoa powder efficiently and at a lower cost, a key ingredient for all later chocolate preparations. Both Dutch processing and the cocoa press transformed chocolate production, making it accessible to a much wider public. The powdered cocoa could then be mixed with liquids and poured into molds, where it finally solidified into the first edible chocolate bars.

The creation of the modern chocolate bar is credited to Joseph Fry, who in 1847 discovered that adding melted cocoa butter to cocoa powder produced a malleable

chocolate paste that could be shaped. This marked the beginning of the modern era of chocolate. The shift from chocolate as a beverage to a solid form was one of the most significant transformations in its history, allowing it to become more versatile and universally cherished.

In 1875, Swiss chocolatier Daniel Peter made an innovative advancement by adding powdered milk to chocolate, thus inventing milk chocolate. This innovation opened the door to a wide variety of chocolate types, including white chocolate, nut-filled versions, and many others. Toward the end of the 19th century, another Swiss innovator, Rudolph Lindt, developed a new and distinctive method for refining chocolate, resulting in a smooth product: dark chocolate.

With the advent of modern technologies and industrial production methods, chocolate became increasingly affordable and widespread. Artisanal production, once slow and labor-intensive, was gradually replaced by mechanical processes that enabled large-scale production. This period truly marked the start of the industrial age of chocolate, making it accessible to people from all walks of life. As it evolved and spread across Europe, chocolate secured its place as one of the most beloved delicacies in the world. The story of chocolate is, ultimately, a journey through cultures, innovations, and passions. Every bar, especially those made by skilled artisans, tells a tale of tradition and enduring love for this divine creation.<sup>1</sup>

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<sup>1</sup> Sources and websites consulted:

<https://www.geopop.it/storia-produzione-e-curiosita-sul-cioccolato-il-cibo-degli-dei/>  
<https://www.eurochocolate.com/cioccolato/storia> ; <https://it.wikipedia.org/wiki/Cioccolato#Note>  
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<https://www.heritagedaily.com/2020/03/medicinal-and-ritualistic-uses-for-chocolate-in-mesoamerica-2/98809> ;  
<https://www.science.org/content/article/earliest-evidence-chocolate-north-america>

## 1.2. The Production Process

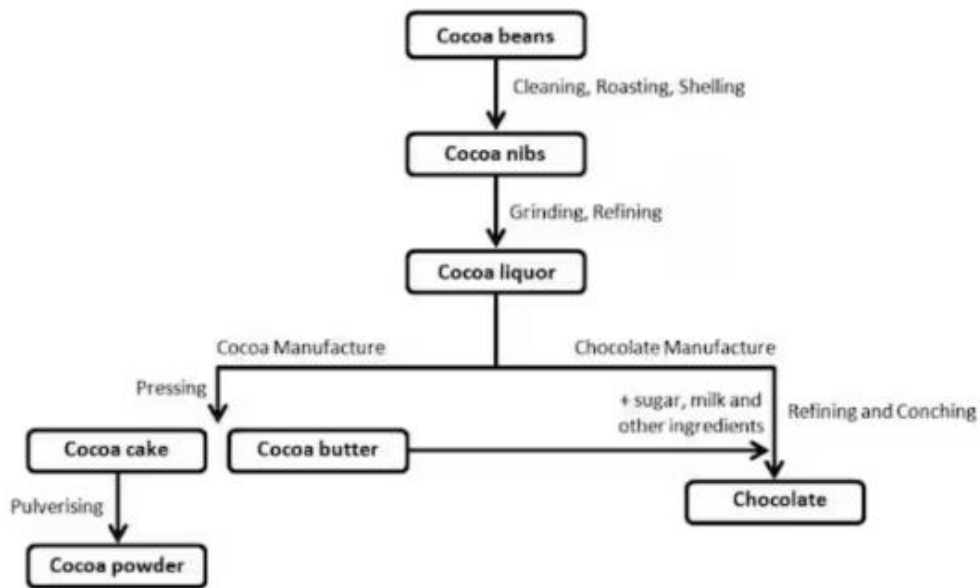


Figure 1: Representation of production process

### 1.2.1. From Beans to Cocoa

The production of chocolate begins with the cultivation of the cacao tree, a tropical plant that bears large fruits known as pods. Each pod contains between 20 and 50 cacao beans, surrounded by a sweet, mucilaginous pulp. Once the pods reach maturity, they are collected manually. This is a delicate operation that requires care to avoid damaging either the fruit or the plant itself.

After collecting, the pods are opened to extract the beans and their surrounding pulp. At this stage, the beans are not yet ready for processing; they must first undergo a crucial step known as fermentation. During fermentation, the beans and pulp are left to ferment for two to seven days. The sugars derived from the pulp undergo alcoholic fermentation, producing ethanol, which is subsequently oxidized to acetic acid.<sup>2</sup> This transformation helps to reduce the beans' bitterness and simultaneously develops the aromatic precursors that will later define the distinctive flavor of chocolate. To enhance and accelerate fermentation, the beans are traditionally loaded into large baskets and covered with banana leaves. This method helps retain heat and vapor, creating the optimal environment for the microorganisms responsible for

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<sup>2</sup> [file:///C:/Users/utente/Downloads/Aprotosoiaie\\_et\\_al-2016-Comprehensive Reviews in Food Science and Food Safety.pdf](file:///C:/Users/utente/Downloads/Aprotosoiaie_et_al-2016-Comprehensive%20Reviews%20in%20Food%20Science%20and%20Food%20Safety.pdf)

fermentation to prosper. The temperature gradually rises to about 50°C, an ideal level to ensure an effective and uniform process.

Once fermentation is complete, the beans undergo drying, a vital step to stop fermentation and stabilize the product. Drying typically lasts from two days to two weeks and is usually carried out under the sun, although mechanical dryers may also be used. The process reduces the beans' humidity content from roughly 60% to about 7.5%, preventing mold growth and allowing residual acids to evaporate. After drying, they are packed into jute sacks and shipped to chocolate manufacturers worldwide.

Upon arrival at processing facilities, the beans are subjected to roasting, with temperature and duration varying according to the cacao variety and the desired type of chocolate. Roasting usually occurs between 100°C and 160°C for 15 to 20 minutes. This stage is crucial, as it eliminates excess humidity and volatile acids, enhances the characteristic brown color, and intensifies the flavor. However, precise control is essential: over-roasting can result in excessive bitterness, while under-roasting may prevent full flavor development. Roasting also loosens the outer shell, which is later removed as it is hard and inedible. After roasting, the beans undergo additional processing steps, including alkalization, a treatment that darkens the cocoa derivatives and lowers their acidity. After cooling, the beans are peeled to separate the shells from the cacao nibs, which are then ready for grinding and liquefaction. This process produces a dense, fluid paste known as cocoa mass or cocoa liquor, composed of solid cocoa particles and cocoa butter. Traditionally, this was achieved manually by crushing the beans with stones or mortars, but modern production relies on specialized machinery that refines the texture until it becomes smooth and homogeneous.

Many manufacturers now employ advanced technologies to achieve a smooth, creamy consistency, an essential feature in high-quality chocolate production. From this base mass, various products can be derived, including pure cocoa butter or finished chocolate bars, depending on the subsequent stages of processing<sup>3</sup>.

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<sup>3</sup> Sources and websites consulted:

<https://www.geopop.it/produzione-del-cioccolato/>

<https://www.altromercato.it/come-nasce-il-cioccolato/>

<https://worldcocoafoundation.org/from-bean-to-bar#top>

<https://www.manitese.it/wp-content/uploads/2019/05/Report-Cacao-Corretto-Ecuador-Mani-Tese-2019.pdf>

<https://www.eurochocolate.com/cioccolato/lavorazione>

<https://www.icco.org/processing-cocoa/>

### 1.2.2. From Cocoa to Chocolate

The production of chocolate as a finished product follows a complex and carefully structured process, which can be summarized in the following stages:

1. Blending (Mélangeur)
2. Conching
3. (Maturation)
4. Tempering
5. Molding
6. Packaging

The process begins with the blending phase, during which the cocoa mass, preheated to around 100 °C, is combined with other ingredients depending on the desired type of chocolate (*figure 2*).

INGREDIENTS	DARK	MILK	WHITE
COCOA MASS	40-48%	15%	0%
SUGAR	42-50%	50%	45-60%
COCOA BUTTER	10%	15%	20-30%
MILK	0%	20%	20-25%

*Figure 2: Quantities in percentages of ingredients for different types of chocolate*

- For dark chocolate, the mixture typically includes cocoa powder, cocoa butter, sugar, and vanilla.
- For milk chocolate, condensed milk or milk powder is incorporated into the blend to provide a creamier texture and a softer flavor profile.
- For white chocolate, the mixture is composed of cocoa butter, sugar, vanilla, and milk (either in liquid or powdered form), notably excluding cocoa solids.

The transformation of cocoa mass into fine chocolate involves a sophisticated, multi-stage process designed to perfect both texture and flavor. This phase allows producers to refine and customize the sweetness and sensory profile of the chocolate.

Once blending is completed, the mixture undergoes refining. During this stage, the mixture passes through rollers or rotating grinders, which progressively reduce particle size until the chocolate reaches a silky, homogeneous consistency. High-quality chocolate is characterized by particles so fine that they are imperceptible on the palate, resulting in an exceptionally smooth texture.

In modern production, this process is carried out using mechanical *mélangeurs* equipped with rotating steel balls, which significantly shorten processing times, from several days to just a few hours. However, this method has some problems: the friction between the steel and the chocolate mass generates heat, which can flatten the aromatic complexity, and metal wear may release microparticles into the mixture. For this reason, magnetic filters are installed at the end of the process to capture any metallic residues.

To better preserve the chocolate's aromatic and sensory qualities, many *artisan chocolatiers* still use stone grinders, which avoid overheating and ensure a gentler, more respectful treatment of the cocoa mass. The trade-off is time: the traditional method can take from 48 up to over 100 hours, depending on the cocoa variety and the desired outcome.

After refining, the cocoa mixture is transferred into large, heated cylindrical mixers known as *conches*, where the conching process takes place, one of the most delicate and defining stages in chocolate production. During conching, the mass is continuously stirred and kept at a controlled temperature for 12 to 72 hours, depending on the type of chocolate being produced. The aim is to make the mixture velvety, uniform, and rich in aroma, while improving its structural and flavor characteristics.

Conching goes beyond simple mixing: it removes residual vapor and volatile acids, which are responsible for bitter or astringent notes. Through heat and constant movement, tannin oxidation and aromatic compound release occur, giving chocolate its signature fragrance and melt-in-the-mouth texture. Once conching is complete, the chocolate acquires a fluid and creamy consistency, a sign that its flavor and texture have fully developed. It is then kept in heated tanks at 45–50 °C, awaiting the next processing stages. Some artisanal producers introduce an optional maturation phase, where the conched chocolate is vacuum-sealed and rested for about three weeks. This allows its aromatic profile to fully evolve before proceeding to tempering, which ensures a glossy and stable final product.

Tempering is a thermal process that involves alternating controlled heating and cooling phases of the chocolate mass in order to achieve a stable crystallization of cocoa butter. At first, the chocolate is heated to approximately 45 °C to ensure the complete melting of all cocoa butter crystals present in the mixture. The temperature is then lowered to around 26–28 °C to encourage the formation of the most stable crystal

structures. After this stage, the mixture is gently reheated, but to a slightly lower temperature than in the first phase, to melt any unstable crystals, leaving only the desired stable forms. Finally, the temperature is reduced again to about 16 °C, allowing the chocolate to set and solidify properly.

In industrial production, tempering is performed using automated machinery capable of precisely regulating both temperature and cooling speed, ensuring consistent and high-quality results. In artisanal or small-scale workshops, however, the process is still often carried out manually. In this traditional method, melted chocolate is transferred onto a work surface and repeatedly spread and gathered with a spatula until it reaches the right texture and shine. If tempering is not performed correctly, the resulting chocolate appears dull or grayish-white, a defect caused by cocoa butter separation and migration to the surface, commonly referred to as *fat bloom*.

After tempering, the chocolate undergoes the molding phase, where it is carefully measured and transferred into molds to create the desired shapes, such as bars, pralines, or truffles. The molds move along a vibrating conveyor, which helps eliminate trapped air bubbles and ensures perfect adhesion of the chocolate to the mold walls. The filled molds then pass through a cooling tunnel maintained at about 6 °C, where the chocolate solidifies gradually and takes its final shape. Controlled cooling is essential to prevent the formation of unstable crystals that could affect both the texture and gloss of the finished product.

Once molding is complete, the chocolate is ready for packaging. In the confectionery industry, chocolate is typically wrapped in aluminum foil lined with greaseproof paper, providing an effective barrier against moisture, light, and air. This type of packaging helps preserve freshness, aroma, and quality during storage and distribution<sup>4</sup>.

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<sup>4</sup> Sources and websites consulted:

<https://www.geopop.it/produzione-del-cioccolato/>

<https://www.altromercato.it/come-nasce-il-cioccolato/>

<https://worldcocoafoundation.org/from-bean-to-bar#top>

<https://www.manitese.it/wp-content/uploads/2019/05/Report-Cacao-Corretto-Ecuador-Mani-Tese-2019.pdf>

<https://www.eurochocolate.com/cioccolato/lavorazione>

<https://www.icco.org/processing-cocoa/>

### 1.3. The Cocoa Supply Chain

The cocoa supply chain is made up of several key actors who represent the main stages that cocoa beans go through, from cultivation in the field to the final product, such as chocolate (figure 3).

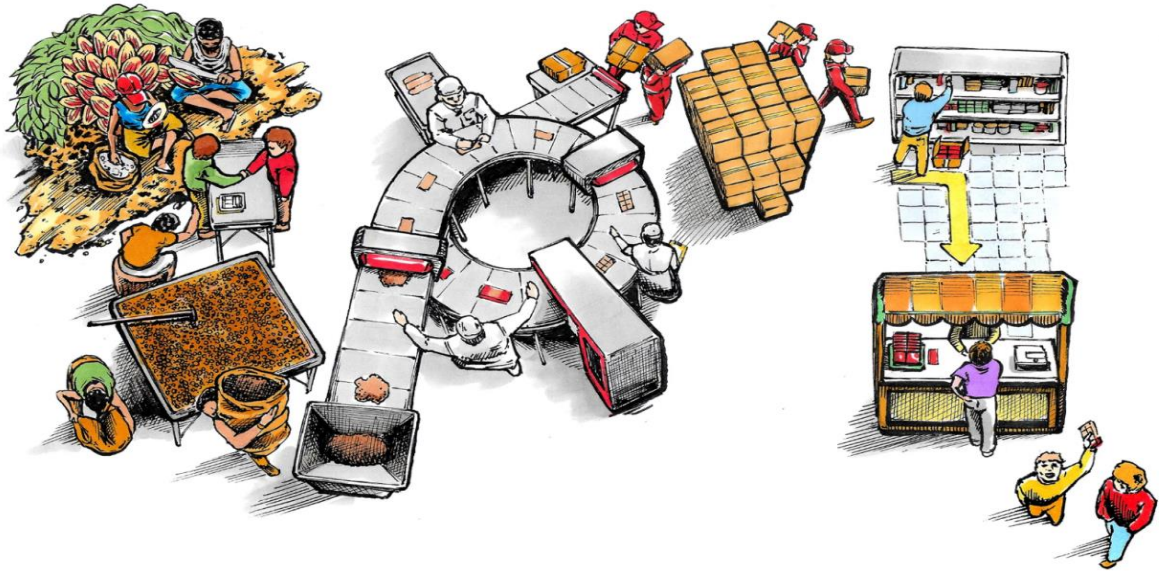


Figure 3: Representation of Cocoa Supply Chain

1. Production: cocoa producers are the farmers responsible for planting, harvesting, fermenting, and drying the beans. Most of them live in tropical countries such as Côte d'Ivoire, Ghana, Nigeria, Ecuador, and Indonesia. Over 90% of the world's cocoa is grown on small family-run farms, typically covering less than 2.5 hectares. Although smallholders form the backbone of the cocoa sector, they receive only 6–8% of the total added value generated along the supply chain.
2. Procurement and Transport: once harvested and dried, cocoa beans are not sold directly on the market but are purchased by intermediaries, including local traders and subsidiaries of multinational corporations. Their function is limited to the buying and selling of raw cocoa, with no involvement in processing activities. Intermediaries can be divided into two categories:
  - Traders, who operate on the physical market, purchasing already-produced cocoa and reselling it to processors (*grinders*).

- Brokers, who work on the *futures market*, trading cocoa that has not yet been produced.

In producing countries, primary traders buy cocoa from numerous small farmers and resell it, often at a higher price, to secondary intermediaries, who are financially stronger and handle export operations directly.

3. **Primary Processing:** this stage involves processing industries, commonly known as *grinders* or *processing companies*. They receive raw cocoa beans and convert them into semi-finished products such as cocoa mass (liquor), cocoa butter, and cocoa powder, which serve as essential ingredients for the food and confectionery industries.
4. **Industrial Production and Distribution:** this is the final manufacturing stage, in which semi-finished cocoa products are transformed into finished goods such as chocolate bars, pastries, or ice cream. The companies operating at this level are mostly located in the Global North and include major chocolate manufacturers and food industries. This segment accounts for roughly 35.2% of the total value generated across the cocoa supply chain.
5. **Retail and Marketing:** the final link in the chain includes packaging, marketing, and retail distribution. The retail sector is the most profitable, representing about 44.2% of the total value of the cocoa and chocolate market. Retailers not only set consumer prices, but also shape consumer preferences and demand through targeted marketing strategies, playing a decisive role in connecting production with the final market.

The cocoa supply chain is among the most labor-intensive and complex agricultural systems in the world. Despite the substantial profits generated by the global cocoa and chocolate industry each year, there remains a profound imbalance in how value is distributed along the commercial and production chain (*Figure 4*).

This disparity stems from a market model that primarily benefits large international corporations, while the most vulnerable actors, small-scale farmers and producing countries, bear the heaviest burdens. In other words, while chocolate fuels a multibillion-dollar global business, those who make its production possible are often excluded from its rewards. The distribution of costs, profits, and added value within the cocoa-chocolate chain clearly exposes deep social and economic inequalities. The greatest share of value is captured by the upper segments of the industry, to the

detriment of the farmers at its base. As the product moves further from its origin, its added value increases, expanding the gap between producers and consumers.<sup>5</sup>

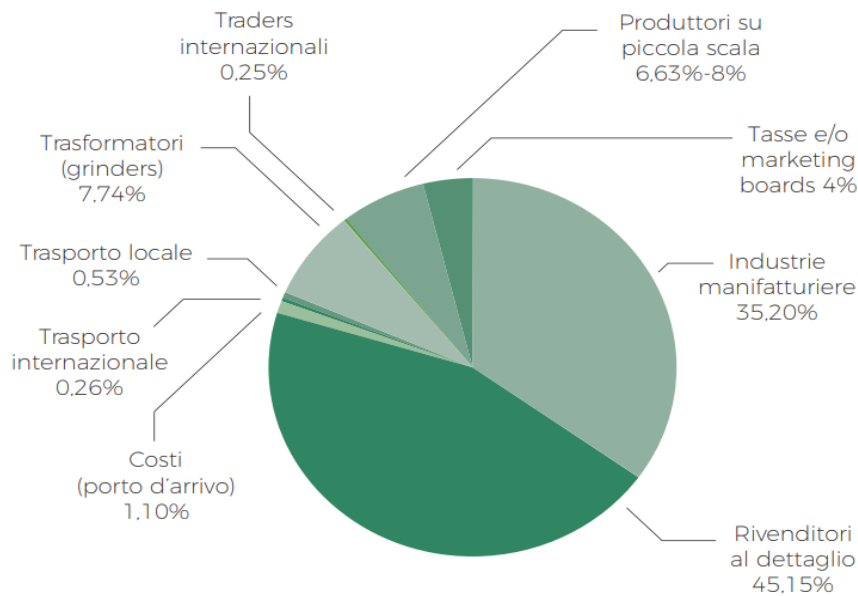


Figure 4: Distribution of value along the supply chain, calculated on the final product

### 1.3.1. Geographical Distribution of Cocoa-Producing Countries

Around 65% of the world's cocoa originates from a small group of West African countries, which form the core of global production. The leading producers are Côte d'Ivoire (38%), Ghana (12%), Nigeria (7%), and Cameroon (7%) (figure 5).

Beyond this region, South America also holds an important role, mainly through Ecuador and Brazil, which account around 10% and 4% of global output, respectively. Together, these areas constitute the main centers of cocoa cultivation worldwide, supplying most of the raw material used by the international confectionery industry<sup>6</sup>.

<sup>5</sup> Sources and websites consulted:

[https://www.eurochocolate.com/chocoday2015/cd2015\\_presentazione.pdf](https://www.eurochocolate.com/chocoday2015/cd2015_presentazione.pdf)

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<sup>6</sup> Sources and websites consulted:

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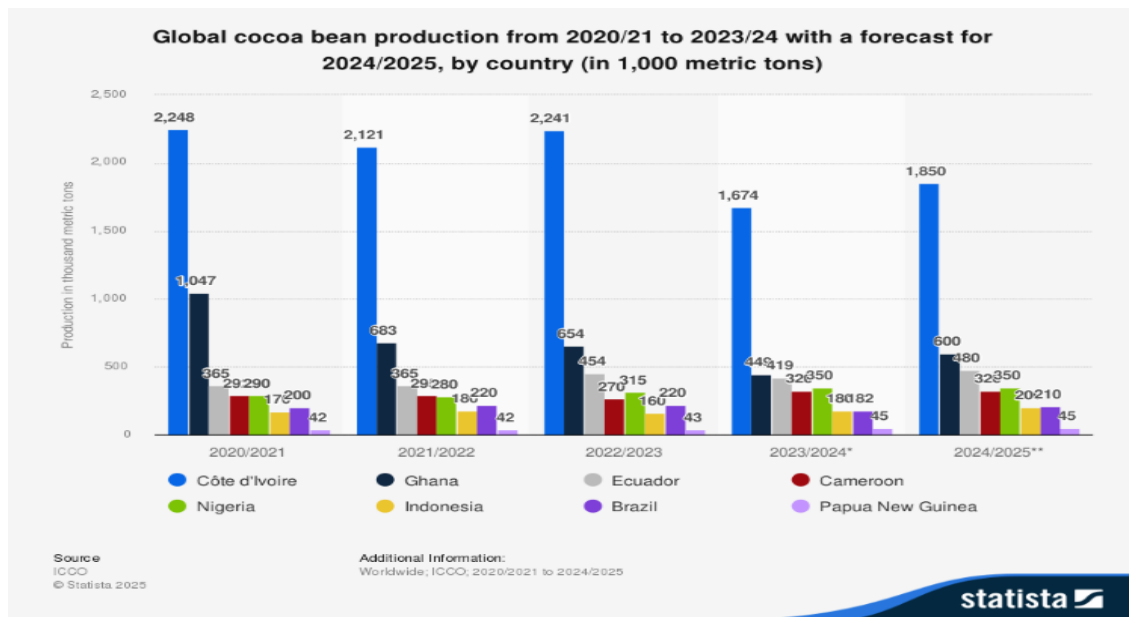


Figure 5: Global cocoa bean production from 2020/21 to 2023/24 with a forecast for 2024/25, by country (Source: Statista)

From a botanical perspective, the cocoa tree can grow well only in warm and humid environments typical of tropical forest regions, where average temperatures range between 20°C and 30°C and rainfall is abundant throughout the year.

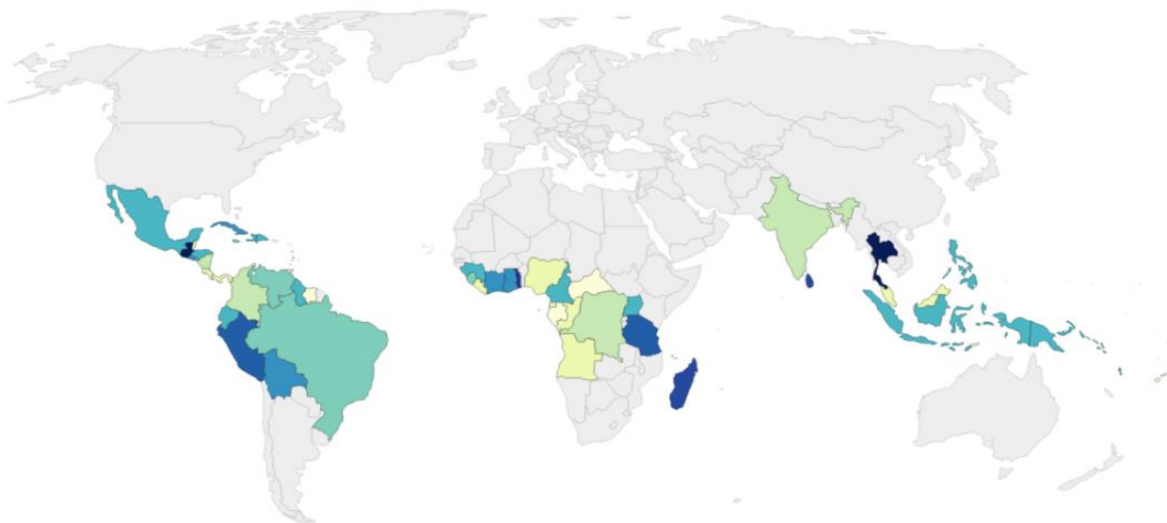


Figure 6: Geographical Distribution of Cocoa-Producing Countries

Cocoa plants prefer to grow under the shade of so-called “mother trees”, taller species whose tree crowns provide natural protection from direct sunlight and severe weather conditions. It is therefore not surprising that most cocoa producing countries are located along the equatorial belt (figure 6), within the rainforest areas of Africa, Asia,

and Latin America, where the climate offers the ideal balance of heat and humidity for the cultivation of this delicate yet valuable plant.<sup>7</sup>

### 1.3.2. Main Cocoa Bean Importing Countries

The main cocoa-consuming regions are located in Europe, the United States, Australia, and parts of Asia, where most of the world's major chocolate manufacturing companies are based. Almost all the cocoa cultivated in the Global South is exported to Europe and North America, where it is processed into finished products such as chocolate and cocoa powder. Among the leading importers are the Netherlands, Germany, and Belgium, which together account for around 25% of the world's cocoa bean imports. Overall, the European Union holds the dominant position, responsible for roughly 60% of total global imports, while the United States and Canada together absorb about 7% of global cocoa production (Figure 7).<sup>8</sup>



Figure 7: Main producers and importers of Cocoa beans (Source: Statista)

<sup>7</sup> <https://www.altromercato.it/filiere/cacao/>

<sup>8</sup> <https://www.statista.com/chart/34325/main-cocoa-bean-producing-and-importing-countries/>

### **1.3.3. Price Formation Mechanisms and Value Distribution in the Cocoa Market**

The global cocoa market is valued at roughly 100 billion dollars per year, yet only a very small share of this wealth reaches cocoa farmers, who remain the most vulnerable segment of the supply chain. Out of the industry's total profits, just 2 billion dollars, around 2% of the overall value, actually goes to agricultural producers. This disproportion reveals a deep structural imbalance within the cocoa value chain, where costs and benefits are distributed in a way that overwhelmingly favors actors positioned in the later stages of production, particularly large multinational companies.

Several interconnected factors explain this inequality. A central issue concerns the way the price of raw cocoa is determined, a process controlled by a small group of multinational firms with enough market power to influence global price trends. Since the liberalization policies introduced in the 1980s, the sector has become more competitive but has simultaneously exposed farmers to extreme price volatility and contributed to a further concentration of economic power among dominant players. Public authorities in producing countries no longer set minimum prices, nor do they intervene in domestic purchasing or export operations. As a result, farmers must accept the prices offered by buyers, without any guaranteed minimum or quality-based premiums, losing much of the potential commercial value of their cocoa.

Cocoa prices are determined daily on international commodity exchanges, primarily the New York CSCE for American cocoa and the London LIFFE, which influences African and Asian markets. The global reference price is calculated as an average of quotations from these two exchanges and is shaped by a range of variables: global supply and demand, production levels and ICCO forecasts, the volume of cocoa stocks held by grinders and traders, political conditions in producing countries, and the strong speculative component generated by futures markets. Futures contracts, originally designed as risk-management tools to help farmers secure stable prices in the face of climatic uncertainty and production shocks, have become another critical element of this system. Although they were meant to allow producers to sell future harvests at a guaranteed price, these contracts have increasingly been used by financial actors and speculative funds with no direct interest in the physical cocoa trade. Their activities

amplify price swings and intensify market volatility, making farmers' incomes even more unpredictable.

Beyond market and financial mechanisms, structural dynamics further contribute to the persistent impoverishment of producing communities. As noted by Andrea Mecozzi, founder of Chocofair and one of Italy's leading cocoa experts, political and economic conditions effectively prevent producing countries from developing their own processing industries. This reflects a global economic model in which developing nations are relegated to the role of raw material suppliers, while value-added processing takes place in industrialized countries. Such a structure reinforces long-standing economic dependence: although rich in natural resources, producing countries must import finished goods made from their own cocoa, which hinders the development of local industries capable of generating employment and wealth.

Corporate purchasing practices further exacerbate the imbalance. Since payment is generally tied to volume rather than quality, farmers have been encouraged to increase output, often abandoning traditional varieties, typically more sustainable and suitable for organic cultivation, in favor of high-yield hybrids that degrade soil health and drive deforestation. The resulting oversupply puts additional downward pressure on prices, reinforcing a cycle of low incomes that farmers struggle to escape.

In recent years, the cocoa market has experienced unprecedented volatility, culminating in an extraordinary price surge that caught even seasoned industry analysts off guard. Between late 2023 and 2025, cocoa futures traded in New York reached historic highs, surpassing 12,000 dollars per ton in December 2024 and climbing to a record 12,931 dollars in early 2025.



Figure 8: Cocoa Price volatility from 2016 to 2025 in USD per Tonnes (Source: Tradingeconomics)

This represents more than a fourfold increase compared to the long-term historical average of 2,000–3,000 dollars per ton (*figure 8*).

However, once financial investors began exiting their positions, prices corrected rapidly, falling below 8,000 dollars in March 2025 before stabilizing around 9,000 dollars in May (*figure 9*).



*Figure 9: Cocoa Price volatility in 2025 in USD per Tonnes (Source: Tradingeconomics)*

The dramatic fluctuation observed in the cocoa market shows how production shocks, financial speculation, and geopolitical uncertainty can intensify the vulnerabilities of a sector already marked by deep structural imbalances. Power asymmetries and the heavy dependence on exporting countries continue to make the price-formation mechanism highly unstable and inherently unfair. The price surge of 2024 was driven by severe supply constraints, extreme climatic events, and intense speculative activity. One of the main triggers was the El Niño weather phenomenon, characterized by unusually high temperatures and irregular rainfall, which sharply reduced production in the leading cocoa-producing countries, Ghana and Côte d'Ivoire, which together account for about 70% of global output. Prolonged droughts and water stress damaged flowering cycles and lowered yields, as the cocoa tree is extremely sensitive to climate fluctuations and requires three to five years to reach full productivity. This biological rigidity prevents producers from responding quickly to price spikes. On top of this, the spread of the Cocoa Swollen Shoot Virus (CSSV) devastated more than 500,000

hectares of cocoa plantations in Ghana, pushing national output to its lowest level in fourteen years. As production declined in the major origins, the resulting supply shortage contributed to upward pressure on global prices. With global demand continuing to rise, the market increasingly struggled to balance supply and consumption, leading to further price escalation alongside heightened speculative activity.

According to the International Cocoa Organization (ICCO), global production for the 2023/24 season was significantly affected by these adverse conditions, producing a marked mismatch between supply and demand. This imbalance triggered immediate reactions on financial markets, where investors interpreted the scarcity of beans as a signal of further price increases. Large investment funds and traders intensified their positions in cocoa futures, amplifying market volatility. As noted by economist Alessandro Volpi, speculation drove prices far higher than what the real supply contraction would have justified, turning a moderate shortage into a surge “primarily financial in nature.” Farmers, often paid a fixed farm-gate price of around USD 1,700 per ton, did not benefit from this extraordinary rally, while profits accrued largely to speculative funds and financial intermediaries.

As prices increased, many hedge funds began to liquidate their positions to lock in their gains. Their withdrawal reduced market liquidity and intensified price swings. Market data show that open interest in cocoa futures reached record highs during the price rally, only to fall sharply as volatility increased and speculative actors scaled back their exposure. This pattern of rapid speculative entry followed by an equally rapid exit is typical of commodity price spikes.

Such extreme volatility has had significant consequences across the entire cocoa supply chain. Farmers, already the weakest link, are frequently excluded from the benefits of rising prices while remaining fully exposed to downturns. The absence of effective mechanisms to redistribute value, combined with limited access to hedging tools, prevents smallholders from planning long-term investments or securing the economic viability of their farms.

Ultimately, cocoa price formation results from the interaction between real factors, such as production levels, climate conditions, and logistical constraints, and financial forces linked to the increasing financialization of agricultural markets. The dominance of major corporations and speculative investors, combined with the structural fragility

of producing countries, has turned cocoa into a commodity highly sensitive to external shocks and speculative pressures, making the market profoundly unstable.<sup>9</sup>

#### **1.4. Environmental and Social Challenges in the Cocoa Market**

Behind the production of cocoa, an essential ingredient in one of the world's most beloved treats, chocolate, lies a complex network of social and environmental issues that threaten both the sustainability of the sector and the protection of human rights in producing countries.

One of the most severe challenges is child labour. According to the *International Labour Organization*, an estimated 152 million children aged between 5 and 17 are engaged in work worldwide, with 71% employed in agriculture. Africa alone accounts for nearly two-thirds of all child labourers, and in Côte d'Ivoire and Ghana over 2.1 million children are involved in cocoa farming. Many of these children perform risky tasks, are refused access to education, and become trapped in a cycle of poverty and exploitation. The environmental dimension of the cocoa trade is equally alarming, particularly concerning deforestation. To satisfy the growing global demand for cocoa, vast areas of tropical forest have been cleared to make way for new plantations. It is estimated that an area equivalent to the size of the Netherlands has already been deforested to meet the European Union's annual cocoa consumption. In Côte d'Ivoire, land dedicated to cocoa expanded from 2.5 to 3.2 million hectares between 2011 and 2019, with roughly 63% of this expansion resulting directly from forest destruction. In the course of the past fifty years, the country has lost more than 80% of its rainforests, one of the fastest rates of forest loss in the world.

The root cause of this system is widespread poverty among cocoa farmers. International market prices remain far too low to provide a decent income. Most farmers earn less than USD 2 per day, an amount which, when divided among family

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<sup>9</sup> Sources and websites consulted:

<https://lukerchocolate.com/en/knowledge-base/volatility-in-cocoa-prices-and-its-impact>

<https://valori.it/mangiare-cioccolato-pesticidi-deforestazione/>

<https://tradingeconomics.com/commodity/cocoa>

<https://www.manitese.it/wp-content/uploads/2019/05/Report-Cacao-Corretto-Ecuador-Mani-Tese-2019.pdf>

[https://www.repubblica.it/economia/rapporti/osservazioni/mercati/2025/06/16/news/cacao\\_prezzo\\_aumentato\\_del\\_220\\_dal\\_2022\\_al\\_2025\\_picchi\\_dioltre\\_10mila\\_euro\\_a\\_tonnellata-424672219/](https://www.repubblica.it/economia/rapporti/osservazioni/mercati/2025/06/16/news/cacao_prezzo_aumentato_del_220_dal_2022_al_2025_picchi_dioltre_10mila_euro_a_tonnellata-424672219/)

members, leaves them below the extreme poverty line of USD 1.90 per person per day. This precarious situation prevents farmers from investing in quality improvements or sustainable farming practices, perpetuating a vicious cycle of exploitation and environmental degradation. To increase earnings, many producers choose to expand their cultivated land at the expense of forests, further worsening deforestation.

Gender inequality also persists across cocoa-producing communities. In West Africa, women manage about one-quarter of cocoa farms but generally have less access to land rights, credit, certification schemes, and producer organizations. In addition to their work in the fields, women bear the pressure of domestic and family responsibilities, resulting in a “double workload” that is often unpaid and unrecognized.

Finally, the climate crisis is worsening the sector’s fragility. Rising temperatures, irregular rainfall, and the spread of pests and plant diseases threaten cocoa productivity, reducing already low farmer incomes and driving expansion into new, often fragile, ecosystems.

These interlinked challenges call for a comprehensive and responsible global response. International policies, ethical certification schemes (such as *Fairtrade* and *Rainforest Alliance*) and greater consumer awareness play a crucial role in guiding the market toward fairer and more sustainable practices. Only through shared commitment, from the cocoa farms to the chocolate bar, can a more equitable and environmentally responsible future for cocoa producers be achieved.<sup>10</sup>

### **1.4.1. Major Certification Programs**

Fair Trade represents a commercial partnership built on dialogue, transparency, and mutual respect, aiming to promote greater equity in international trade. Its primary objective is to support sustainable development by providing fairer trading conditions and safeguarding the rights of disadvantaged producers and workers, particularly in countries of the Global South.

In the case of cocoa, a key raw material for chocolate production, issues of fairness and sustainability are especially critical. Behind the “sweetest of treats” lies a hardened

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<sup>10</sup> Sources and websites consulted:

<https://www.altromercato.it/filiere/cacao/>

<https://voicenetwork.cc/wp-content/uploads/2019/07/2018-Cocoa-Barometer.pdf>

<https://www.manitese.it/wp-content/uploads/2019/05/Report-Cacao-Corretto-Ecuador-Mani-Tese-2019.pdf>

<https://valori.it/mangiare-cioccolato-pesticidi-deforestazione/>

reality: cocoa farmers in major producing countries often face precarious living conditions, volatile prices, and incomes insufficient to secure a respectable life for their families.

In recent years, efforts to make cocoa production more sustainable have increased. Smallholder farmer cooperatives have joined forces to obtain fairer prices, promote environmentally friendly agricultural practices, and reduce or eliminate pesticide use and deforestation. At the same time, pioneering projects are emerging that aim to enhance local production by processing cocoa into chocolate directly in producing countries, thereby creating added value and new economic opportunities.

One of the most notable organizations in this field is Fairtrade International, which, through the Fairtrade certification label, ensures that production and trade comply with strict social, economic, and environmental standards. In Italy, Fairtrade Italia promotes the certification label and collaborates with businesses and consumers to increase the demand for certified products.

Fairtrade provides practical tools to improve conditions for producers, including:

- Fairtrade Minimum Price, acting as a safety net when market prices fall below sustainable levels.
- Fairtrade Premium, an additional sum allocated for community or farm-level investments, such as plantation renewal or local infrastructure projects.
- Women's empowerment programs, such as the Fairtrade Africa Women's Leadership School, which encourages female participation in cooperative decision-making.
- Support for small farmers organized in cooperatives or associations to negotiate better contracts or access wider markets.
- Child protection initiatives, aimed at combating child and forced labor still present in some production areas.
- Climate resilience projects helping farming communities adapt to weather fluctuations and mitigate the impacts of climate change.

Alongside Fairtrade, Rainforest Alliance plays a crucial role, promoting sustainable and socially responsible agricultural practices. The Rainforest Alliance works to promote sustainable farming by reducing the use of chemicals, protecting soils, improving the well-being of workers and their families, and encouraging waste recycling, with the goal of protecting ecosystems, fostering decent working conditions, and creating

sustainable economic opportunities for rural communities. Since 2018, Rainforest Alliance has merged with UTZ Certified, forming a unified global standard for cocoa and other tropical crops. This system enhances supply chain traceability and enables more effective monitoring of producers' social and environmental performance.

Beyond Fairtrade and Rainforest Alliance/UTZ, the cocoa sector is also influenced by additional programs promoted by multinational corporations and foundations.

The adoption of these certifications reflects growing awareness among companies and consumers about the importance of social and environmental responsibility within global supply chains. Choosing cocoa and chocolate products certified by Fairtrade or Rainforest Alliance contributes to a fairer trade model that ensures dignified incomes for producers, promotes gender equality, protects human rights, and safeguards tropical ecosystems.



Figure 10: Logos of the main certifications for the sustainable cocoa industry

In conclusion, fair trade and sustainability certifications serve as essential instruments to address the social and environmental challenges within the cocoa market, promoting a transition toward a more ethical, inclusive, and environmentally responsible economy.<sup>11</sup>

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<sup>11</sup> Sources and websites consulted:

[https://www.fairtrade.net/it-it/filiere/cacao.html?\\_gl=1\\*\\_tpsjom\\*\\_up\\*MQ.\\*\\_gs\\*MQ..&gclid=CjwKCAiAwqHIBhAEEiwAx9cTeT8L7PB Y7DFUYa7Siv8PASBCHX5LnSlhp9geaaypcYaeynW-2ANq\\_RoCbW AQAvD\\_BwE&gbraid=0AAAAADv2vBEMjQN0q0BfzW9dpitQAXu6H](https://www.fairtrade.net/it-it/filiere/cacao.html?_gl=1*_tpsjom*_up*MQ.*_gs*MQ..&gclid=CjwKCAiAwqHIBhAEEiwAx9cTeT8L7PB Y7DFUYa7Siv8PASBCHX5LnSlhp9geaaypcYaeynW-2ANq_RoCbW AQAvD_BwE&gbraid=0AAAAADv2vBEMjQN0q0BfzW9dpitQAXu6H)  
<https://www.rainforest-alliance.org/utz/>  
<https://www.rainforest-alliance.org/cocoa/#top>  
<https://www.rainforest-alliance.org/cocoa/>  
<https://valori.it/mangiare-cioccolato-pesticidi-deforestazione/>  
[https://www.eurochocolate.com/chocoday2015/cd2015\\_presentazione.pdf](https://www.eurochocolate.com/chocoday2015/cd2015_presentazione.pdf)

## 1.5. Industrial Chocolate vs. Artisan Chocolate

In the world of chocolate, people often distinguish between “*artisan*” and “*industrial*” chocolate. However, understanding the true differences between the two is not as simple as it seems, as they involve several factors such as production methods, ingredient quality, flavor complexity, and ethical considerations (*figure 11*).

1. **Production Process:** it is one of the most significant distinctions between artisan and industrial chocolate. Artisan chocolatiers typically select their cocoa beans by hand, often working directly with farmers and choosing only the best varieties. This approach makes the process slower but more meticulous. Every stage is monitored closely, prioritizing quality over quantity. As a result, artisan chocolate offers a rich, layered taste and complex aromatic notes rarely found in mass-produced varieties. Industrial chocolate, by contrast, is made on a large scale, focusing on efficiency, standardization, and output. Automated systems ensure consistent results but often at the expense of the chocolate’s individuality.
2. **Quality of Ingredients:** Another key factor that differentiates artisanal from industrial chocolate is the quality of the raw materials used. The selection and ratio of ingredients vary considerably between the two production methods. In artisanal chocolate-making, master chocolatiers typically favor premium-quality ingredients, often sourced through ethical and sustainable supply chains. Every element, from the cocoa beans to the cocoa butter, sugar, and any natural flavorings, is carefully chosen to craft a distinctive and recognizable flavor profile. Some features of artisanal chocolate include:
  - “Fino de Aroma” cocoa, a rare and prized variety cultivated in specific regions or plantations, generally reserved for high-end artisanal producers.
  - Pure cocoa butter, used without replacing it with cheaper vegetable fats.
  - Absence of additives, such as preservatives, colorants, or artificial substances.

In contrast, industrial chocolate production prioritizes large-scale efficiency and cost reduction. This approach often results in lower ingredient quality and the use of less refined materials. Common industrial practices include:

- Lower-grade cocoa, often sourced from mixed origins with weak or even defective flavor profiles, later masked through heavy roasting or artificial flavor enhancement.
- Vegetable fats, used as substitutes for cocoa butter to cut costs.
- Additives, including preservatives, emulsifiers, and colorants, added to extend shelf life and improve appearance.
- Synthetic aromas, designed to replicate the natural scent of cocoa.

These disparities in ingredient quality and composition directly affect the sensory experience. While artisanal chocolate offers a deep, layered tasting experience, industrial chocolate tends to emphasize a simpler, more uniform flavor, designed to appeal to the mass market.

3. Flavor: it is maybe the most noticeable and defining difference between artisanal and industrial chocolate. Each bite of handmade chocolate can become a unique sensory experience, shaped by both the production choices and the quality of the ingredients. Distinctive traits of artisanal chocolate include:

- Unique flavor profiles: each bar may reveal floral, fruity, spicy, or earthy notes, depending on the cocoa's origin and the chocolatier's skill.
- Smooth texture: meticulous grinding produces a smooth, velvety consistency that gently melts on the palate.
- Flavor complexity: the absence of additives and the use of pure ingredients allow cocoa to fully express its nuanced and evolving flavor layers.
- Refined presentation: care and creativity often extend to elegant packaging and artistic bar designs.

Industrial chocolate, on the other hand, is formulated for a more immediate and standardized taste experience, guided by different goals:

- Consistency of flavor: large-scale processes ensure that each bar tastes identical.
- Affordability and accessibility: Lower prices and wide distribution make it easily available to consumers worldwide.
- Consumer appeal: High sugar content and artificial flavorings are calibrated to enhance sweetness and encourage frequent consumption.

In short, artisanal chocolate aims to deliver a complex, multi-sensory experience, while industrial chocolate focuses on uniformity, simplicity, and mass appeal.

4. **Uniqueness and Variety:** artisanal chocolatiers constantly explore innovative flavor combinations, pushing beyond the traditional dark, milk, and white varieties. By experimenting with unusual ingredients and creative combinations, they offer a wide spectrum of tasting experiences that surprise and delight the palate. These artisans often work with different cocoa varieties, test diverse fermentation methods, and use different roasting techniques to produce chocolates with distinctive, rich, and complex flavor profiles.
5. **Accessibility and Price:** industrial chocolate is characterized by its broad availability and affordable pricing, making it easy to purchase in supermarkets and shops worldwide. This mix of convenience, consistent taste, and affordability has made industrial chocolate particularly popular among the general public.
6. **Sustainability:** industrial chocolate production often has significant environmental and social consequences:
  - Intensive monoculture farming: depletes soil, drives deforestation, and disrupts local ecosystems.
  - Use of pesticides and chemical fertilizers: negatively impacts biodiversity and affects the quality of the final product.
  - Energy-intensive processes: industrial machinery and global transportation contribute to high CO<sub>2</sub> emissions.
  - Labor conditions: Workers in industrial supply chains often face low wages and poor conditions, while large corporations reap the majority of profits.

Conversely, many artisanal producers commit to environmentally and socially responsible practices:

- Sustainable farming: collaborations with small-scale farmers who use agroforestry methods help maintain biodiversity and prevent deforestation.
- Reduced use of chemicals: minimal reliance on pesticides and fertilizers preserves environmental health and cocoa quality.

- Shorter supply chains: fewer intermediaries mean lower emissions, stronger local economies, and fairer conditions for producers.
- Fair compensation: farmers receive equitable pay for their work and crops—one of the main reasons artisanal chocolate tends to be more expensive than its industrial counterpart.<sup>12</sup>

	Industrial Chocolate	Artisan Chocolate
<b>Raw materials</b>	Standardized, mixed	Select, Single Origin
<b>Ingredients</b>	Artificial additives and flavors	Natural, without additives
<b>Production process</b>	Automated, fast	Slow, handcrafted
<b>Taste</b>	Uniform, sweeter	Complex, authentic
<b>Price</b>	Cheaper	Higher, but justified by the quality

Figure 11: Differences between Artisan and Industrial Chocolate

## 1.6. The “Bean-to-Bar” Movement

The term *Bean to Bar* refers to a chocolate-making approach in which the producer oversees every stage of production, from selecting the cocoa beans to creating the finished chocolate bar. This method, which emerged as a response to the growing industrialization and standardization of the chocolate industry, emphasizes quality, transparency, and sustainability. Unlike mass production, the Bean-to-Bar philosophy allows for greater flavor customization and careful attention to ethical and environmental practices, including supply chain traceability and fair treatment of farmers. For consumers, Bean-to-Bar chocolate embodies authenticity and craftsmanship, the result of meticulous processing and a direct connection to the cocoa’s origin.

The differences between industrial, traditional artisanal, and Bean-to-Bar chocolate mainly concern the level of control over production and the quality of the raw materials.

<sup>12</sup> Sources and websites consulted:

<https://www.limchocolate.com/differenze-cioccolato-artigianale-e-industriale/>  
<https://www.noshgelato.com/differenza-tra-cioccolato-artigianale-e-cioccolato-industriale/>  
<https://cacaomotum.it/produzione-artigianale-e-industriale-cioccolato-differenze-caratteristiche/#3> Differenze tra cioccolato industriale e artigianale

In industrial production, large corporations rely on automated processes to manufacture chocolate on a massive scale, typically purchasing pre-processed cocoa from global suppliers while prioritizing cost reduction. This approach leads to a high degree of standardization and less focus on detail. The ingredients often include refined sugars, vegetable fats that replace cocoa butter, and artificial flavorings, producing a sweeter yet less complex chocolate.

Traditional artisan chocolatiers who are not Bean to Bar don't oversee the entire process. Instead, they purchase ready-made cocoa mass or butter and focus on creating high-quality bars. Although they don't control the full supply chain, they carefully select premium ingredients, avoid additives, and maintain precise craftsmanship, offering a refined and authentic product.

In contrast, Bean-to-Bar producers manage every step of production themselves, from selecting and fermenting the beans to roasting, grinding, and conching. This direct involvement allows them to highlight the distinctive aromatic profile of each cocoa variety, resulting in chocolate made almost exclusively from cocoa and sugar, without added flavorings or preservatives.

From a sensory perspective, the differences are immediately perceptible. Industrial chocolate tends to be sweeter and more uniform, with a smooth texture but lacking the aromatic complexity typical of fine cacao. Artisanal chocolate, though often superior in texture and balance, may not always convey the full range of flavors inherent to the beans. Bean-to-Bar chocolate, however, reveals a rich and multifaceted flavor profile: each bar tells its own story, with notes that may range from fruity and floral to spicy or earthy, depending on the origin of the beans and the maker's technique. It is a chocolate that enhances rather than masks the natural aromas, offering an authentic and intense tasting experience. For those usual to mass-market sweetness, the first confront with Bean-to-Bar chocolate can be surprising or even challenging, yet this very complexity represents its greatest richness.

Beyond flavor, the Bean-to-Bar movement stands out for its commitment to sustainability and social responsibility. Many chocolate makers personally visit cocoa farms, select the best beans, and establish direct partnerships with farmers to ensure fair pay and environmentally respectful agricultural practices. This ethical model contrasts deeply with industrial logic, where cocoa is purchased in bulk on the global

market with little regard for its origin or variety. The result is a chocolate that is not only delicious but also *just*, both socially and environmentally.

Roasting in Bean-to-Bar production usually occurs in small batches, allowing precise temperature control and full expression of each harvest's aromatic potential, whereas industrial production focuses on uniformity and flaw correction.

The origins of the Bean-to-Bar movement trace back to the 1990s, when small-scale producers began to revive traditional chocolate-making methods in reaction to the loss of authenticity caused by industrial mass production. Pioneering brands such as Scharffen Berger in the United States and Domori in Italy were among the first to focus on bean quality and artisanal processing, elevating chocolate to a gourmet food. Later, companies like Amedei, Valrhona, and Michel Cluizel helped spread the Bean-to-Bar philosophy across Europe, raising consumer awareness about cocoa provenance and fair trade.

During the 2000s, as the demand for high-quality, authentic food grew, the movement expanded globally. Today, Bean-to-Bar chocolate represents a conscious, sustainable, and high-end product that embodies a deep connection between craftsmanship, culture, and territory.

Without discrediting industrial chocolate, which remains a widely available and affordable product, or diminishing the quality achieved by many non-Bean-to-Bar artisans, it is clear that Bean-to-Bar represents the most authentic and complete expression of chocolate artistry. Each bar is the culmination of care, knowledge, and passion, a small master work that unites ethics, flavor, and culture, offering an experience that goes far beyond simple pleasure.

From an analytical perspective, the Bean-to-Bar model can be evaluated through a SWOT analysis, highlighting its strengths, weaknesses, opportunities, and threats. Among its strengths are the superior product quality, full control of the production chain, transparency, traceability, and commitment to sustainability and ethical labor. These elements give Bean-to-Bar chocolate a distinctive value recognized by both experts and ethically minded consumers.

The weaknesses, however, include high production costs, the logistical challenges of maintaining a short supply chain, and the limits of small-scale manufacturing. Consequently, its higher retail price can affect competitiveness in mass markets and reduce accessibility for less informed consumers.

In terms of opportunities, Bean-to-Bar benefits from a rapidly expanding niche market driven by interest in authentic, sustainable, and artisanal food. Collaborations with gastronomy and tourism sectors, participation in chocolate festivals, and the celebration of local origins offer further growth potential.

Finally, threats include competition from industrial brands that misuse the “artisanal” or “Bean-to-Bar” label without adhering to its principles, global cocoa price volatility, and supply challenges related to climate change or economic instability in producing countries.

Overall, this analysis shows that despite economic and logistical challenges, the Bean-to-Bar model represents one of the most conscious and sustainable ways to produce chocolate today. It combines quality, ethics, and culture, restoring to chocolate its original essence, that of a food capable of telling the story of human labor, land, and a passion for excellence.<sup>13</sup>

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<sup>13</sup> Sources and websites consulted:

<https://enricorizzi.com/blogs/magazine/cioccolato-bean-to-bar?srsltid=AfmBOop7MHM3R8Ip0vp-ChcHjkeHhBLLn41sKey1tldSyKXceYvtU30V>

<https://www.limchocolate.com/cioccolato-bean-to-bar-definizione/>

<https://www.limchocolate.com/storia-movimento-bean-to-bar-origini-evoluzione/>

<https://www.tastefrance.com/magazine/french-pantry/bean-bar-chocolate-french-american-story>

## CHAPTER 2

### ANALYSIS OF THE CHOCOLATE MARKET

#### 2.1. The Global Market

##### 2.1.1. Market definition

In this analysis, we will focus on the Chocolate Confectionery market. Chocolate confectionaries appear in a wide variety of forms, brands, and shapes. Within this segment are chocolate bars, candy bars, and pralines, all designed for immediate consumption as indulgent treats. Products such as cookies containing cocoa or chocolate spreads are not considered part of this segment, as they belong to other food categories rather than confectionery. The market encompasses retail sales through both online and offline sales channels to private end customers (B2C). The market only covers at-home consumption; out-of-home consumption is not included. *Figure 12* provides a detailed overview of the products included in the segment and those excluded from it.<sup>14</sup>



Figure 12: Overview of in-scope and out-of-scope product categories within the Chocolate Confectionery market segment

<sup>14</sup> <https://www.statista.com/outlook/cmo/food/confectionery-snacks/confectionery/chocolate-confectionery/worldwide?srltid=AfmBOopzywli-G06mbUR8vLbHqkV1zHK4dqCdKZt-LUpCZ8OMRuvO3tg#analyst-opinion>

## 2.1.2. Market Trends

The Chocolate Confectionery market is experiencing rapid growth. Its value has increased from USD 107.4 billion in 2018 to USD 133.6 billion in 2024 and reached USD 140.15 billion in 2025. Over the longer term, the market is expected to continue expanding at a CAGR of approximately 4.89%, reaching nearly USD 177.92 billion by 2030 (figure 13).

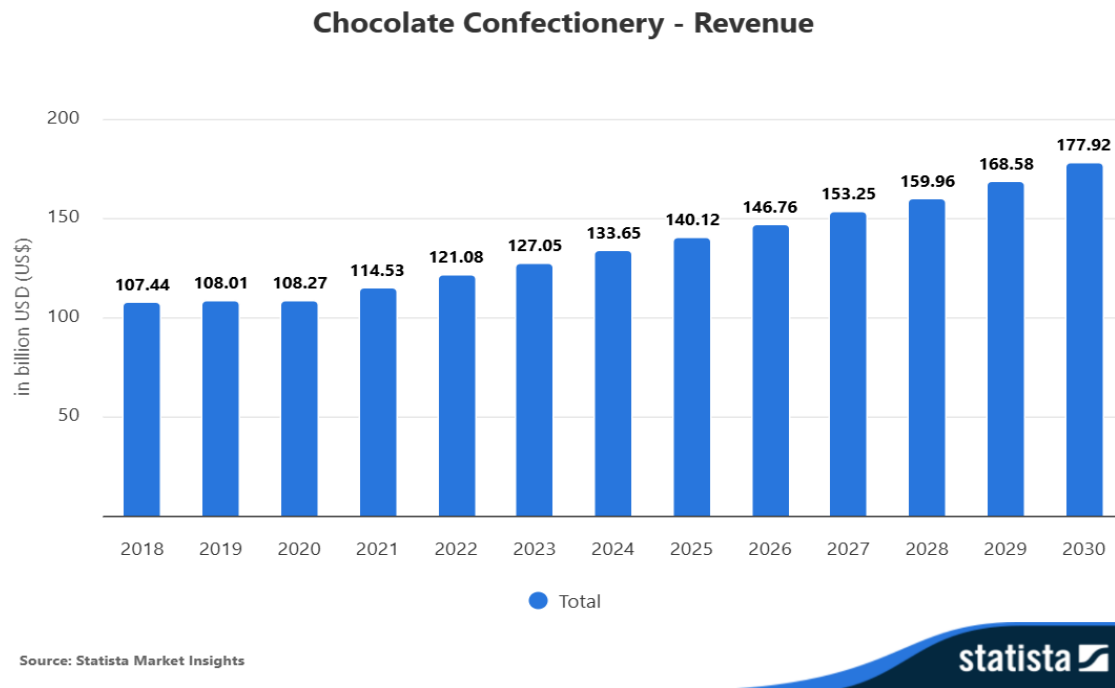


Figure 13: Size of the chocolate confectionery market worldwide from 2018 to 2030 (in billion U.S. dollars) (Source: Statista)

The chocolate confectionery market is experiencing steady expansion, driven by shifting consumer preferences and evolving industry conditions. Growing awareness around health, rising expectations for sustainable practices, and the desire for products that offer emotional and experiential value are increasingly shaping purchasing decisions.

Key markets such as the United States, France, Belgium, and Germany are observing particularly strong growth in premium chocolate categories. This force is largely fueled by consumer demand for transparency in sourcing, ethical manufacturing standards, and distinctive flavor profiles. The rising popularity of single-origin products and fine-flavor cocoa, often supported by sustainability certifications, signals a broader shift toward authenticity and product integrity.

Seasonality remains a critical factor influencing market performance. Holidays and celebrations such as Christmas, Easter, and Valentine's Day continue to generate significant sales volumes, as chocolate is widely perceived as a meaningful and symbolic gift.

At the same time, the global expansion of snacking habits is reinforcing demand. Chocolate is increasingly consumed throughout the day, serving as a source of comfort, a quick energy boost, or a moment of indulgence. User-friendly and visually attractive packaging plays an important role in stimulating impulse purchases and strengthening brand presence, particularly across e-commerce channels that are growing rapidly in the Asia-Pacific region.

Despite favorable growth trends, the industry faces several constraints. One notable challenge is the expanding use of cocoa butter substitutes, including palm oil, soybean oil, and shea butter. These alternatives are valued for their lower cost and improved fat stability and are being actively developed by major manufacturers. Their adoption may reduce dependence on traditional cocoa-derived ingredients, with potential implications for the broader cocoa supply chain.

In parallel, the global push for ethically sourced and environmentally responsible cocoa is placing increasing pressure on companies to enhance supply-chain transparency and invest in sustainable agricultural practices.

Price volatility represents another significant obstacle. Cocoa-producing regions in West Africa are frequently affected by climate-related disruptions and economic instability, leading to fluctuating cocoa prices. Such volatility raises production costs and complicates pricing strategies, particularly for premium and sugar-free chocolate products that depend heavily on high-quality cocoa inputs. These conditions can discourage market entry and slow expansion efforts among established producers.

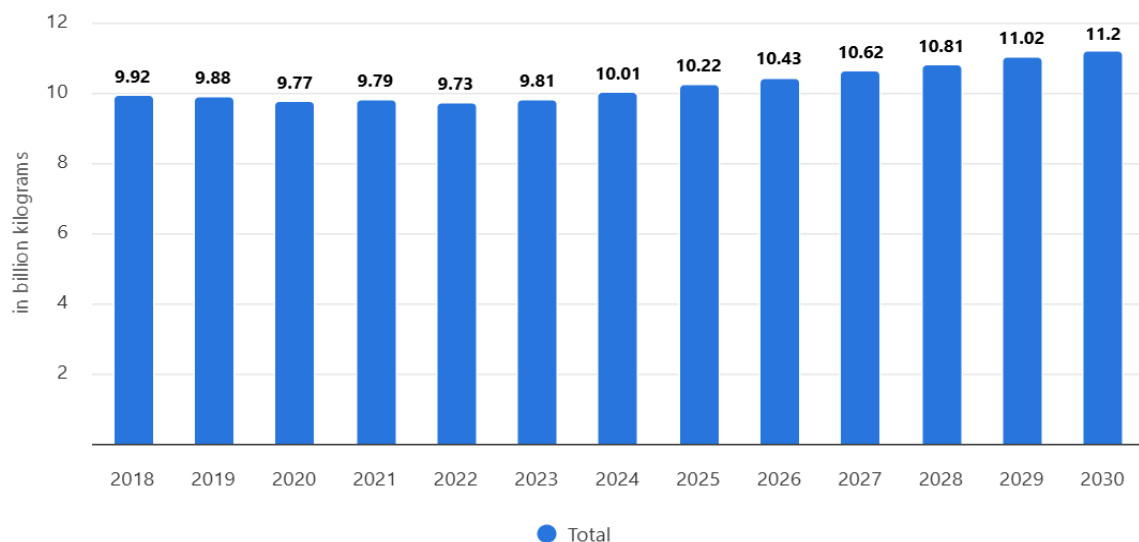
Competitive pressure further limits growth potential. Leading companies such as Mars, Ferrero, Mondelez, Hershey, and Nestlé frequently engage in aggressive pricing strategies to protect market share. While effective in the short term, such competition can compress margins and limit investment in innovation, ultimately constraining long-term industry development.

Consumer behavior analysis indicates an increasingly sophisticated and segmented market. In developed economies, demand is shifting toward higher cocoa content, reduced sugar formulations, and added functional benefits. In contrast, consumers in

emerging markets tend to prioritize affordability and product availability. As a result, brand storytelling, ethical positioning, and transparency have become essential components of modern marketing approaches.

Overall, the chocolate confectionery market is moving toward a model that balances indulgence with health considerations, ethical responsibility, and innovation. Brands that successfully combine premium quality with transparent and sustainable practices are best positioned to compete effectively. Despite ongoing challenges, the market continues to expand in value and, more gradually, in volume. By 2030, global consumption is forecast to reach 11.20 billion kilograms, corresponding to a volume CAGR of 1.81% (Figure 14).

### Chocolate Confectionery - Volume



Source: Statista Market Insights

statista

Figure 14: Volume of chocolate confectionery consumed worldwide from 2018 to 2030 (in billion kilograms) (Source: Statista)

However, this volume growth remains considerably lower than the increase in market revenue. This divergence is largely attributed to the rise in average selling prices (figure 15), driven by the substantial increase in cocoa prices. As cocoa becomes more expensive, production costs rise accordingly, pushing retail prices upward. As a result, the growth in market value is supported not only by consumption trends but primarily by higher input costs that translate into more expensive finished products. The rise in

cocoa prices is reshaping the industry’s pricing structure, leading to faster revenue growth compared with the physical volumes sold.<sup>15</sup>



Figure 15: Average retail value per unit for chocolate confectionery products from 2018 to 2030 (in USD) (Source: Statista)

### 2.1.3. Importers and Exporters

Chocolate is often perceived as a simple pleasure, yet its production process offers a clear example of how strongly interconnected modern global supply chains have become. While cocoa trees can only be cultivated in tropical climates, the conversion

<sup>15</sup> Sources and websites consulted:

[https://info.lukerchocolate.com/l/892141/2025-02-20/ztssq/892141/1740093855QZlIPw4o/Snacks and confectionery chocolate trends report Luker Chocolate 2025 .pdf](https://info.lukerchocolate.com/l/892141/2025-02-20/ztssq/892141/1740093855QZlIPw4o/Snacks%20and%20confectionery%20chocolate%20trends%20report%20Luker%20chocolate%202025.pdf)  
<https://www.towardsfnb.com/insights/chocolate-confectionery-market#:~:text=in%20the%20Report-.Chocolate%20Confectionery%20Market%20Size%2C%20Share%20and%20Growth%20Analysis,the%20growth%20of%20the%20market>  
<https://www.industryresearch.biz/market-reports/chocolate-confectionery-market-110383#:~:text=Online%20channels%20contributed%2018,of%20purchases%20in%20North%20America>  
[https://marketresearch.biz/report/chocolate-market/#Chocolate Industry By Region](https://marketresearch.biz/report/chocolate-market/#Chocolate%20Industry%20By%20Region)  
<https://www.marknteladvisors.com/research-library/chocolate-market.html#:~:text=The%20Global%20Chocolate%20Market%20size,%20i.e.%202025%20D30>  
<https://www.grandviewresearch.com/industry-analysis/chocolate-market>  
<https://www.statista.com/outlook/cmo/food/confectionery-snacks/confectionery/chocolate-confectionery/worldwide>

of cocoa beans into finished chocolate products usually occurs far from the regions where the raw material is grown.

Today, countries such as Côte d'Ivoire, Ghana, Ecuador, Cameroon, and Indonesia play a central role as the world's main suppliers of cocoa beans. Once harvested, these beans are shipped mainly to Europe, where many of the most established chocolate manufacturers are located. In these countries, cocoa undergoes roasting, grinding, and further processing to obtain cocoa butter and cocoa mass, which are the essential ingredients used in chocolate production. This complex sequence of stages highlights the truly global nature of the chocolate industry.

To analyze international trade flows within this sector, I consulted data from the UN Comtrade Database, which provides detailed import and export statistics between countries worldwide. The database is structured around the Harmonized System (HS) classification, and my analysis focused on HS code 1806, which includes *chocolate and other food preparations containing cocoa*. By selecting this aggregated category rather than individual sub-codes, it was possible to capture the full range of cocoa-based products and obtain a more comprehensive view of global trade dynamics.

The data show that European countries dominate chocolate exports. In particular, Germany, Belgium, and Netherlands emerged as the leading exporters in the most recent year analyzed, with export volumes of approximately 991 million, 619 million, and 474 million kilograms respectively (*Figure 16*).

### The World Leaders in chocolate trade

Largest **Exporters** (in million kilograms) of chocolate and other food preparations containing cocoa in 2024

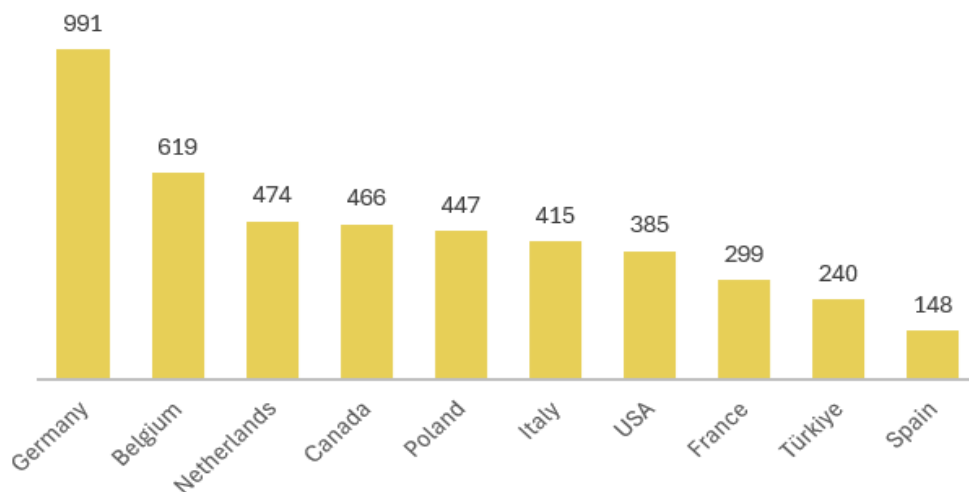


Figure 16: The largest exporters in chocolate trade

Germany also led in export value, reaching roughly \$6.92 billion worth of chocolate shipments in 2024, followed by Belgium at \$4.45 billion and Poland at \$3,26 billion.<sup>16</sup> On the demand side, the United States, Germany, and France were the leading importers of chocolate (*figure 17*). The USA alone imported around 757 million kilograms of chocolate in 2024, valued at nearly \$4,92 billion, sourcing primarily from Canada, Mexico and Belgium.<sup>17</sup>

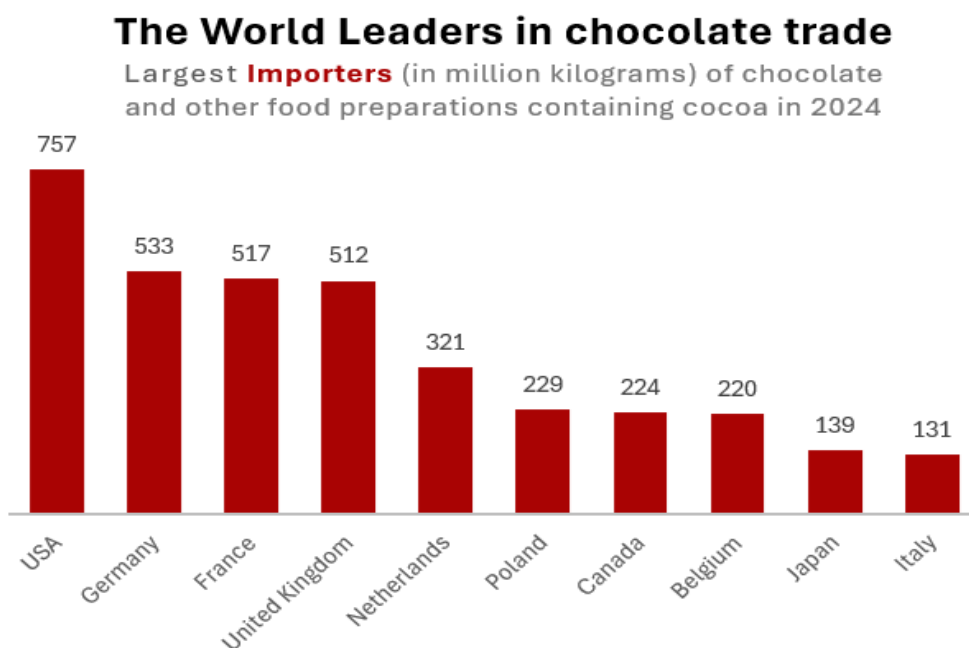


Figure 17: The largest importers in chocolate trade

#### 2.1.4. The Main Competitors

The global chocolate industry is characterized by strong competitive pressure and a pronounced level of market concentration, with a limited number of multinational corporations exerting significant influence over production practices, consumption patterns, and sustainability priorities across the entire cocoa value chain. As consumer demand increasingly shifts toward premium products, ethically sourced ingredients, and innovative recipes, major manufacturers have been required to adapt their business strategies in order to remain competitive within a steadily expanding international market. Within this context, the industry continues to be dominated by

<sup>16</sup><https://comtradeplus.un.org/TradeFlow?Frequency=A&Flows=X&CommodityCodes=1806&Partners=0&Reporters=all&period=2024&AggregateBy=none&BreakdownMode=plus>

<sup>17</sup><https://comtradeplus.un.org/TradeFlow?Frequency=A&Flows=M&CommodityCodes=1806&Partners=0&Reporters=all&period=2024&AggregateBy=none&BreakdownMode=plus>

well-established players whose economic scale, brand strength, and global reach define the structure of the market.

In 2024, Mondelez International confirmed its position as the world's leading chocolate and cocoa company in terms of net sales, reaching approximately 36 billion U.S. dollars (*Figure 18*). Headquartered in Chicago, Mondelez manages a broad and globally recognized portfolio of chocolate brands, including *Cadbury Dairy Milk*, *Milka*, and *Toblerone*. The company has also positioned itself at the forefront of sustainability initiatives through its *Cocoa Life* program, an initiative designed to support cocoa farmers, improve livelihoods, and promote environmentally responsible farming practices.

Ranking second in 2024 was Mars Inc., which recorded net sales of around 23 billion U.S. dollars. Based in McLean, Virginia, Mars owns some of the most iconic brands in the global confectionery market, such as *M&M's*, *Snickers*, and *Galaxy*. The company's long-term sustainability framework, *Cocoa for Generations*, focuses on improving supply-chain traceability while fostering more ethical, inclusive, and resilient cocoa sourcing systems.

The third-largest chocolate producer worldwide in 2024 was the Ferrero Group, with net sales exceeding 19 billion U.S. dollars. Headquartered in Alba, Italy, Ferrero has established a strong global reputation through premium products including *Ferrero Rocher*, *Kinder*, and *Nutella*. The company's emphasis on high product quality, strong brand identity, and continuous innovation has enabled it to reinforce its competitive position in both mature and emerging markets.

Beyond these three market leaders, several other companies play a key role in shaping the global chocolate industry. Nestlé, headquartered in Vevey, Switzerland, remains one of the world's largest food multinationals. Although chocolate represents only one segment of its diversified portfolio, brands such as *KitKat*, *Aero*, and *Smarties* ensure Nestlé's continued relevance within the confectionery sector. The Nestlé Cocoa Plan further reflects the company's commitment to promoting sustainable agricultural practices and improving conditions in cocoa-producing regions.

The Hershey Company, based in Hershey, Pennsylvania, holds a dominant position in the North American market. The company maintains strong consumer loyalty through long-established brands such as *Hershey's Milk Chocolate Bar*, *Reese's*, and *Kisses*, while

simultaneously investing in initiatives aimed at reducing environmental impact and increasing transparency throughout its supply chain.

Another important actor in the premium segment is Lindt & Sprüngli, headquartered in Kilchberg, Switzerland. Lindt is widely recognized for its focus on craftsmanship and high-quality production, with top lines such as *Lindor* and the Excellence range of dark chocolate. Sustainability also represents a core element of the company’s strategy, supported by long-standing commitments to responsible cocoa sourcing.

Collectively, these companies illustrate the broad diversity and strategic complexity of the global chocolate industry, where brand heritage, product innovation, and responsible sourcing increasingly define competitive advantage. The predominance of Mondelez, Mars, and Ferrero underscores the significant market power exerted by multinational corporations, while the presence of specialized premium producers highlights the growing segmentation and sophistication of global chocolate demand.<sup>18</sup>

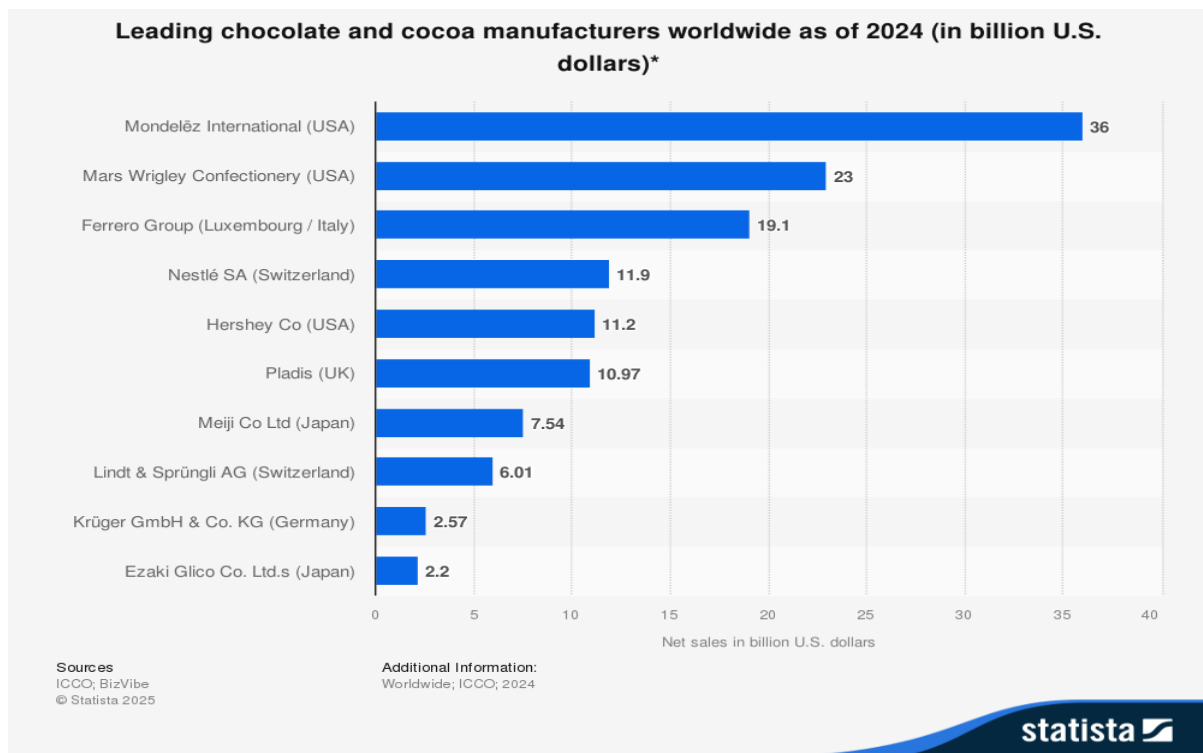


Figure 18: Leading chocolate and cocoa manufacturers worldwide as of 2024 (Source: Statista)

<sup>18</sup> Sources and websites consulted:

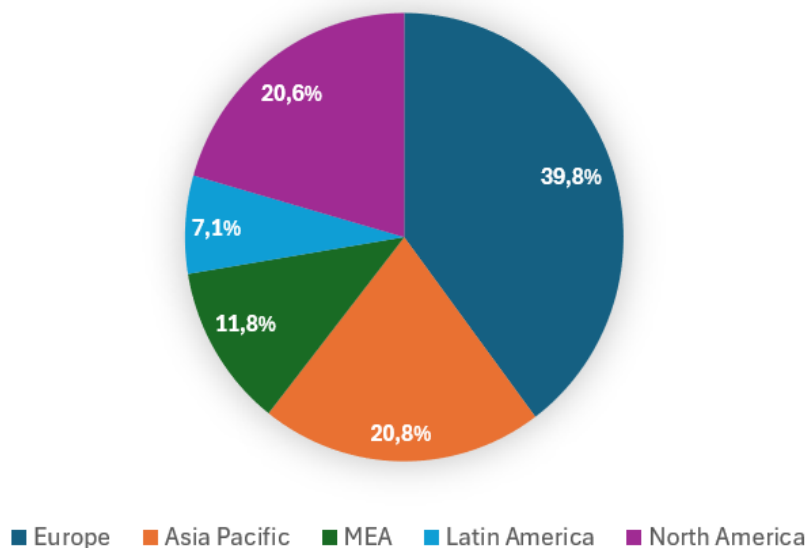
<https://www.cocoahub.eu/blogs/cocoa-hub-whats-new/who-are-the-largest-chocolate-manufacturers?srsId=AfmBOopv01FvYFDz0d17Mvqhw43XnJV4vOfpifUThF8-MUmQetDbonxt&shpxid=8c5fec25-2f6e-45a7-9bad-fd506bad438f>  
<https://www-statista-com.ezproxy.biblio.polito.it/statistics/1298191/top-chocolate-manufacturers-worldwide/>

### 2.1.5. Chocolate Market Segmentation Analysis

The Chocolate Confectionery Market can be examined by dividing it into a number of strategic segments that help clarify how demand and growth differ across the industry. These segments typically include the type of chocolate, such as white, milk, and dark, as well as the distribution channels through which products are sold, both online and offline. This form of segmentation allows for a more precise analysis of consumer behavior, competitive dynamics, and potential development opportunities within the global chocolate sector.

From a geographical perspective, the market is commonly classified into North America, Europe, Asia-Pacific, Latin America, and the Middle East & Africa. Marked differences emerge when comparing these regions. In 2024, Europe hold the largest share of the global Chocolate Confectionery Market, accounting for approximately 39.8%. Asia-Pacific follows with about 20.8%, while North America holds a comparable position, representing roughly 20.6% of total market share (*Figure 19*).

**Market share of chocolate confectionery worldwide in financial year 2024, by region**

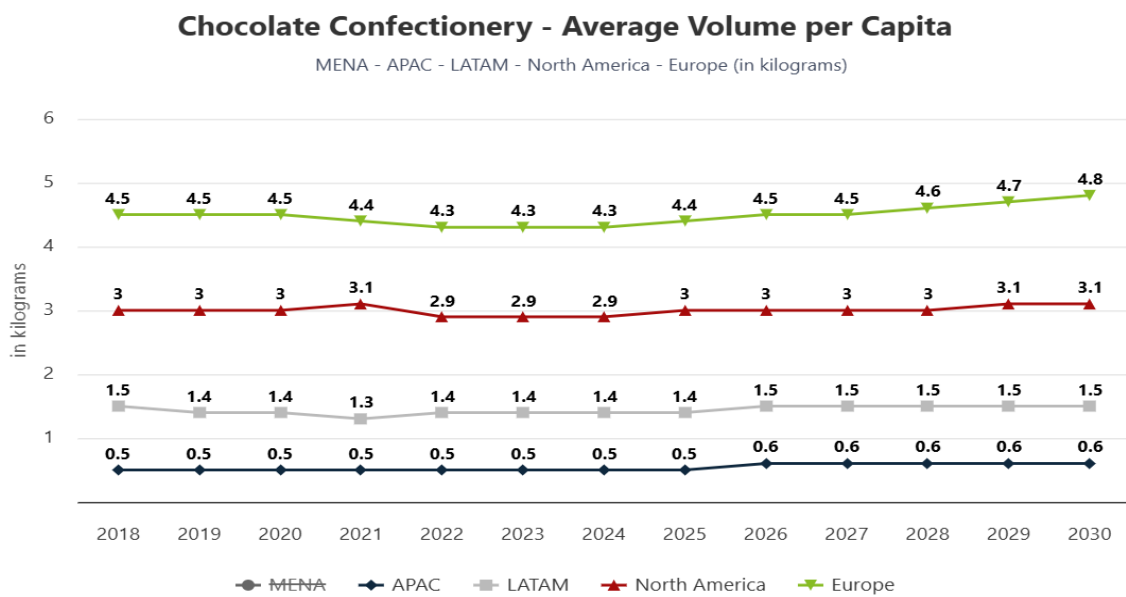


*Figure 19: Market share of chocolate confectionery worldwide in 2024*

The global chocolate market is currently undergoing sustained and diversified growth, shaped by region-specific consumer habits, income levels, and cultural preferences. While overall demand continues to expand worldwide, the underlying drivers of consumption vary significantly across geographical areas.

Europe remains the leading region in the global chocolate market, supported by a long-established cultural tradition of chocolate manufacturing and consumption. Annual per capita consumption is estimated at between 4 and 5 kilograms (*Figure 20*), the highest level recorded globally. This strong consumption base reflects both deeply rooted dietary habits and the presence of numerous historic chocolate producers across the region.

In North America, the chocolate confectionery market has reached a value of approximately 27.6 billion U.S. dollars, with the United States representing the most influential and largest national market. The competitive environment within the U.S. is highly concentrated, and The Hershey Company occupies a dominant position. Market data indicate that around 56% of chocolate and candy bar consumers in the United States regularly purchase Hershey’s products, underscoring the company’s strong brand loyalty and market penetration.



Source: Statista Market Insights



Figure 20: Average volume per Capita from 2018 to 2030 (Source: Statista)

The Asia-Pacific region is characterized by particularly rapid expansion and is expected to record a compound annual growth rate (CAGR) of approximately 5.3% between 2025 and 2030. This growth is largely driven by increasing disposable incomes, accelerating urbanization, and the growing influence of Western consumption patterns. In countries such as China, India, and Japan, chocolate has traditionally been consumed mainly during special occasions or as a gift rather than as an everyday product.

However, younger consumer segments are increasingly attracted to premium products and unconventional flavor profiles. At the same time, the expansion of e-commerce platforms and modern retail formats has improved product availability and market access. Despite this growth, per capita chocolate consumption in Asia-Pacific remains relatively low compared to Western markets, indicating substantial unexploited potential. To address local tastes, manufacturers are increasingly developing region-specific products, with flavors such as green tea, durian, and matcha gaining popularity among consumers.

In Latin America seasonal demand and impulse purchases support stable sales, while price sensitivity remains significant due to economic disparities. Brazil is one of the largest consumers, with consumption linked to cultural traditions, gifting, and everyday indulgence. Interest in dark, sugar-free, and health-oriented chocolate is growing, and e-commerce is expanding, though supermarkets remain the main sales channel.

The Middle East and Africa chocolate market shows the fastest growth globally, with a CAGR of 5.6% from 2025 to 2030. In the Middle East, chocolate is closely linked to gifting, hospitality, and celebrations, while in Africa, affordability drives consumption. Premium and luxury segments are growing in richer countries such as the UAE, Saudi Arabia, and South Africa, whereas price-sensitive regions are dominated by mass-market products. Challenges include chocolate storage in hot climates and distribution costs in rural areas.

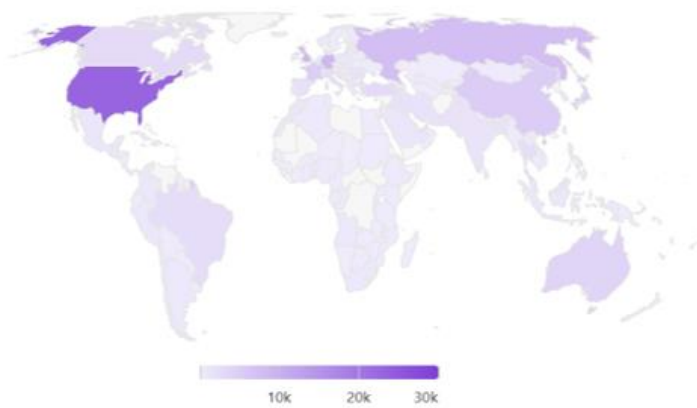
In global comparison, most revenue is generated United States (USD 23,2 million), followed by the United Kingdom (USD 8,918 million), Germany (USD 8,783 million), Russia (USD 7,752 million), and China (USD 5,393 million) (*figure 21*).<sup>19</sup>

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<sup>19</sup> Sources and websites consulted:

[https://www.statista.com/outlook/cmo/food/confectionery-snacks/confectionery/chocolate-confectionery/custom?token=GzKogixE5nuns1pwG9V9V2KZ2vvlF8DPLHaw6RdtlmjdXeqxPxrnvKS4WLyBn15j3xJqV47ZvHKb7sRHkfMrA5zYR7rZUS3AxRD7iFeBjf\\_XHUUEXLnGFVS2n7kWR1jkTA%3D%3D&currency=USD](https://www.statista.com/outlook/cmo/food/confectionery-snacks/confectionery/chocolate-confectionery/custom?token=GzKogixE5nuns1pwG9V9V2KZ2vvlF8DPLHaw6RdtlmjdXeqxPxrnvKS4WLyBn15j3xJqV47ZvHKb7sRHkfMrA5zYR7rZUS3AxRD7iFeBjf_XHUUEXLnGFVS2n7kWR1jkTA%3D%3D&currency=USD)  
<https://www.grandviewresearch.com/industry-analysis/chocolate-market>  
[https://marketresearch.biz/report/chocolate-market/#Chocolate\\_Industry\\_By\\_Region](https://marketresearch.biz/report/chocolate-market/#Chocolate_Industry_By_Region)  
<https://www.towardsfnb.com/insights/chocolate-confectionery-market#:~:text=in%20the%20Report-,Chocolate%20Confectionery%20Market%20Size%2C%20Share%20and%20Growth%20Analysis,the%20growth%20of%20the%20market>

### Chocolate Confectionery - Revenue Comparison



### Top 5 countries (2024) in million USD (US\$)

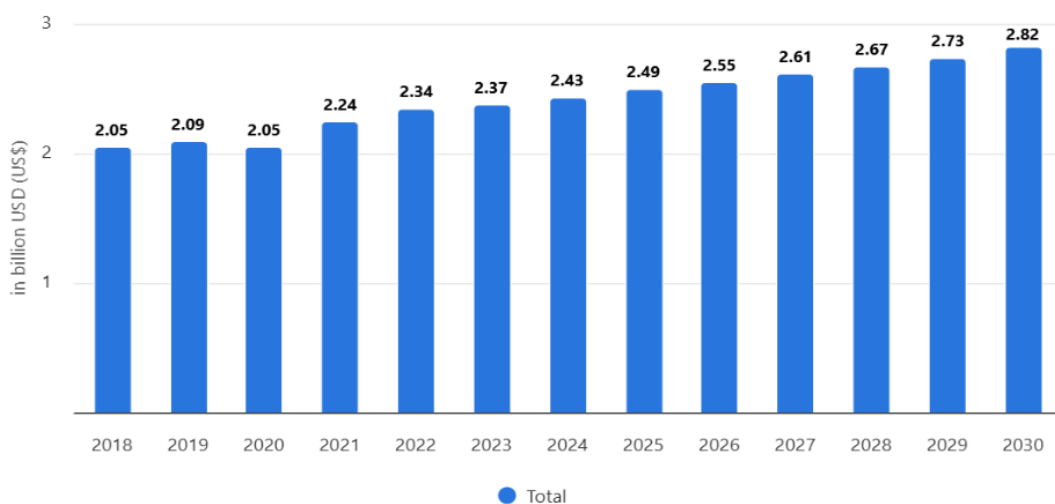
1. United States	23,205
2. United Kingdom	8,918
3. Germany	8,783
4. Russia	7,752
5. China	5,393

Figure 21: Comparison of revenues among countries in 2024 (Source: Statista)

## 2.2. The Chocolate Confectionery Market in Italy: Consumer Trends and Sales

This chapter provides a comprehensive overview of the Italian chocolate market from a retail perspective, focusing on the “Chocolate Confectionery” segment. Using data from Statista, the analysis investigates consumer behavior, market size in terms of revenue and sales volume. This section aims to explain the economic relevance of chocolate as a consumer good before moving on to the analysis of its industrial manufacturing.

### Chocolate Confectionery - Revenue



Source: Statista Market Insights

statista

Figure 22: Size of the chocolate confectionery market in Italy from 2018 to 2030 (in billion U.S. dollars) (Source: Statista)

In 2025, the Italian Chocolate Confectionery market is expected to generate US\$2.49 billion in revenue (*figure 22*), with an annual growth rate (CAGR) of 2.52% between 2025 and 2030.

In relation to total population figures, per-capita revenues amount to US\$42.06 in 2025. Volume is expected to reach 255.68 million kg by 2030, with a projected volume growth of 0.3% in 2026 (*figure 23*).

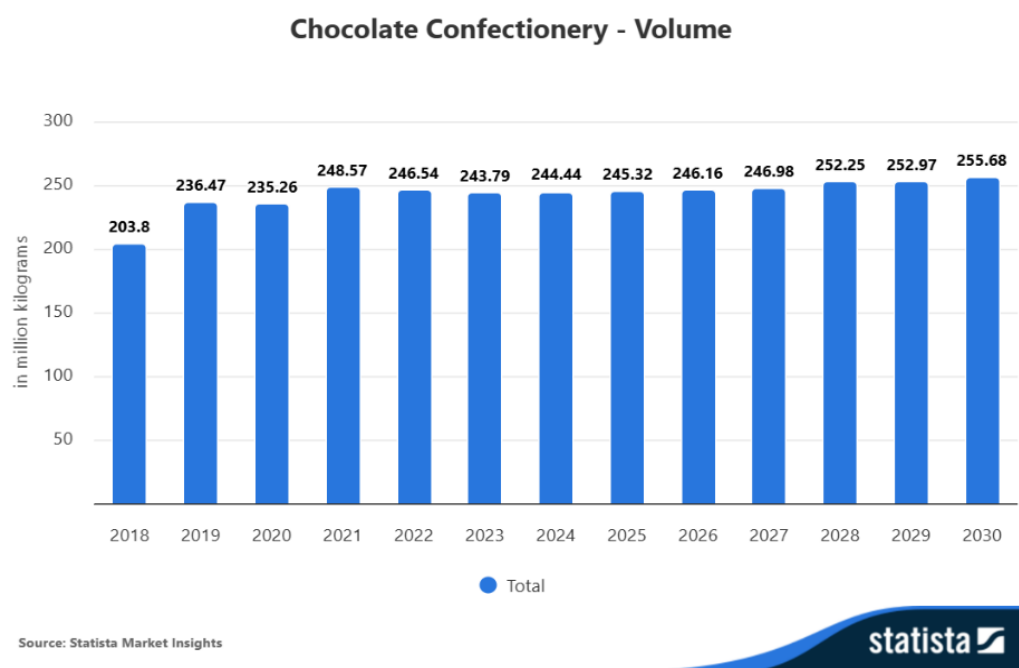


Figure 23: Volume of chocolate confectionery consumed in Italy from 2018 to 2030 (in billion kilograms) (Source: Statista)

Consumer behavior in Italy has experienced a evident transformation in recent years. As health and well-being have gained importance in purchasing decisions, demand has increased for chocolate confectionery products that are organic, vegan, and lower in sugar content. At the same time, Italian consumers are showing growing sensitivity toward sustainably and ethically sourced chocolate, a trend that aligns with the country’s strong cultural emphasis on artisanal craftsmanship and high-quality food traditions. These evolving preferences are particularly evident among younger and more health-conscious consumers, who tend to place greater importance on ingredient transparency, product origin, and the environmental and social impact of their consumption choices.

Market developments clearly mirror these changes in demand. Manufacturers are increasingly reformulating their products by reducing sugar levels and enriching

recipes with functional ingredients such as nuts, berries, and so-called superfoods. Alongside the shift toward healthier alternatives, the appetite for premium and artisanal chocolate remains strong, with many consumers willing to pay higher prices for distinctive products characterized by superior quality and originality. For producers, one of the main challenges lies in finding an effective balance between improving nutritional profiles and maintaining the indulgent sensory experience traditionally associated with chocolate.

The structure of the Italian chocolate market is further influenced by its unique cultural and production characteristics. Italy benefits from a long-standing tradition in premium chocolate manufacturing, often centered on the use of high-quality raw materials such as hazelnuts and almonds. In addition, strict food-labeling requirements and rigorous quality-control standards help sustain elevated production benchmarks, reinforcing the strong presence of artisanal and high-end chocolate products within the domestic market.

Lastly, broader macroeconomic conditions also play a role in shaping the sector's performance. Solid consumer spending levels and relatively high disposable income support ongoing demand for premium chocolate products, while public policies and investments in the food industry contribute to overall market stability. Nevertheless, volatility in global cocoa prices and the gradual shift toward alternative healthy snacks represent potential constraints on future market growth.<sup>20</sup>

### **2.2.1. Industrial Production and the manufacturing Landscape**

While the previous chapter concentrated on the retail dimension of the chocolate market, this section adopts an industrial perspective by focusing on the supply side of production. Drawing on datasets provided by ISTAT (the Italian National Institute of Statistics), the analysis explores Italy's manufacturing capacity within the chocolate and cocoa sector. By moving beyond the consumer-oriented "confectionery" segment, these data allow for a broader understanding of the industry, encompassing intermediate outputs and semi-finished products intended for industrial use.

In order to examine chocolate production in Italy, ISTAT data classified under the PRODCOM system were used, with particular attention given to codes beginning with

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<sup>20</sup> <https://www.statista.com/outlook/cmo/food/confectionery-snacks/confectionery/chocolate-confectionery/italy>

10.82.2x, which correspond to chocolate and cocoa-based products. The analysis focuses on three key macroeconomic indicators:

- Realized production in physical quantity, representing the total volume of chocolate manufactured;
- Sold production in physical quantity, indicating the amount of product effectively sold by companies;
- Value of sold production, expressed in thousands of euros, reflecting the economic value generated by industrial output.

**COMPARISON BETWEEN VALUE OF SOLD PRODUCTION AND QUANTITY SOLD IN THE ITALIAN CHOCOLATE INDUSTRY (2020–2024)**

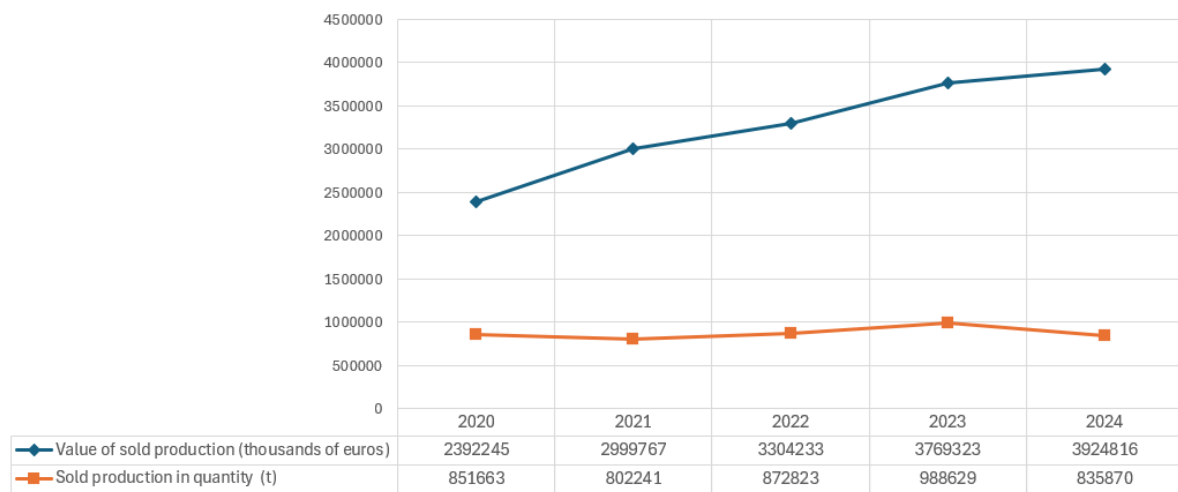


Figure 24: Comparison between Value of Sold Production and Quantity Sold in the Italian Chocolate Industry (2020–2024)

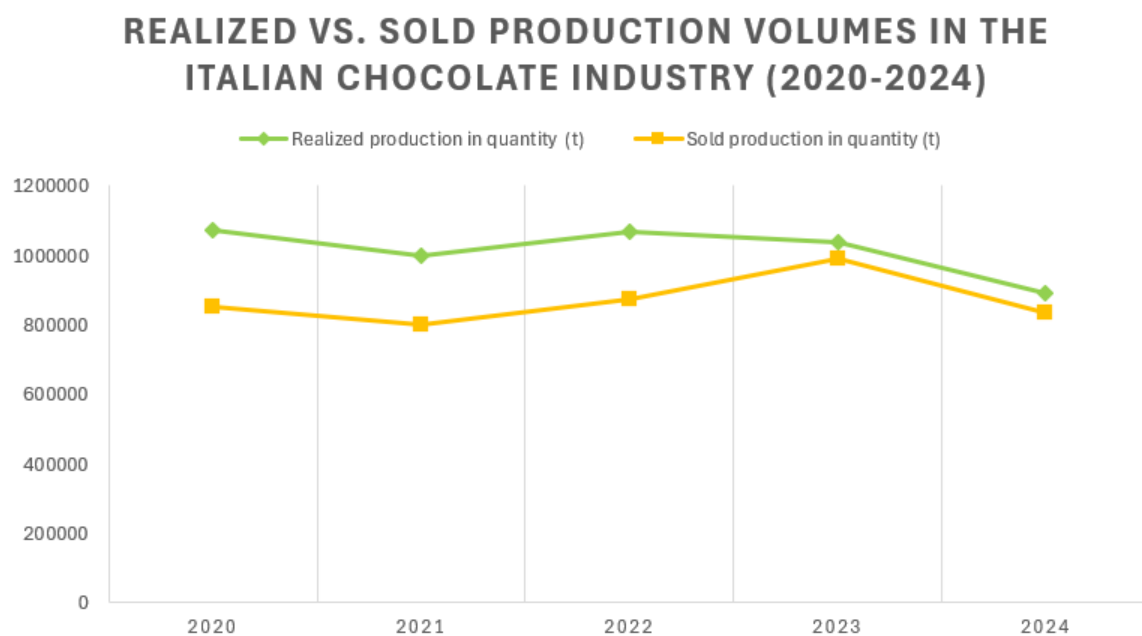
An examination of the 2020–2024 period reveals a clear and consistent pattern: while the physical quantities of chocolate sold have increased at a steady pace, the corresponding monetary value expressed in euros has grown at a significantly faster rate (Figure 24). This divergence suggests a non-linear relationship between production volumes and economic value, indicating that revenue growth cannot be explained solely by higher output levels.

A comparison between the Value of Sold Production (measured in euros) and the Quantity of Sold Production (measured in tons) provides valuable insight into both the pricing mechanisms and the overall economic efficiency of the Italian chocolate manufacturing sector.

This discrepancy can be attributed to several key factors:

- **Raw Material Volatility:** The chocolate industry is highly sensitive to the cost of cocoa beans. Increases in international commodity prices are directly reflected in the Value of Sold Production, even if the physical output remains constant.
- **Premiumization:** There is a clear shift in the Italian manufacturing landscape toward higher-quality products (e.g. single-origin cocoa, organic certifications, or high-percentage dark chocolate). These products command a higher market price, inflating the value side of the ratio.

To gain a more comprehensive understanding of the Italian chocolate manufacturing landscape, it is therefore essential to examine the relationship between production volumes and commercial performance in greater detail, as illustrated in *Figure 25*.



*Figure 25: Realized vs. Sold Production Volumes in the Italian Chocolate Industry (2020-2024)*

This analysis is structured around three core dimensions: inventory dynamics, market absorption, and unit value growth. In this framework, the relationship between Realized Production and Sold Production is used as an indicator of how Italian chocolate manufacturers adjust inventory levels in response to changing market conditions.

Data covering the 2020–2022 period show that realized production volumes consistently exceeded sold quantities. This pattern indicates the presence of a systematic production surplus, suggesting that firms deliberately accumulated

inventories. Such behavior can be interpreted as a strategic choice aimed at meeting predictable seasonal demand peaks, particularly during periods such as Christmas and Easter, or as a precautionary measure to mitigate potential supply chain disruptions.

In contrast, the reduced gap observed in 2023 points to a more efficient alignment between production output and market demand. This phase can be interpreted as a “lean” operational approach, in which nearly all produced output was absorbed by the market. As a result, inventory holding costs were minimized, reflecting improved coordination between manufacturing planning and sales performance.

The efficiency of the sector can be quantified through the Market Absorption Rate, calculated as:

$$\text{Absorption rate} = \left( \frac{\text{Quantity sold}}{\text{Quantity produced}} \right) \times 100$$

Trend analysis indicates that although the absorption rate remained relatively stable during the early years of the 2020s, the 2023–2024 period represents a clear turning point. The exceptionally high absorption level recorded in 2023, followed by a simultaneous decline in both production and sales volumes in 2024, points to a phase of increased market volatility. The contraction observed in 2024 suggests that manufacturers deliberately reduced output in response to the sharp increase in global cocoa prices, opting to protect economic margins and financial stability rather than pursue volume growth.

Overall, the Italian chocolate industry exhibits a refined ability to balance industrial capacity with market demand. Examination of the gap between Realized Production and Sold Production highlights a structural shift away from a entirely volume-oriented approach toward a more efficient, value-focused production model. The contraction recorded in 2024 is particularly indicative of this strategic evolution: by recalibrating output levels and emphasizing unit value enhancement, Italian producers have effectively navigated the challenges associated with the “cocoa crisis.” This adaptive response has improved the position of the Italian manufacturing sector as a benchmark for excellence within the global premium confectionery market.<sup>21</sup>

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<sup>21</sup>[https://esploradati.istat.it/databrowser/#/it/dw/categories/IT1,Z0600IND,1.0/IND\\_PRODUCTION/DCSP\\_PRODCOM/IT1,115\\_168\\_DF\\_DCSP\\_PRODCOM\\_2,1.0](https://esploradati.istat.it/databrowser/#/it/dw/categories/IT1,Z0600IND,1.0/IND_PRODUCTION/DCSP_PRODCOM/IT1,115_168_DF_DCSP_PRODCOM_2,1.0)

### 2.2.2. Iconic Brands of Italian Chocolate

Italy's connection with chocolate is deeply established in history and culture, blending centuries-old craftsmanship with innovation and a strong sense of identity. This rich heritage is reflected not only in globally recognized companies such as Ferrero, but also in historic artisanal producers including Caffarel, Majani, Perugina, Romanengo, Venchi, Guido Castagna, and Peyrano. Each of these names has contributed in a distinctive way to shaping Italy's reputation for excellence through innovation, craftsmanship, and storytelling.

One of the earliest milestones in Italian chocolate history can be traced back to Caffarel. Founded in 1826 by Pierre Paul Caffarel, the company originated when he converted a former tannery near Turin into one of Europe's earliest chocolate workshops. Driven by curiosity and experimentation, Caffarel played a key role in the development of the *Gianduiotto*, a confection that would become emblematic of Piedmontese chocolate tradition. Over time, the company introduced mechanized production techniques designed to reproduce the precision and skill of master chocolatiers, successfully combining artisanal know-how with industrial innovation.

An equally influential chapter began in Alba with the emergence of Ferrero. During the 1940s, Pietro Ferrero, together with his brother Giovanni Ferrero and his wife Piera Cillario, began experimenting in a small pastry shop. These early efforts led to the creation of the *Giandujot*, a hazelnut-based product that would later evolve into Nutella, officially launched in 1964. The subsequent introduction of the Kinder line further strengthened Ferrero's global expansion. Despite becoming a multinational leader, the company has maintained a strong emphasis on precision, consistency, and confidentiality, elements that continue to define its products.

In central Italy, Perugina was founded in Perugia in 1907 and quickly established itself as a major force in chocolate production. After relocating its facilities in 1915, the company expanded its operations and refined its cocoa processing techniques. A defining moment came in 1922, when Luisa Spagnoli created the *Bacio*, a gianduia-filled chocolate enriched with chopped hazelnuts and accompanied by a romantic message. This product became an enduring symbol of the brand and remains one of Italy's most iconic confections.

Venchi also played a significant role in promoting Italian chocolate internationally. Founded in Turin in 1878 by Silvano Venchi, the company initially gained recognition

for specialties such as *Nougatine*, caramelized hazelnuts coated in dark chocolate. Over time, Venchi evolved into a premium brand with boutiques across the globe. Despite its international expansion, the company has preserved a strong artisanal identity, offering chocolate, gelato, and spreads within refined retail spaces that celebrate Italian design and taste.

Bologna, meanwhile, was home to the Majani family's chocolate tradition long before the rise of modern industrial production. Founded in 1796, the Majani workshop gradually expanded into a substantial enterprise that combined manufacturing spaces with family residences. Under the leadership of Giuseppe Majani in the mid-nineteenth century, the company introduced advanced machinery that modernized production processes. This evolution culminated in celebrated creations such as the FIAT *Cremino*, whose four-layer structure earned first prize in the 1911 competition organized by FIAT to mark the launch of the Tipo 4 automobile.

Together, these stories represent only a portion of Italy's vast chocolate-making tradition, yet they clearly illustrate how the sector has evolved through sustained experimentation, creativity, and passion. Italian chocolate, shaped by both artisanal excellence and industrial innovation, continues to influence national culture while maintaining a prominent role within the global confectionery landscape.<sup>22</sup>

### **2.2.3. Analysis of Imports and Exports**

The analysis of Italian chocolate import and export flows is based on data from the UN Comtrade Database, one of the main international sources for foreign trade statistics, which collects official information provided by national customs authorities.

For the purpose of this analysis, products classified under HS code 1806 – *Chocolate and other food preparations containing cocoa* were selected, allowing for a consistent identification of international trade in chocolate and related products. The period under consideration covers 2020 to 2024, and the data are analyzed in terms of both value (expressed in U.S. dollars) and quantity (measured in kilograms).

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<sup>22</sup> Sources and websites consulted:

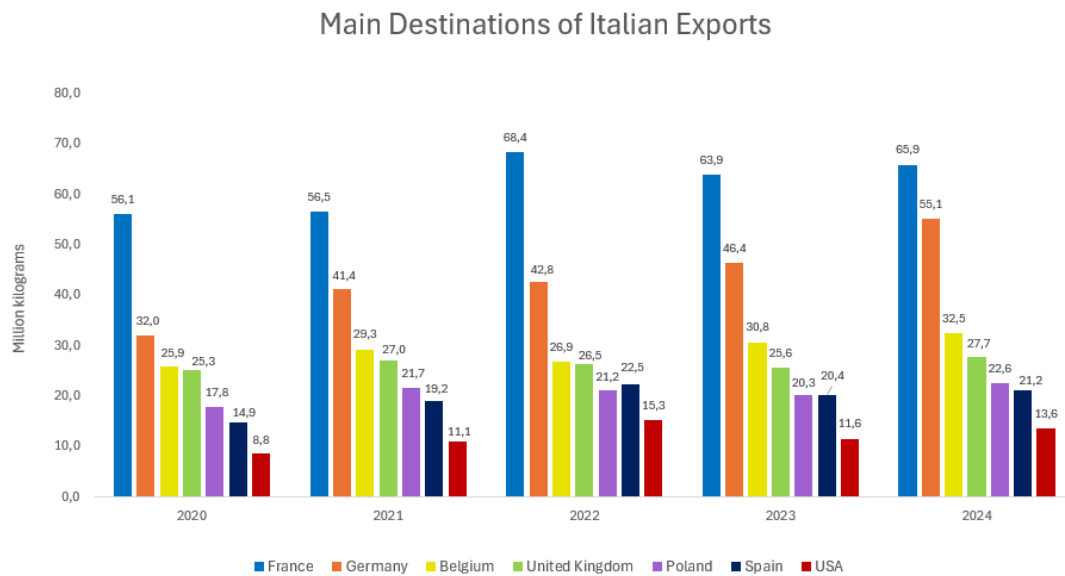
<https://cocoatreeclub.net/cenni-storici/le-industrie-del-cioccolato-in-italia/>

[https://www.repubblica.it/il-](https://www.repubblica.it/il-gusto/2021/07/07/news/giornata-mondiale-del-cioccolato-world-chocolate-day-2021-309136696/)

[gusto/2021/07/07/news/giornata mondiale del cioccolato world chocolate day 2021-309136696/](https://www.repubblica.it/il-gusto/2021/07/07/news/giornata-mondiale-del-cioccolato-world-chocolate-day-2021-309136696/)

In 2024, Italian chocolate exports reached a value of \$ 3,023 million, recording an increase of +13.58% compared to 2023. This strong performance confirms the growing international demand for Italian chocolate, supported by the reputation of *Made in Italy*, high artisanal quality, and the innovative capacity of the confectionery sector.

As shown in *Figure 26*, Europe represents the main destination market for Italian chocolate exports. France, Germany, Belgium, and the United Kingdom account for the largest shares, benefiting from geographical proximity, well-established distribution networks, and structurally high demand for confectionery products.



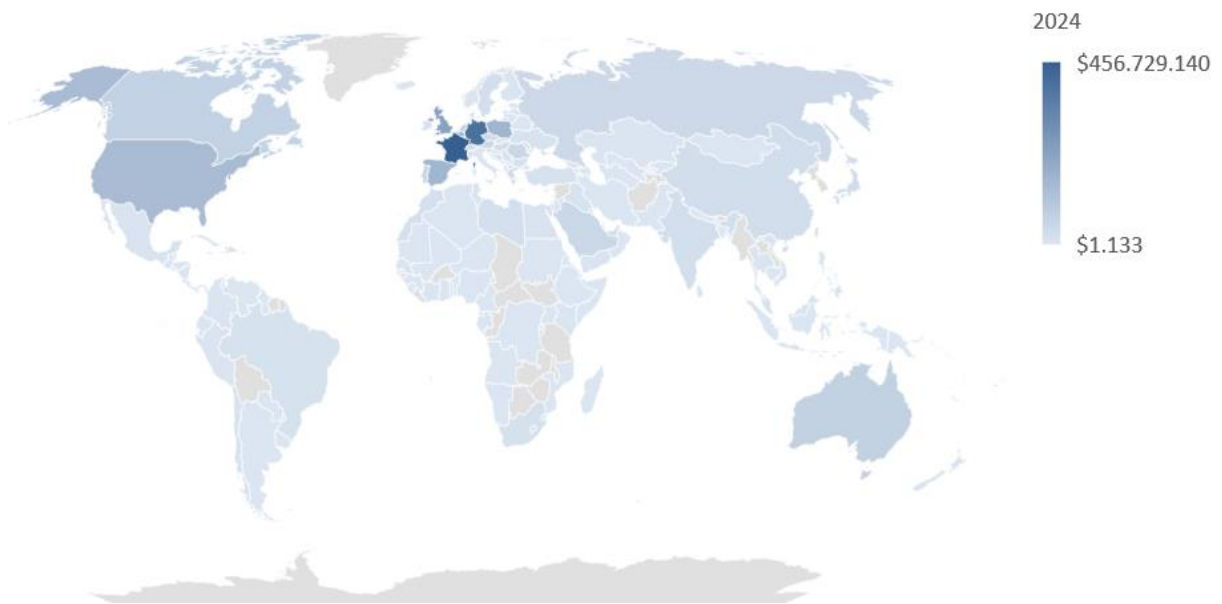
*Figure 26: Main destination of Italian Chocolate exports*

France emerges as the leading export destination, with export volumes reaching approximately 65.9 million kilograms in 2024, reflecting strong consumer appreciation for premium and gourmet products. Germany also plays a central role, importing about 55.1 million kilograms, despite its substantial domestic chocolate production, thus confirming its position as one of the main European trade hubs in the sector.

At the same time, a growing importance of extra-EU destinations can be observed, particularly the United States, which represents the second largest non-European market for Italian chocolate. In 2024, exports to the U.S. amounted to around 13.6 million kilograms, highlighting a steady upward trend. In this market, Italian chocolate is predominantly positioned in the premium segment and is associated with values of quality, craftsmanship, and certified origin. Overall, approximately 28% of Italian chocolate exports to non-EU countries are destined for the United Kingdom and the

United States, indicating a gradual geographical diversification of export destinations. Spain and the United Kingdom remain strategically important markets due to the stability of volumes and high per-capita consumption of confectionery products.

*Figure 27* provides a geographical map illustrating the distribution of Italian chocolate exports by destination country in 2024. The map highlights a strong concentration of export flows within Europe, confirming the region as the core market for Italian chocolate. Beyond Europe, the map shows a significant export presence in North America, particularly in the United States, confirming the dual structure of Italian chocolate exports: on the one hand, a dense and stable network of neighboring European markets; on the other, a selective expansion toward high-income overseas markets, where Italian chocolate is positioned as a premium product.



*Figure 27: Geographical distribution of Italian chocolate exports*

The prominence of these destinations is driven by several key factors. In wealthier economies, Italian chocolate is positioned as a premium product rather than a mass-market good, with consumers willing to pay higher prices for quality, tradition, and refined presentation. Cultural affinity also plays an important role, particularly in countries with a strong-tasting culture and high awareness of ingredients and origin, which aligns closely with Italy's emphasis on superior raw materials and craftsmanship. Finally, efficient logistics and favorable trade frameworks support

export growth, facilitating reliable supply chains within Europe and reinforcing Italy’s presence in overseas markets.<sup>23</sup>

On the import side, Italy sources chocolate mainly from other European countries, as illustrated in *Figure 28*.

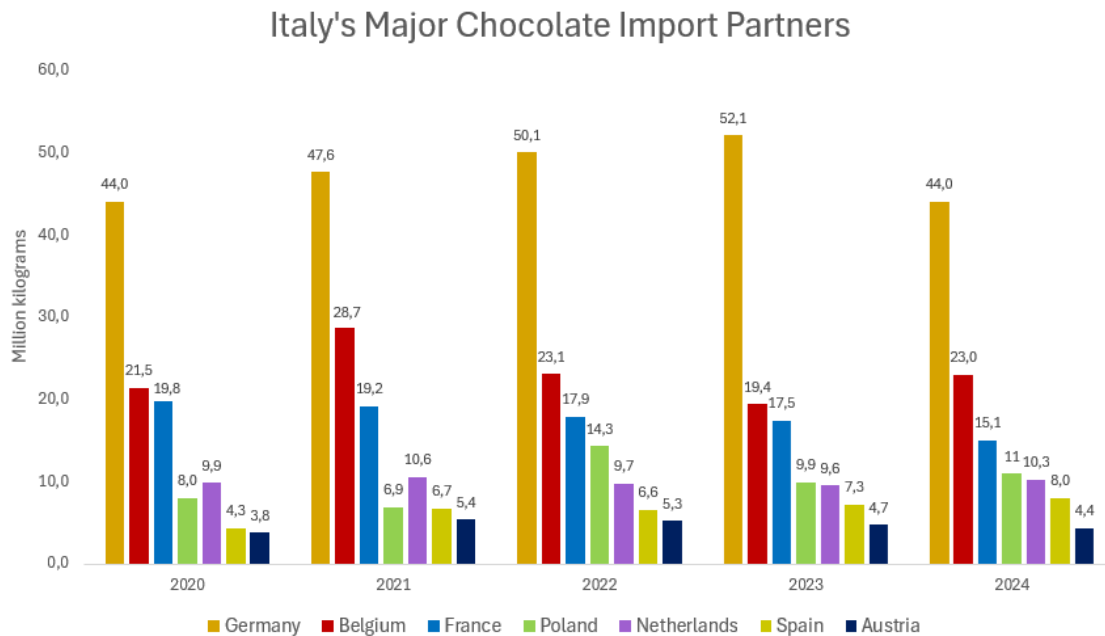


Figure 28: Top Importing Countries of Chocolate from Italy

Germany has consistently been the largest supplier since 2020 and in 2024 provided approximately 44.0 million kilograms of chocolate and cocoa-based products, supported by its large production capacity, specialized industry, and efficient logistics. Belgium and France follow with significant but more variable volumes, accounting for about 23.0 million kilograms and 15.1 million kilograms respectively in 2024. Other countries such as Poland, the Netherlands, Spain, and Austria contribute smaller yet stable shares, reflecting diversified supply channels within Europe.

Italy imports chocolate from these countries due to a combination of geographical, economic, and industrial factors. Geographic proximity plays a crucial role, as neighboring countries such as Germany, Belgium, France, the Netherlands, Austria, and

<sup>23</sup> Sources and websites consulted:

<https://comtradeplus.un.org/TradeFlow?Frequency=A&Flows=X&CommodityCodes=1806&Partners=all&Reporters=380&period=2024&AggregateBy=none&BreakdownMode=plus>  
<https://www.sostegnoexport.it/notizie/export-cioccolato-italiano-17-nel-2024-e-nuove-opportunita-per-le-pmi/>

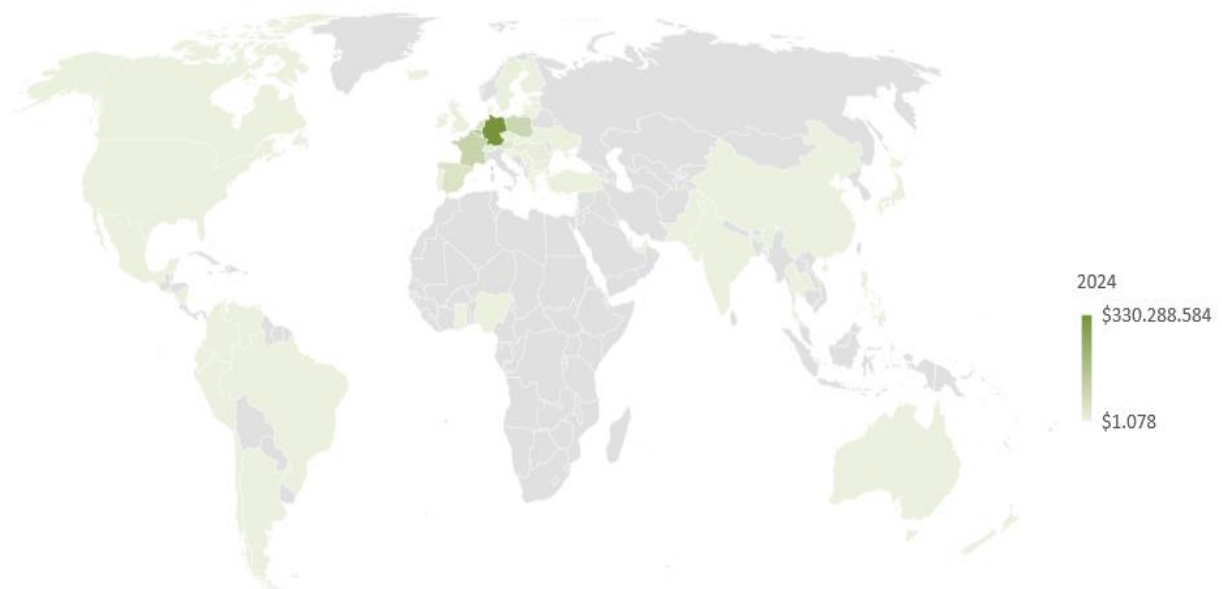
Spain allow for lower transportation costs, shorter delivery times, and more efficient logistics.

In addition, several of these countries have strong traditions and well-established expertise in the chocolate and confectionery industry. Belgium, Germany, and France are known for their high-quality production and advanced processing capabilities, making them reliable suppliers of both finished products and semi-processed inputs.

Trade within the European Union further facilitates these exchanges, as the absence of customs duties and the harmonization of regulations encourage stable and cost-effective commercial relationships. Moreover, differences in production specialization across countries lead to integrated supply chains, where Italy complements its domestic production with competitive and specialized inputs from abroad.

Overall, Italy's chocolate import patterns reflect the importance of proximity, industrial specialization, market integration, and supply reliability in shaping international trade relationships.

Finally, *Figure 29*, which maps the geographical distribution of imports in 2024, highlights a strong concentration of supply within the European Union, confirming the central role of Europe in the Italian chocolate sector's supply chains.<sup>24</sup>



*Figure 29: The distribution of imports across Countries*

<sup>24</sup><https://comtradeplus.un.org/TradeFlow?Frequency=A&Flows=M&CommodityCodes=1806&Partners=0&Reporters=380&period=2024&AggregateBy=none&BreakdownMode=plus>

# **CHAPTER 3**

## **FINANCIAL ANALYSIS OF COMPANIES IN THE CHOCOLATE SECTOR**

In this chapter, I present a statistical analysis of the Italian chocolate sector using the Stata software. The main objective is to describe the structure of the sector, highlight its trends, and identify the factors that influence its performance. To this end, I rely on data from firms' balance sheets, income statements, profitability ratios, and productivity indicators for companies operating in Italy.

The sample selection and dataset construction are based on the AIDA database. In the first step, I extracted all firms classified under code 10.82 according to the ATECO 2007 classification, adding "active companies" as an additional selection criterion. This preliminary filter yielded an initial set of 352 firms.

The ATECO 2007 code 10.82 corresponds to "Manufacture of cocoa, chocolate and sugar confectionery", which includes not only companies involved in cocoa and chocolate processing, but also producers of candies, chewing gum, nougat, and related confectionery products. To obtain a sample consistent with the specific focus of this study on the chocolate market, I subsequently refined the dataset by excluding firms whose main activity is the production of candies, chewing gum, nougat, and sugared almonds. The exclusion of sugared almond producers is justified by the fact that, although these products may contain chocolate, chocolate is not sold as a standalone product but rather used as an ingredient.

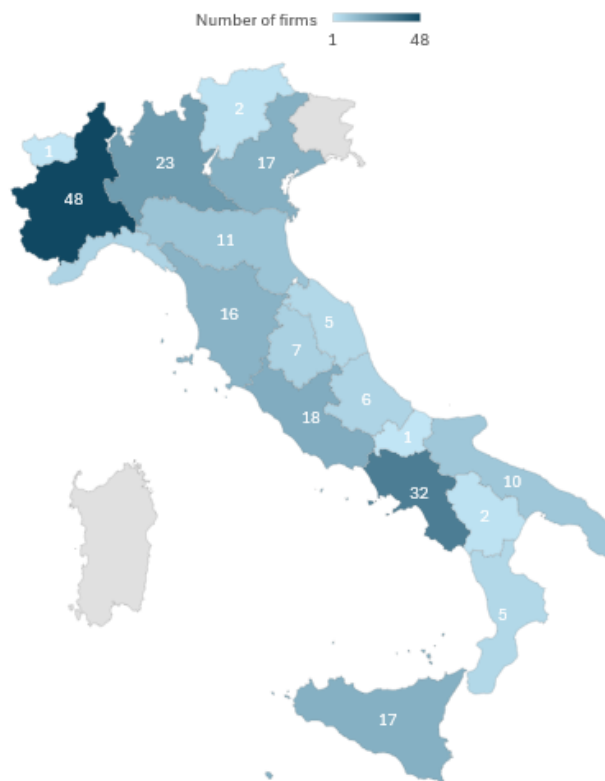
The final sample therefore includes all firms that produce chocolate in various forms (for example chocolate bars, chocolate eggs, pralines, and assorted chocolates). For some of these firms, chocolate represents their only product line, whereas for others it is part of a broader product portfolio. After this screening and data-cleaning process, the final dataset consists of 227 firms.

With regard to the type of information collected, from the AIDA database I downloaded, for each firm, the income statement, the balance sheet, assets side, and the balance sheet, liabilities and equity side. These accounting documents provide detailed data on revenues, costs, assets, liabilities and capital structure, and constitute the basis for the economic and financial indicators used in the empirical analysis.

### 3.1. Geographic Distribution of Companies

Using the region of the main operating headquarters as the reference variable, I examined how chocolate-producing firms are distributed across Italian regions in order to identify where they are most concentrated (*figure 30*). The analysis reveals a clear predominance of firms located in the northern regions, with a particularly high concentration in Piedmont. Overall, approximately 48% of the firms in the sample are based in Northern Italy, confirming the strong industrial development that characterizes this macro-area.

**Geographical Distribution of Chocolate Firms in Italy by Region**



*Figure 30: Geographical distribution of Chocolate Firms in Italy (Source: Stata)*

Out of a total of 227 firms, 48 are located in Piedmont, accounting for 21.1% of the entire sample. Piedmont therefore emerges as the most important region in terms of the number of companies involved in chocolate production. The high concentration of companies in this area is consistent with the historical development and economic structure of the region. Piedmont has a long-standing tradition in the confectionery and chocolate industry, supported by the presence of nationally and internationally recognised brands. Over time, this has encouraged the development of a dense

industrial fabric, where professional skills, know-how, and production techniques have been consolidated and passed down across generations.

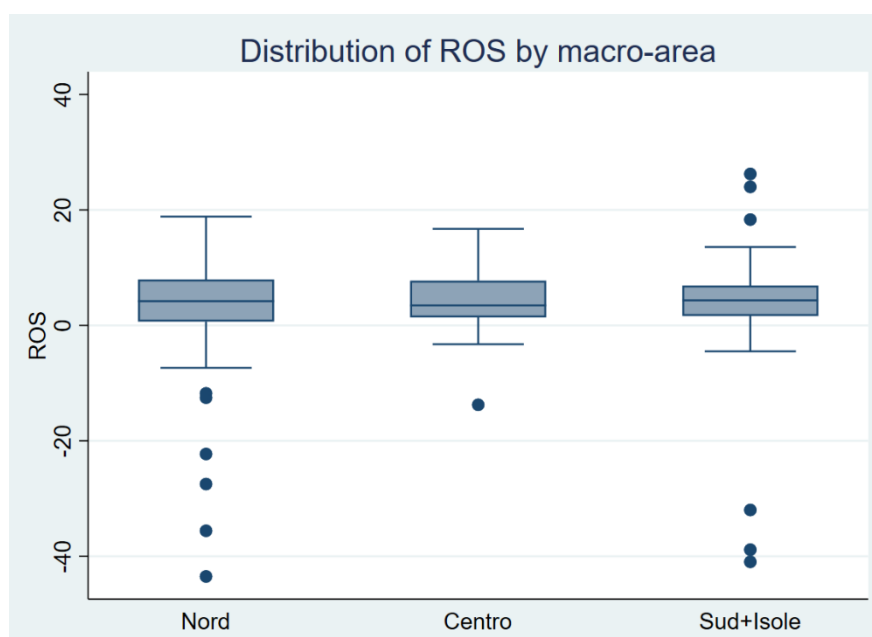
In addition to tradition, the presence of major brands and a well-structured supply chain in Northern Italy has consolidated this concentration. One possible factor that may help explain the higher concentration of chocolate producers in the northern regions, compared with the South, is the difference in climatic conditions within Italy. Milder summer temperatures and fewer extreme heat episodes in the North make it generally easier to store, handle and sell chocolate in solid form, reducing some of the operational constraints faced by firms located in hotter areas. While climate is only one of several factors of the geographical distribution of the industry, together with historical, cultural and demand-related aspects, it may have contributed to making northern regions relatively more favourable for the development and survival of small and micro chocolate manufacturers.

Northern Italy also benefits from more advanced transport and logistics infrastructure, such as highways, rail connections, and links to international markets, which simplify both the procurement of ingredients and the distribution of finished products on national and foreign markets.

### **3.2. ROS analysis by geographical macro-area**

To move beyond a purely regional perspective and obtain a more synthetic view of the territory, I then grouped the regions into three macro-areas: North, Centre, South & Islands. The Italian regions were thus aggregated according to a conventional territorial breakdown: this step allows for a more compact and interpretable comparison between broad geographical areas, rather than between individual regions. Once firms were assigned to these three macro-areas, I used Stata to compare their performance in terms of ROS and Revenues, using 2024 data. The idea is to investigate whether the geographical location of the firm is associated with systematically different performance indicators, and therefore whether location might be considered a relevant factor in explaining the heterogeneity in firm outcomes. To ensure the statistical robustness of the findings, the analysis was conducted in two stages: an initial assessment of the entire sample and a subsequent refinement focused on the dataset after the removal of extreme outliers.

Building on this reclassification, *Figure 31* reports the distribution of ROS across the three macro-areas. The boxplots show that the median ROS is positive in all groups and relatively similar in magnitude, indicating that, on average, firms in the North, Centre and South & Islands achieve comparable operating margins on sales. What differs more clearly is the within-area dispersion: all macro-areas display a wide range of outcomes, with a several number of firms exhibiting strongly negative margins, particularly in the South & Islands and in the North. This pattern highlights the heterogeneity in operating performance within each territory, rather than to a clear separation between macro-areas.



*Figure 31: Distribution of ROS by Macro-Area (Source: STATA)*

The *table 1* shows that the average ROS is positive in all three macro areas. Firms in the Centre record a slightly higher mean margin (around 4.31%) compared with those in the South+Islands (about 3%) and in the North (about 2.68%), although the differences are not very large. Moreover, the comparison between mean and median values suggests some asymmetry in the distributions: in the North and in the South & Islands the mean is lower than the median, signalling the presence of a number of firms with very negative outliers that pull the average down, whereas in the Centre the mean exceeds the median, reflecting the influence of some highly profitable firms. Standard deviations are sizeable in all groups (10.05 in the North, 6.09 in the Centre and 11.79

in the South & Islands), confirming a strong heterogeneity in margins within each macro-area.

*Table 1: Summary of ROS by Macro-Area (Source: STATA)*

Summary for variables: ROS\_2024  
by categories of: area\_geo

area_geo	mean	p50	sd	N
Nord	2.68	4.19	10.05	80
Centro	4.31	3.46	6.09	28
Sud+Isole	3.00	4.33	11.79	51
Total	3.07	4.04	10.06	159

The companies characterized by a ROS below -20% represent entities in a state of severe financial distress or nearing market exit. To prevent these statistical anomalies from distorting the overall economic reality of the sector, a "cleaning" process was implemented. By excluding 9 outlier firms (reducing the sample from 159 to 150), the dataset achieved a more balanced distribution, allowing for a more accurate representation of the standard operating environment within the Italian chocolate industry. Following the removal of outliers, the average national ROS increases from 3.07% to 5.04%, reflecting a notably healthier industrial landscape (*table 2*).

*Table 2: Summary of ROS by Macro-Area without outliers (Source: STATA)*

Summary for variables: ROS\_2024  
by categories of: area\_geo

area_geo	mean	p50	sd	N
Nord	4.74	4.42	5.58	75.00
Centro	4.98	3.48	5.05	27.00
Sud+Isole	5.52	4.44	6.09	48.00
Total	5.04	4.30	5.63	150.00

The central region shows a solid average ROS of 4.98%. However, it is worth noting that this area maintains the lowest median (p50) at 3.48%, suggesting that while the "average" firm is profitable, the mean is likely pushed upward by a few top-performing players within the cluster.

As the primary industrial hub for chocolate production, the North shows a more consolidated and mature profile. Although its average ROS (4.74%) is slightly lower than the other regions, the significant reduction in standard deviation (now at 5.58) indicates a more homogeneous and stable competitive environment.

The geographical analysis suggests that while the North represents the quantitative heart of the industry, firms in the South and Islands are successfully figure out high-margin positions, potentially through specialized or niche production strategies.

To determine whether the observed differences in ROS across the three geographical areas (North, Centre, South & Islands) were statistically significant or merely due to random sampling fluctuations, two different statistical tests were performed.

A One-Way Analysis of Variance (ANOVA) was performed to test the null hypothesis that the mean ROS is equal across all three macro-areas (*table 3*).

*Table 3: Analysis of Variance (ANOVA) (Source: STATA)*

Number of obs =		<b>150</b>	R-squared =	<b>0.0037</b>	
Root MSE =		<b>5.66124</b>	Adj R-squared =	<b>-0.0098</b>	
Source	Partial SS	df	MS	F	Prob>F
Model	<b>17.639228</b>	<b>2</b>	<b>8.8196139</b>	<b>0.28</b>	<b>0.7598</b>
area_geo	<b>17.639228</b>	<b>2</b>	<b>8.8196139</b>	<b>0.28</b>	<b>0.7598</b>
Residual	<b>4711.3047</b>	<b>147</b>	<b>32.049692</b>		
Total	<b>4728.9439</b>	<b>149</b>	<b>31.737878</b>		

The results from the model yielded an F-statistic of 0.28 with a corresponding p-value of 0.7598.

Since the p-value is considerably higher than the standard significance threshold ( $\alpha = 0.05$ ), we fail to reject the null hypothesis. This indicates that the geographical variable *area\_geo* does not have a statistically significant effect on the ROS of the companies analyzed. The low R-squared (0.0037) further confirms that geographical location explains less than 0.4% of the total variance in profitability, suggesting that other firm-specific factors play a far more decisive role.

Considering that financial ratios like ROS often exhibit non-normal distributions, the Kruskal-Wallis equality-of-populations rank test was employed as a robust non-parametric alternative to the ANOVA (*table 4*). This test evaluates whether the samples originate from the same distribution by comparing rank sums rather than means.

The distribution of ranks across the three groups aligns with the sample sizes and shows no significant skewness toward any specific region. The results of the Kruskal-Wallis test reinforce the ANOVA findings, confirming that there is no statistically significant difference in the profitability ranks across the Italian territory.

*Table 4: Kruskal-Wallis test (Source: STATA)*

area_geo	Obs	Rank Sum
Nord	75	5630.00
Centro	27	1970.00
Sud+Isole	48	3725.00

Turning to revenues, the results indicate to a marked asymmetry in the economic size of firms across the macro-areas (*Table 5*).

*Table 5: Summary of Revenues (Source: STATA)*

Summary for variables: REV\_2024  
by categories of: area\_geo

area_geo	mean	p50	sd	N
Nord	58931.00	2679.31	149956.69	81.00
Centro	1168.37	661.12	1751.89	29.00
Sud+Isole	6060.06	780.90	13940.90	52.00
Total	31619.86	1284.16	109494.59	162.00

Here the picture is clearly different: median revenues are positive and relatively modest in all groups, amounting to about 2.6 million in the North and roughly 0.7 million in both the Centre and the South & Islands, indicating that the “typical” firm is smaller in the latter two areas. However, mean revenues differ much more markedly, reaching about 58.9 million in the North, 6 million in the South & Islands and only 1.1 million in the Centre. The large gap between means and medians, especially in the North and in the South & Islands, indicates that the distributions are strongly influenced by a few very large firms. This is confirmed by the high standard deviations (149.9 million in the

North and 13.9 million in the South & Islands, against 1.7 million in the Centre), which reveal substantial heterogeneity in firm size within macro-areas and a particularly polarized structure in the North. The Centre, despite exhibiting the highest average profitability, is characterised by very low average revenue levels, suggesting a predominance of small-sized firms.

### 3.3. Firm size distribution in the Italian chocolate sector

After examining performance by macro-area, I then turned to the internal structure of the Italian chocolate industry, focusing on firm size. To this end, I first plotted the distribution of the number of employees for the full sample, using 2024 data. The resulting histogram (*figure 32*) shows a very long right tail: a few firms employ several dozen workers or more, but they are so few that they are almost invisible in the overall distribution.

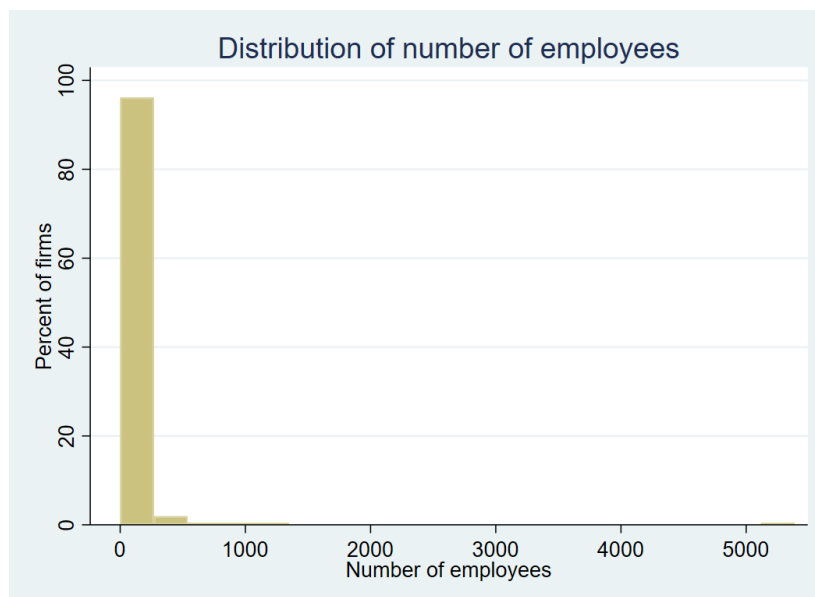


Figure 32: Distribution of number of employees (Source: STATA)

For this reason, I constructed a second graph (*figure 33*) that restricts attention to firms with fewer than 50 employees. In this case the shape of the distribution becomes much clearer: most firms are clustered in the lowest size brackets, with a high concentration of observations between 1 and around 10 employees and rapidly weakening frequencies as firm size increases.

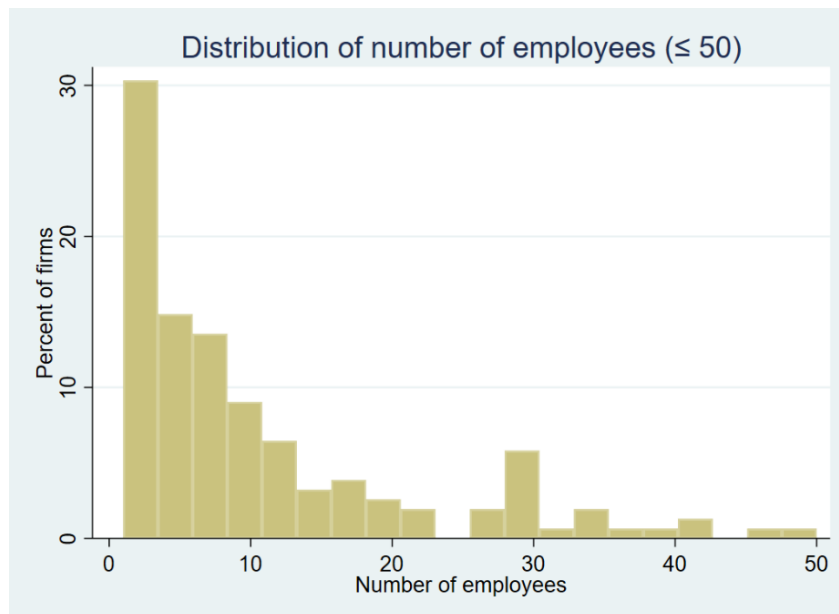


Figure 33: Distribution of number of employees less than 50 (Source: STATA)

Taken together, these graphs indicate that the Italian chocolate sector is predominantly composed of small, often very small, firms, with a limited number of medium-sized or large producers operating in the upper tail of the distribution. This pattern is consistent with the idea of a sector where artisanal or small-scale industrial businesses play a central role, while larger industrial players represent an important but numerically limited share of the market.

### 3.4. ROS analysis by firm size

In a second dimension of the analysis, I examined the role of firm size. I grouped companies into four employment size classes, following the EU classification: micro enterprises (0–9 employees), small (10–49), medium (50–249) and large (250 or more). This categorisation was implemented in Stata by creating a discrete variable based on the number of employees reported for each firm. The aim is to assess whether operating margins differ systematically along the size distribution. *Figure 34* reports the average operating margin (ROS) for each employment size class, using 2024 data. Although the number of large firms is limited, this evidence suggests that, within the Italian chocolate industry, larger producers tend to convert sales into operating profits more effectively than micro enterprises, which appear to operate with much thinner margins.

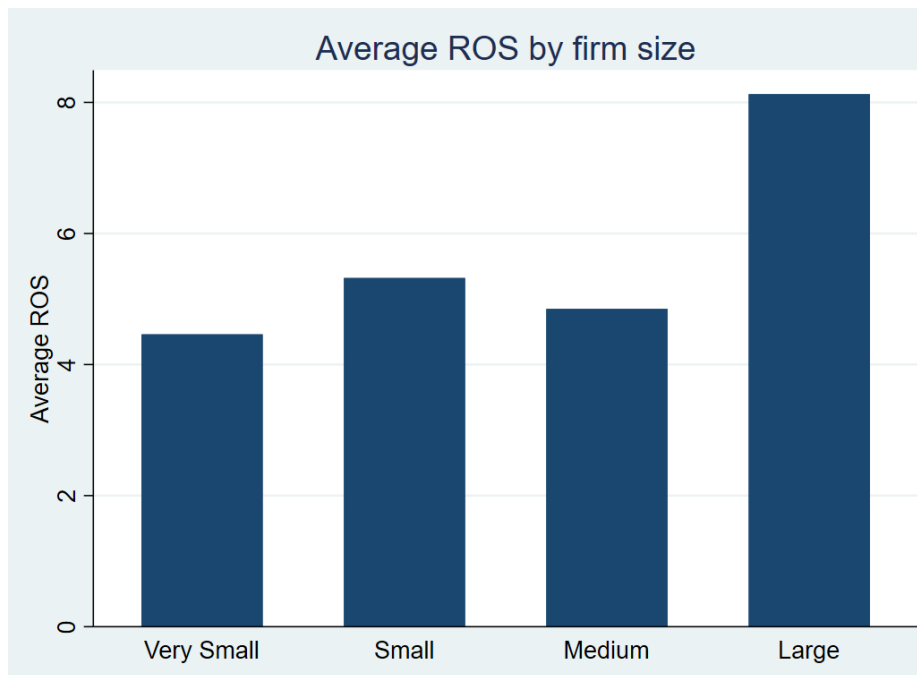


Figure 34: Average ROS By Employment size class (Source: STATA)

Beyond operating margins, it is also informative to examine how firm size translates into revenues (table 6). Micro firms exhibit relatively modest average sales, whereas small, and especially medium and large enterprises, operate at much higher revenue levels. This confirms that, while the sector is numerically dominated by small units, the bulk of total sales is generated by firms in the upper size classes.

Table 6: Average revenues and average ROS by size class (Source: STATA)

Dimension	Employ~s	Revenues	ROS
Very Small	4.21	743.91	4.46
Small	22.32	10424.29	5.32
Medium	108.33	60547.67	4.85
Large	1118.89	244700.76	8.13
Total	87.85	31619.86	5.04

Considering these results together with the previous evidence on the distribution of firm size, a consistent picture emerges. On the one hand, the sector is numerically dominated by very small firms; on the other, the highest average margins are observed in the upper part of the size distribution.

### 3.5. Firm concentration ratios

Based on the AIDA dataset, the Italian chocolate market consists of 227 firms. Of these, 172 are included in the present analysis, as the remaining firms lack the data necessary to compute firm concentration ratios. The concentration ratios (CR4 and CR8) were calculated based on total sales revenues to assess the market power of the leading players. The results indicate that the competitive structure of the market is highly asymmetric: firms are not of uniform size.

On the contrary, the evidence points to a marked distinction between a few large firms and a long tail of smaller firms.

Table 7: Firm concentration Ratios (Source: STATA)

Variable	Obs	Mean
CR4	4	.4928201
CR8	8	.6637491

The CR4 index, equal to 0.49, indicates that the four largest firms in the chocolate sector together account for around 49% of the market (*Table 4*).

This means that about half of total sales is concentrated in the hands of a very small number of firms. Comparing this result with the total number of firms (172), it becomes clear that the remaining market share, slightly above 50%, is split among the other 168 firms, many of which hold a very small market share.

The CR8 index, equal to 0.66, shows that the eight largest firms collectively control around 66% of the market. Consequently, the remaining 164 firms share only 34% of the total market.

These results further support the idea of an unbalanced market structure: a small group of leading firms covers roughly two-thirds of demand, while a large number of small firms operates on the residual share of the market.

Overall, these results suggest that the Italian chocolate market, despite the presence of a large number of firms, is highly concentrated at the upper end of the size distribution. A small number of companies has a very substantial weight, whereas the majority of firms is characterized by more limited size and a relatively low capacity to penetrate the market. From the perspective of market structure analysis, this configuration can be described as one of medium-to-high concentration: competition is present and

numerically extensive, but market power is largely concentrated in the hands of a small group of dominant operators.

### 3.6. ROS over time

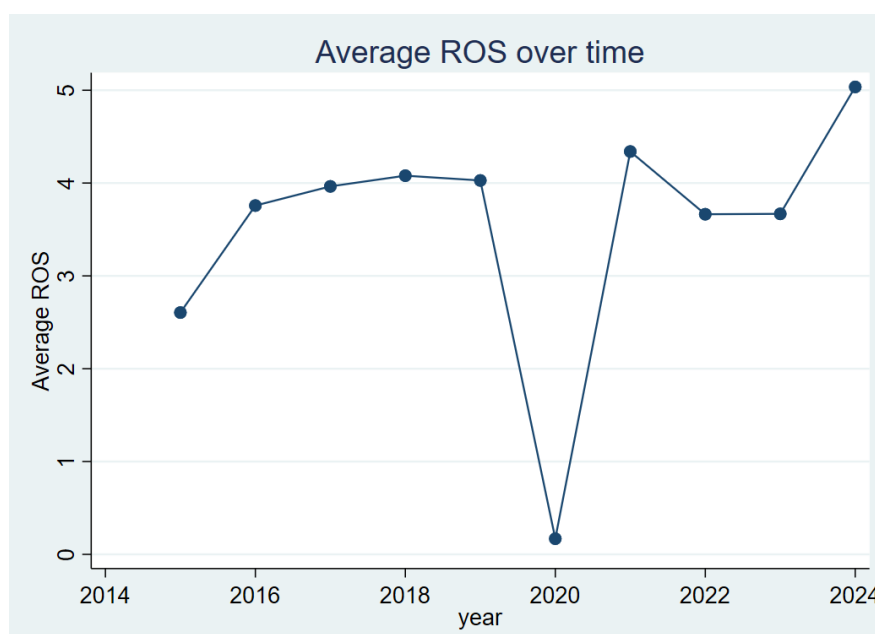


Figure 35: Average ROS over time (Source: STATA)

When examining the evolution of the average ROS over time, the pattern appears fairly stable in the years prior to 2020, followed by a pronounced deterioration in 2020 and a recovery thereafter (*figure 35*). As shown in the time-series graph, the average ROS dropped from approximately 4% in 2019 to nearly 0% in 2020 (*table 8*). However, the median ROS in 2020 stands at 2,5%, indicating that at least half of the firms in the sample report profitability above this level. This evidence suggests that the “typical” firm does not experience a negative ROS and that the decline in the mean is likely driven by a relatively small group of companies with markedly poor performance. The combination of near-zero mean, a positive median and strong left-skewness (skewness of about -1,55) suggests that the deterioration in overall performance is driven by a limited group of firms with very poor results, rather than by a uniform decline in profitability across the entire sample. This suggests that the 2020 shock affected firms in a heterogeneous way, with a subset of companies bearing a disproportionate share of the impact.

The decline in ROS observed in 2020 is likely driven by a combination of factors. From a macroeconomic perspective, 2020 coincides with the peak of the Covid-19 crisis,

characterised by severe supply chain disruptions, heightened uncertainty and, in many industries, a contraction in sales volumes.

Table 8: Distribution of Return on Sales (ROS) of chocolate firms – 2020 (Source: STATA)

ROS_				
	Percentiles	Smallest		
1%	-40.97	-45.16		
5%	-23.71	-40.97		
10%	-15.29	-35.73	Obs	138
25%	-1.55	-29.86	Sum of Wgt.	138
50%	2.515		Mean	.1688406
		Largest	Std. Dev.	10.90518
75%	5.66	15.58		
90%	8.91	19.1	Variance	118.923
95%	13.07	23.32	Skewness	-1.550335
99%	23.32	28.14	Kurtosis	6.90022

### 3.7. Cobb–Douglas production function and returns to scale in the Italian chocolate industry

In this section, the production function is estimated using a Cobb-Douglas specification in log-linear form, based on firm-level panel data for the Italian chocolate industry over the observation period. The dependent variable is the logarithm of value added, while the regressors include the logarithm of labour input, measured by the labour cost, and the logarithm of the capital stock, proxied by fixed assets. To ensure the reliability of the estimates, the dataset was refined by removing outliers and all nominal variables were deflated using ISTAT price indices (base year 2015). This transformation is crucial as it converts nominal values into real measures, eliminating the distorting effects of inflation and allowing for an analysis of true productivity changes.

The model is estimated through a fixed-effects panel regression (xtreg). This approach allows us to control for unobserved time-invariant firm characteristics, focusing on the internal dynamics of production within each firm. The dependent variable is the logarithm of real value added, while the primary regressors are the logarithms of capital stock and labor cost. Additionally, year dummy variables were included to capture systemic shocks and temporal shifts in the production frontier.

Table 9: Fixed-effects estimation of the production function for Italian chocolate firms (Source: STATA)

```

Fixed-effects (within) regression      Number of obs   =    1,208
Group variable: id                   Number of groups =    177

R-sq:                                Obs per group:
  within = 0.2977                    min =          1
  between = 0.9026                   avg =          6.8
  overall = 0.8907                   max =          9

corr(u_i, Xb) = 0.8677                F(10,176)      =    28.83
                                        Prob > F        =    0.0000

```

(Std. Err. adjusted for 177 clusters in id)

ln_va	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
ln_k	.1184775	.0322208	3.68	0.000	.0548886	.1820663
ln_L	.4422603	.0528171	8.37	0.000	.338024	.5464966
year						
2017	.1032415	.0692494	1.49	0.138	-.0334247	.2399076
2018	.1887159	.0626798	3.01	0.003	.0650153	.3124165
2019	.2290871	.0651327	3.52	0.001	.1005454	.3576288
2020	-.1447853	.0802655	-1.80	0.073	-.303192	.0136215
2021	.16412	.0703714	2.33	0.021	.0252396	.3030004
2022	.2327973	.0713396	3.26	0.001	.0920061	.3735886
2023	.3136597	.0687508	4.56	0.000	.1779777	.4493417
2024	.3288176	.0685677	4.80	0.000	.1934969	.4641382
_cons	4.170623	.2167902	19.24	0.000	3.74278	4.598466
sigma_u	1.3569498					
sigma_e	.41026193					
rho	.91624575	(fraction of variance due to u_i)				

The goodness-of-fit statistics indicate that the Cobb-Douglas specification provides a good representation of the data, especially in terms of cross-sectional differences. The overall *R-squared* is about 0,8907 meaning that, for the full panel, the model accounts for nearly 90% of the total variation in the logarithm of value added. The between *R-squared* approximately 0,9026, shows that the combination of labour and capital explains very well the average structural differences across firms in the sample. By contrast, the within *R-squared* is relatively low (around 0,2977), which implies that only 30% of the time variation in value added within the same firm can be attributed to changes in labour and capital, while the remaining share is driven by factors not

included in the model (such as demand conditions, efficiency changes, sector-specific shocks or firm-level strategic decisions).

The estimated coefficients confirm that both labour and capital have a positive and statistically significant impact on value added. The coefficient on the logarithm of labour is about 0,442: holding capital constant, a 1% increase in labour input for a given firm is associated, on average, with an increase in value added of roughly 0,44%. The coefficient on the logarithm of capital is around 0,118: for a 1% increase in capital, keeping labour fixed, value added rises by about 0,12% on average. The fact that the labour coefficient is larger than the capital coefficient indicates that, in this sample, changes in employment are associated with output variations of greater magnitude than those linked to changes in the capital stock. Overall, the statistical significance of the estimated parameters suggests that these relationships are not driven by random noise, but rather capture a systematic link between production inputs and output over the period considered.

A key aspect of the analysis concerns the assessment of returns to scale. In a Cobb-Douglas framework, the sum of the coefficients on the input variables provides an indication of how output responds to proportional and joint changes in all factors. In the present case the sum of the input coefficients indicates the nature of returns to scale. In this refined model, the sum is 0.56 ( $0.442 + 0.118$ ), which is significantly below unity.

This implies that a simultaneous increase in labour and capital by a given percentage leads, on average, to a less than proportional change in value added; for instance, a 10% increase in both inputs results in an output increase of less than 10%. From an economic standpoint, this evidence is consistent with the presence of decreasing returns to scale in the sample. In other words, as firms expand their operational scale, the associated increase in output becomes progressively more limited relative to the overall growth in inputs. The inclusion of year dummies provides a crucial temporal dimension to the model. These dummies act as controls for macro-shocks that affect all firms simultaneously.

The coefficient for the year 2020 is negative (-0.145) and shows a marginal significance level ( $p = 0.073$ ). This captures the idiosyncratic "pandemic effect" where, for a given level of labor and capital, firms produced significantly less value added due to lockdowns and market closures.

From 2021 onwards, the coefficients become positive and increasingly significant, reaching a peak in 2024. This upward trend in the time dummies suggests a progressive improvement in Total Factor Productivity (TFP) or a general recovery in market demand that allows firms to generate more value added from the same amount of inputs compared to the baseline year.

The model shows a high degree of internal consistency, with a rho of 0.916, indicating that over 91% of the total variance is due to firm-specific structural differences. This confirms that while inputs and time trends are important, the individual "efficiency" and strategic positioning of each firm remain the primary determinants of success in the Italian chocolate market.

## CONCLUSIONS

The analyses carried out in this thesis make it possible to draw some overall conclusions regarding the structure and recent dynamics of the chocolate market.

At the global level, the chocolate confectionery market is experiencing steady expansion, driven by shifting consumer preferences. There is a gradual move towards higher-quality products, with increasing attention to experiential attributes, health-related aspects, and sustainability. At the same time, chocolate prices have been rising, both as a result of premiumization processes and of higher cocoa prices, which are in turn influenced by supply constraints and climatic factors that have made production in the main cocoa-growing areas more uncertain and volatile.

With regard to the Italian market, the analysis of Istat data on quantities sold, considered both in value and volume terms, shows that the value of sold production has grown more rapidly than physical volumes. This pattern is consistent with the international context, where the combination of cocoa price volatility and premiumization has pushed part of the supply towards mid- to high-end segments, characterised by higher value added per unit of product.

The empirical analysis based on AIDA data for Italian firms provides further insights into the structure of the domestic supply side. The findings highlight the prevalence of small-sized firms, often identifiable as artisanal businesses, and a geographical distribution showing a higher concentration of companies in Northern Italy, where productive capabilities, manufacturing traditions, and more developed distribution networks tend to be located. The investigation of possible economies of scale does not reveal significant evidence in the observed sample, suggesting that the sector, at least for the firms analysed, is not strongly characterised by cost advantages associated with increased size. From the perspective of market structure, almost 66% of total market share is held by the 8 largest firms, while the remaining 34% is distributed among the other 164 companies, outlining a polarised configuration with a small group of dominant operators and a multitude of small producers.

Overall, the thesis confirms that the chocolate market is a particularly interesting field of study not only because of its economic and competitive features, but also due to the cultural and symbolic role played by this product. Chocolate remains widely

appreciated across different age groups and consumer profiles, combining industrial production and artisanal tradition with a strong emotional component in consumption behaviour, which makes the analysis of this sector relevant from both a scientific and a broader social perspective.

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