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Master's Degree Thesis

VERTICAL INTEGRATION IN EYEWEAR INDUSTRY

Case study: Luxottica s.p.a

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1 INTRODUCTION

Vertical integration is one of the best-known business strategies and has been widespread among companies, especially in the last century. The company with this strategy carries out within its perimeter the activities necessary to produce and/or distribute the product and uses only a minimal part of the help of third-party agents present on the market.

Nowadays vertical integration is still implemented but not as frequently as in past decades. In particular, since the nineties, a process of streamlining and simplifying businesses has often begun, with the so-called vertical disintegration process. The companies have abandoned the carrying out of activities in favor of the purchase of products or services in the market, carried out by specialized third parties.

With this paper we want to retrace the most important steps of vertical integration from the theoretical point of view and then arrive at a practical case of a company that still today successfully bases its strategy on the internal performance of as many activities as possible.

In this regard it was decided to structure the work in three parts.

In the first chapter the literature produced on the subject was examined; obviously it was not possible to give space to the whole amount of papers present on the subject and therefore we focused on the aspects considered most useful for the purposes of this paper.

In the second chapter we analyzed the practical case of a company that still makes extensive use of vertical integration. This company is Luxottica, a world leader in the production and marketing of spectacle frames. Before going into the details of the company, the eyewear industry was briefly analyzed, reporting its volumes, major trends and the most important players. Then the most indicative group company data were reported and the most significant stages in the company's history were retraced.

Finally, in the last chapter the Luxottica case was further investigated through a practical case of insourcing of components previously produced by third parties. It will be exposed how this process of vertical integration has led to a qualitative and productive improvement and to a consequent reduction in costs.

2 VERTICAL INTEGRATION

Vertical integration is commonly defined as the process of "*eliminating contractual or market exchanges and replacing them with internal exchanges at the company's borders*". With these words Perry defines vertical integration, one of the most widespread business strategies of the last century.

In this first chapter some of the most important aspects of vertical integration will be examined. Only part of the theory will be considered: starting from the most theoretical approaches, we will give large space to the theory of transaction costs, the cornerstone of economic theory in explaining the company organization by contrasting the market and hierarchy. Following will be treated the essential characteristics of vertical integration, its most common forms as well as the benefits and costs of this strategy. The chapter concludes with the analysis of the most recent trends that vertical integration has been taking in recent years, on the one hand its opposite process, namely vertical disintegration or outsourcing and on the other offshoring and reshoring.

2.1 THEORY OF TRANSACTION COSTS

According to Williamson, one of the most important scholars on transaction cost theory vertical integration manifests business chain internalization activities as the substitution of internal organization for market exchange; the reason attributed to this is mainly the transactional failure of the market in operations for intermediate goods, and also to the transaction costs which arise when using the market mechanism.

Thus, vertical integration is proposed as one of the possible alternatives to the use of the market to complete the transactions that the company needs. Consequently, they will no longer be carried out outside the company but within it.

However, to understand better what the transaction costs are, it may be useful to refer to the distinction between these and the production costs exposed by Arrow, which states that *"the distinction between transaction costs and production costs is that the former can be changed by changing the way in which the resources are allocated while the latter depend on technological and taste changes"*.

Following the Williamson's idea, transaction costs arise from two main transactional difficulties: human and environmental, which can jointly explain the rise of transaction costs and therefore also the market failure.

We can have two types of human factors:

1. *Limited rationality*. This refers in particular to the limits of the individual capacity to receive, memorize, retrieve and process information without making mistakes.
2. *Opportunism*. This human factor is the effort of the subjects to obtain individual gains through the lack of honesty in the transactions. This can be put into practice for example by misrepresenting preferences, distorting data and information, obfuscating and concealing problems and confusing transactions, making very costly to understand if the other party acts opportunistically or not.

Alongside the human factors, there are transactional ones, of which the main ones are certainly the uncertainty, the specificity of the investments and the frequency of the transactions:

1. *Uncertainty*. Among the environmental factors, this is certainly the one closest to human factors and is almost a bridge between the two types. This is because the presence of uncertainty in the market is linked to the presence of opportunism. The greater the opportunism, the greater the uncertainty will be.

Williamson describing this factor says that: "*under the conditions of uncertainty and complexity, it becomes very expensive, perhaps impossible, to describe the complete decision tree*". The same author shows how the increase in uncertainty also increases the incentives to move from market transactions to a greater degree of vertical integration.

Walker and Weber also theorize the existence of two different types of uncertainty, that of volume and technology. For the two authors, "*the uncertainty of volume depends on the estimate of fluctuations in the demand for components and the trust placed in this estimate*" while the technological uncertainty is described in terms of changes in component specifications: the technological change in the design of the components would thus require a conversion of production.

In both cases, the authors hypothesize that as the uncertainty increases, whatever it may be, the company's willingness to move away from the market in favour of internal production also increases. The authors explained how the volume uncertainty is considered more dangerous and therefore is more decisive for a make or buy decision. This is because probably for managers the volume changes of the demand for components have more significance respect than technological changes, partly because changes in the demand for components are more frequent than technological changes.

2. *Specificity of investments (assets)*. Williamson explains that the specificity of the investments is due to the presence of particular investments that the supplier must make in relation to the specific identity of the parties. This type of transaction is also defined idiosyncratic by the author. Williamson shows how, on

the one hand, the supplier is incentivized to remain in the transaction as he made investments for assets that have a specific value only for that particular buyer. In fact, in case you want to exit from the transaction the value of the asset would collapse given the utility linked only to the specific client. On the other hand, the purchasing company is also blocked in the transaction because it cannot switch to other sources of supply by obtaining an equal value from non-specialized suppliers.

Williamson explains that there are three different sources of asset specificity. The first is the specificity of the production site, i.e. the supplier and the buyer are neighbours to reduce transport and warehouse costs or for technical reasons. The second case is that of the specificity of physical assets that are required for the production of particular components. Finally, the last one is the case of the specificity of human assets that derives from learning by doing.

Basing on the trend of transaction and production costs as the specificity of assets changes, Williamson explains when it is more convenient for companies to satisfy themselves in the market or to internalize production: looking at the graph below, it is possible to see that for low levels of asset specificity suppliers have advantages of production costs compared to buyers, as shown by the ΔPC curve which indicates the difference between the production costs of the company (buyer) and those of the market (supplier).

As you can see, the curve decreases as asset specificity increases and this means that the supplier's production costs increase while those of the company decrease.

However, the difference is never negative, so the buyer's production costs will never be lower than those of the supplier, usually due to the economies of scale that the latter manages to reach.

On the other hand, the ΔTC curve represents the difference between transaction costs related to the internalisation of production and transaction costs associated with bargaining in

the market. In this case, it is possible to observe how the intercept B' is positive, that is for null values of specificity of the assets there are transaction costs. However, the curve decreases as the specificity increases to indicate an increase in transaction costs related to the market and therefore an incentive to the internalization of production (vertical integration).

In particular, looking at the transaction costs, the buyer would have the advantage of internalising the production when the specificity reaches a value of A . However, considering the presence of production costs, in reality the company will obtain positive results due to the choice of vertical integration only after point A' . In fact, at this point the curve indicating the sum between ΔPC and ΔTC becomes negative.

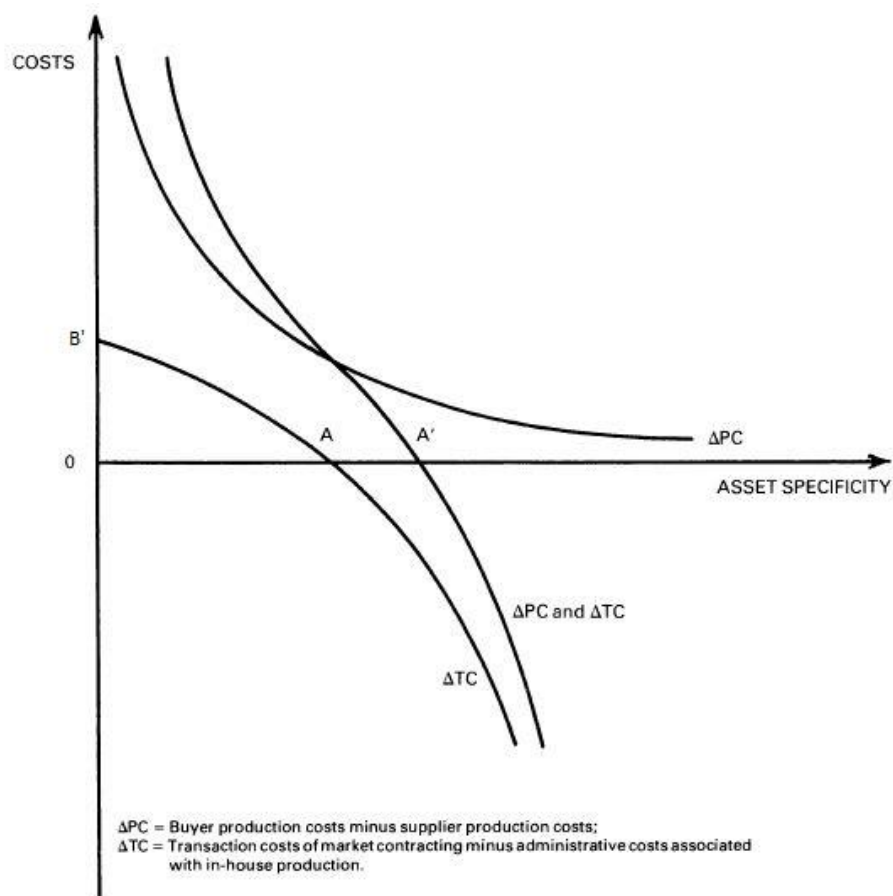


Figure 1. Relationship between specificity of investments and transaction and production costs

3. *Frequency of transactions.* The frequency indicates the recurrence of the same transaction over time. Williamson specifies how it depends solely on the activity of the buyer for market transactions and offers for the frequency a distinction in three levels: "one-time", occasional and recurring. However, since the former are irrelevant, we focus our attention on the last two.

In his work *"Transaction-Cost Economics: The Governance of Contractual Relations"* Williamson proposes a matrix, in which he relates the two types of frequency with the three distinctions of asset specificity. Thus, six types of transactions are ideally created, as illustrated in the following matrix.

We want to emphasize that, for simplicity, in this model there is no uncertainty that is considered constant at an intermediate level. The central node, however, lies in finding the most appropriate transaction control structures for each type. In the next paragraph the solution offered by Williamson will be exposed.

		<i>Investment Characteristics</i>		
		Non-specific	Mixed	Idiosyncratic
<i>Frequency</i>	Occasional	Purchasing standard equipment	Purchasing customized equipment	Constructing a plant
	Recurrent	Purchasing standard material	Purchasing customized material	Specific transfer of intermediate product across successive stages

2.2 GOVERNMENT STRUCTURES OF TRANSACTIONS

Williamson explains how in general there are three different types of transaction governance structures that are non-specific, semi-specific and highly specific.

The market is certainly the most classic non-specific form of government. The specific structures are instead created specifically to satisfy particular needs of the transaction, while semi-specific structures are placed halfway.

Then, these three generic types are adapted by the author in three different concrete structures of government, in relation to the matrix previously exposed.

In particular, *market governance* would be the most suitable for non-specific transactions, both occasional and recurring. In fact, in the case of recurring transactions, the market is the most optimal solution, considering that buyer and seller can rely on their past experience with the other party to decide whether or not to continue the relationship and in case of termination to bear limited costs.

Regarding the case of occasional transactions, the parties have more difficulty in protecting themselves against the opportunism of the other party because they cannot rely on their previous experience. However, they can often rely on the experience of other buyers and sellers, also considering that transactions have a high level of standardization. The structure identified by Williamson for occasional transactions is called *Trilateral governance*.

Finally, the *transaction - specific governance* is suggested by the author for the last two cases of a recurring-mixed and recurrent-idiosyncratic transaction. Within this structure the author identifies two different substructures: in the first case, a bilateral structure is suggested where the autonomy of the parties remains, but with a strong contractual agreement and reciprocal controls. In the second case, a unified structure is suggested, that is the complete removal of the transaction from the market and its internalization in the company by embracing the vertical integration strategy.

The advantage of vertical integration in this circumstance is that the company can freely adapt production to its needs without the need to complete, review or negotiate agreements with other parties.

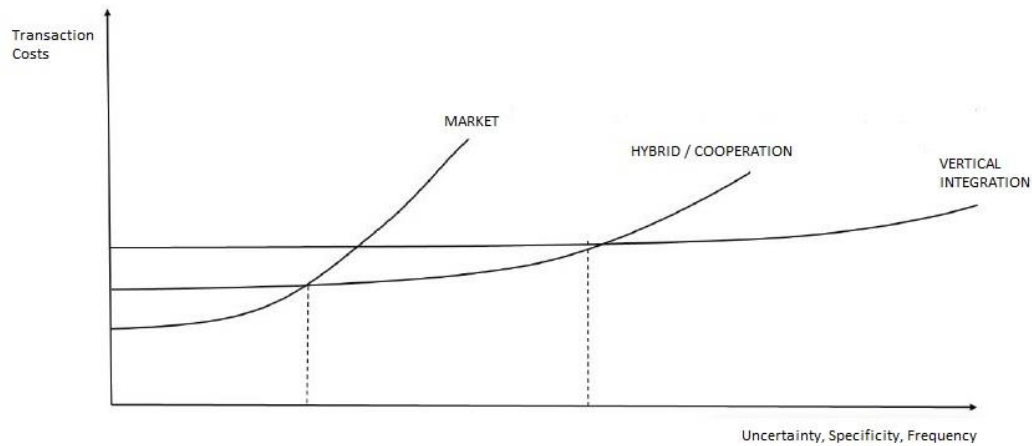


Figure 2. Transaction costs and governance models

In the chart above there are three curves that represent the main solutions that companies can take. The first (the market) appears to be the most efficient when the three factors are still at fairly low initial levels. In this case, however, the transaction costs are quite sensitive and grow fast when the intensity of the three factors increases, causing the market choice to become unseemly.

At this time, due to average levels of uncertainty, specificity and frequency, the most convenient solution is the hybrid solution, at which costs are at the same time lower than those of the market and vertical integration. However, when the three factors reach high levels of intensity, it becomes convenient to integrate vertically for the enterprise.

It is interesting to note how vertical integration can be seen as the choice that presents the highest transaction costs in the case of low levels of uncertainty, specificity and frequency but, at the same time, this is also the least sensitive to these factors and therefore the costs increase very slowly as the intensity of the factors increases.

2.3 OTHER CAUSES OF VERTICAL INTEGRATION

For a company, the decision to integrate vertically can also be guided by other reasons than those explained by the theory of transaction costs.

There are many advantages of using a vertical structure, but despite this, in Europe we have witnessed a de-verticalization phenomenon that began in the '70s. In fact, when certain conditions prevail, such as competition between suppliers and the presence of common type inputs, the benefits of recourse to the market are evident.

Before analyzing this phenomenon and understanding the contextual conditions that pushed European companies to favor a market appeal approach, let us analyze on a theoretical level the advantages and disadvantages of a vertically integrated system.

The advantages connected to a vertically integrated structure are:

1. *Investment protection and better coordination of the same:* in modern economies, companies use highly specialized tools. They will undertake to train their dealers to use and understand these tools, so that they can explain to potential buyers how to use them, and they will have specific skills in the workforce. If, on the other hand, the company used external dealers, it should cope personnel training and coordination costs in order to transfer information to the customer. This would determine not only an indirect communication between the company and the final consumer, but would increase the cost and time. Another problem that is solved by vertically integrating, and which contributes to the protection of the investment, is that of preserving internal know-how from external companies: the profound knowledge on the use of technology is therefore conserved in the company itself, avoiding to be diffused among the competing companies.

In an integrated organization, coordination and planning take into account the needs of those who manufacture the product, who sells it and who supplies its components. These actors together identify the necessary production capacity, investments in specialized plants and the improvements they need to increase the quality of the product and have lower production costs.

2. *Less need to resort to performance-based incentives:* if you rely on an independent provider you must resort to an incentive plan, as this will decide in an autonomous way how to allocate your commitment and time between the various activities. If it is difficult to assess the performance of suppliers, the difficulty of establishing adequate incentives increases, so it is expensive to use an external company to obtain the desired services.
3. *The distortions caused by the presence of monopolies:* in the case that the market in which it operates is not perfectly competitive, there may be situations of inefficiency concerning the use of the market. In fact, if the company operates in a monopolistic system, the supplier, endowed with effective contractual force towards it, could apply a higher price for the services offered, higher than its marginal cost. This price leads to an inefficient use of input and a loss of value of the company. The vertical integration in this case represents the solution, even if it is not free of costs: acquiring the supplier and maintaining its production scale could mean, for the company, incurring the payment of costs linked to the incentive of the manager of the supplying company, to ensure that it has an appropriate behaviour that is consistent with the company's objectives.
4. *Conquest of the supplier's revenues:* sometimes there are problems of bargaining between the company and its supplier. These could derive from the fact that the latter, in order to

maximize its profits, could ask to the company higher prices than usual, linked to the quality of the goods it supplies, or, in some cases, to reduce the sustained costs for the goods with the decrease of the required quality. Vertical integration gives companies the opportunity to avoid this situation.

However, it is important to note that the firm may still not be able to match the performance of their supplier. Instead, if there are no skills and knowledge possessed by the supplier, the company will easily match the technical efficiency achieved by the supplier and this may be able to produce at a lower cost than the price previously paid for the input.

5. *Barriers to entry*: the creation of barriers is a feature of integration, which can sometimes bring benefits to businesses that verticalize. If we consider only the interest of the company that carries out the operation of integration with one of its suppliers, this can be advantageous because it creates barriers to entry for the other companies that subsequently decide to compete in the same market. This is because the integration of the supplier would eliminate an important source of supply for a downstream competitor, who will be forced to look for an alternative source of supply. Given this difficulty, the competing company would certainly be dissuaded from making an entry attempt.

6. *Know-How as a strategic variable*: in the past years, companies have shown a concentration of use of their resources aimed at protecting those that were considered core businesses, i.e. the top activities on which they built their competitive advantage. In fact, by vertically integrating, the company avails the risk of making public knowledge of production, flow and quality shared with the supplier. Consequently, in recent years, there was a change in the trend: companies have understood the importance of internal knowledge as an advantage to be

preserved and knowledge able to distinguish it from other societies.

Knowledge is fundamental in responding to the increasingly frequent changes in demand: indeed, these changes are intercepted also thanks to internal know-how, which allow the company to differentiate its offer.

Until now we have examined the advantages of vertical integration. However, connected to it there are some disadvantages, which will be examined below:

1. *Difficulty in switching to new suppliers*: when the integration process is carried out, the company absorbs within it the supply activities of specific goods that were previously operated in the market.

However, make large investments in permanent activities leads the company in question to have difficulty in change and evolution. Indeed, it is very difficult to make new agreements with other suppliers on the market that could represent a more convenient solution.

This concept is closely linked to the phenomenon of the *irrecoverability* of investments and to *the lock-in effect* that binds the company to pursue less profitable investments than others, but which are nevertheless less expensive than a possible disinvestment to resort to the market again.

2. *Increase in fixed costs and break-even point*: when the size of the company increases, it also increases the amount of fixed costs incurred. This is due to the absorption of new production processes within it and the growth of costs related to coordination and incentive to pursue the global objectives.

3. *Slowness in the adoption of innovative technologies*: the greater firmness of the company, due to the increase in the structural dimensions of the same, can sometimes cause slowness in adapting to changes in the sector.

Nowadays the most efficient companies that obtain the most profits are those that are more responsive to changes or that even show themselves as *first mover* of a certain technology. This capacity can only be achieved by agile and flexible companies, which don't use excessive internal bureaucracy to regulate their processes and ensure stability.

4. *Increase of barriers to exit*: This phenomenon is closely linked to those previously listed. The barriers to exit are identifiable in those economic and strategic factors that hold an enterprise in a market, even if this would have an interest in coming out of it given its low profitability.

With the increase in the size of the company for investments made and specialized suppliers absorbed, the barriers to exit are increasingly evident. Examples of exit barriers are: presence of high fixed costs, presence within the company of facilities with specialized plants difficult to transfer to third parties or to be reconverted, strategic activity dependent on actions taken by other companies operating in the same market, political or contractual obstacles that constrain the company to remain in the market in which it operates.

2.4 DIFFERENT TYPE OF VERTICAL INTEGRATION

An enterprise may decide to integrate upstream or downstream from the phase of the production cycle it is carrying out.

Downstream integration occurs when a company expands its activities to both production and distribution of the final product. While a company integrates upstream producing raw materials or capital goods in the production of final output.

Moreover, vertical integration can be complete or partial: it will be complete when the company produces and uses all the inputs it needs and distributes its final products through its sales force; on the other hand, it will be partial when the company needs to purchase part of the inputs and/or sell part of its products through third-party distribution channels.

Furthermore, a company that decides to integrate has two main alternatives to do so: through internal growth or through mergers and acquisitions.

A company that decides to integrate using internal growth will build upstream production facilities for the production of intermediate goods or create its internal distribution structure. Instead, a company that chooses the road to mergers and acquisitions will buy productive assets from a company that already operates upstream or downstream or will buy the shares of a company that owns these assets.

Harrigan in his text *“Formulating Vertical Integration Strategy”* identifies four dimensions in which decisions that a company takes when it establishes to integrate itself vertically can be grouped:

1. The first decision concerns the number of phases of the production process that the company will carry out or how far it is upstream or downstream in the production chain the company wants to position itself.
2. Once it has been decided which phases to carry out, the company must also decide the extent of the activities to be performed internally for each production phase and consequently also the activities purchased in the market. The breadth of integrated activities is the number of tasks that companies perform internally. Consequently, companies that

perform many upstream or downstream tasks on their own are widely integrated.

3. A third decision concerns the degree of integration or the proportion of resources (goods or services) produced that are transferred internally or sold externally. In fact, fully integrated companies transfer almost one hundred percent of a particular good or service internally.
4. The form of control of vertical integration is the last type of decision taken by the company. In this case the decision concerns the quantity of equity held by the company in the business units positioned in the phases concerning the integration. As Harrigan specifies *"in some specific cases contracts, franchises, joint ventures, or other forms of quasi-integration can be good alternatives to wholly controlled initiatives"*.

Harrigan in his studies also tests the effects of these decisions on the results of vertically integrated companies.

Regarding the number of steps in the production process to be carried out, research shows that less successful companies lose the opportunity to penetrate potentially profitable markets by operating in a few stages of the process when the industries are still young. On the other hand, the most successful companies extend their range of action to a higher number of phases when the industries are young in order to be able to respond quickly to technological changes. Moreover, these companies are also present in a greater number of phases when the added value owned to the suppliers is high enough to appropriate them.

Regarding the extent of the activities carried out internally, Harrigan has identified that the most concentrated industries are also the most stable and therefore have a more hospitable environment in which to increase the number of activities carried out. This opportunity is well exploited by companies that perform a greater number of activities

even when there are suppliers or customers in the industry with a high relative bargaining power.

Regarding the degree of vertical integration, the most successful companies have a high degree of upstream integration when they are based on a high product quality strategy. On the other hand, they have a reduced degree of integration when operating in highly volatile industries, this to minimize exit barriers.

With regard to the degree of downstream integration, it makes sense for the company to be vertically integrated when the added value of distributors or customers is high and when it has a strategy based on high quality products or with a very strong brand. All this allows you to create and develop a unique position in the market and defend it.

In conclusion, successful companies integrate with forms of control that imply less than full ownership when the added value of upstream or downstream companies is not particularly high.

In making the decision to internally produce or rely to the market, a company may decide to position itself at the ends of this decision by integrating completely or not integrating at all. Between these two extremes there are other possibilities such as partial integration or quasi-vertical integration.

In this next step, we analyze this type of casuistry.

1. *Non-vertical integration.* In this case, as is easily understood, the company decides to acquire the necessary goods or services in the market without using internal transfers of resources. The classic method to achieve this are contracts. As Harrigan explains, usually companies that decide to follow this path do so because they do not want to invest in assets with high specificity, by preferring to limit investment so as to reduce the breakeven point, especially if there is a low level of demand. Even if there are efficient suppliers or distributors, the company could have the advantage not to integrate but to use these external sources.

2. *Complete vertical integration.* We have already mentioned this earlier and it is when the whole output of an upstream process is used completely as an intermediate input for a downstream process or the whole amount of intermediate inputs in a downstream process is obtained from the output of an upstream process. This strategy should be followed in the presence of physically interconnected production technologies between different phases of the production process but also when there is not a high price competition.

However, transferring the satisfaction of all the needs of the company internally exposes the latter also to particular risks such as a decrease in flexibility, a loss of information from the market, a possible excess capacity and an increase in barriers to exit due to increase in invested capital.

3. *Partial vertical integration.* This is when companies are integrated upstream or downstream, but they rely on third parties for part of their supply or distribution.

According to Porter, partial integration can bring to the enterprise many of the benefits of complete integration and at the same time reduce its specific cost. Obviously, this varies from industry to industry and therefore it must be done, case by case, an analysis of benefits and costs.

In particular, partial integration would result in a lower increase in fixed costs compared to full costs and greater flexibility. The partially integrated enterprise can change the degree of partiality to adapt to the change in the market by changing the proportion of products and services purchased in the market itself.

In practice, the company would maintain constant the amount of goods and services produced internally by changing instead the ones purchased in the market, in order to reflect the fluctuations of the market risk.

The partial integration allows companies also to have access to some of the innovation coming from the market.

Finally, the company's presence in the market and its simultaneous internal production means that the company gains an advantage in finding additional information compared to its competitors. However, partial vertical integration can also generate some negative aspects such as an increase in coordination costs between internal production and supply in the market.

4. *Quasi-vertical integration.* "*Quasi-vertical integration is the creation of relationships between vertically correlated activities and is positioned halfway between long-term contracts and full ownership*", these are Porter's words to describe it. According to Harrigan, quasi-integrated companies do not need to own one hundred percent of upstream or downstream activities to enjoy the benefits. In fact, it allows to achieve the benefits of integration without supporting costs.

Examples of quasi-vertical integration are minority holdings, loans or loan guarantees, exclusive agreements, specialized logistics structures, joint ventures and research and development cooperatives.

In this type of integration, it is important to create a community of interests between buyer and seller that makes it easier to create specialized agreements so as to reduce costs and mitigate the risk of interruptions in demand or supply. This community of interests usually manifests itself through an increase in informal contacts, greater sharing of information and, sometimes, even from cross-holdings of financial interests. Moreover, quasi-vertical integration (like partial integration) requires less fixed capital investments and has a greater degree of flexibility than full integration.

2.4.1 SPECIAL FEATURES OF DOWNSTREAM INTEGRATION

Going into the details of the downstream integration advantages, the main ones are listed below:

- A. Greater ability to differentiate the product: vertical downstream integration provides the particular benefit of being able to increase product differentiation from those of competitors or in any case make the product perceived as differentiated by customers.
- B. Access to distribution channels: integrating itself downstream the company overcomes the problem of access to distribution and also avoids the bargaining power of distributors and retailers.
- C. Better access to market information: the phases further downstream in the production chain are those that have the greatest opportunity to find and control information coming from the market. An integrated downstream company certainly has the advantage of being able to estimate the level of demand more quickly and transfer this information to all stages upstream. Furthermore, it is also possible to find information regarding tastes and fashions as well as the needs of consumers in a quicker and more reliable way, thus preparing and modifying the mix of products and components.
- D. Final higher prices: being integrated downstream can give the company the opportunity to put into practice activities to raise the realization price. For example, it is easier for a downstream integrated company to be able to put into practice price discrimination, or to sell products at different prices for different types of consumers.
Moreover, it is possible to associate particular paid services to the sale of products in order to discriminate on the basis of the elasticity of the demand.

2.4.2 SPECIAL FEATURES OF UPSTREAM INTEGRATION

Instead, the main characteristics of downstream vertical integration are:

- A. Knowledge of ownership: if a company integrates vertically upstream it has an advantage in spreading the least amount of possible information regarding its products with external parties. In fact, when companies purchase components outside, they have to provide information on the final product to their suppliers so that they can obtain the component with the optimal characteristics. This can be avoided thanks to vertical upstream integration.
- B. Differentiation: even upstream integration as well as downstream integration can allow to differentiate an enterprise, even if in a different way. In this case, integration offers the opportunity to create differentiation using inputs with particular characteristics that allow to improve the product or in any case to differentiate it from that of competitors.

2.5 VERTICAL INTEGRATION AND INNOVATION

There are particular studies that have focused on analyzing the impact of vertical integration on innovation. Armor and Teece have shown in their study *“Vertical Integration and Technological Innovation”* how there is a statistically significant relationship between vertical integration and innovation. The two scholars have also identified the incentives that vertical integration gives to innovation. The first of these is given by the removal of the information asymmetries that are present in the market. If there is the possibility of innovating between different phases of the production chain, there is usually the need to

acquire in the market the technology knowledge possessed by the other phase that the company does not carry out.

It is possible to avoid information asymmetry through an accurate investigation and / or an efficient contractual apparatus. However, this causes quite considerable transaction costs.

Consequently, the solution that can be chosen is that of vertical integration that allows to eliminate costs, asymmetries and possible opportunism by placing the different phases and the knowledge under the same property.

Integration also encourages innovation from a practical point of view, since a company that performs all the production phases will be more able to introduce new production technologies or new products quickly and efficiently according to future expectations. If we think instead about separate production units, each of them could have different expectations about the future and the expected events and could put into practice incompatible decisions. As vertical integration reduces this risk, it increases the expected value of investments in research and development.

Furthermore, in order to have a good research and development process, the two authors explain how it is essential to have clear objectives and how to formalize the latter it is important that researchers have the opportunity to observe and move between the various stages of production. For example, if the company is integrated, scientists and engineers can freely analyze and observe the technologies of each production phase. Furthermore, this process will help to create and disseminate a codified language that will help in transferring technology and information within the company.

It is important to note how the adoption of the vertical integration strategy can depend on the level of skills and knowledge present in the industry. In fact, when the set-up of these capacities is different from that what is necessary to give life to the innovation of an industry, vertical integration can be the solution to create new capacities in a fast and inexpensive way.

However, it is fundamental also to consider different points of view: Silver, for example, sees vertical integration as the result of a forcing

deriving from the lack of appreciation in the industry towards innovation. Sometimes in some industries, often still young, a company may not find supporters for its innovations and is forced to integrate upstream or downstream. In fact, it can happen that no one believes that a certain innovation is useful or marketable or no one can understand the needs of a company that will then be forced to integrate to innovate.

2.6 RECENT DEVELOPMENTS OF VI: THE VERTICAL DISINTEGRATION

Vertical integration has been one of the most widespread strategies among companies in various sectors during the last century. However, at the end of this the reverse process, i.e. the vertical disintegration, has become very frequent. This type of practice is often called with the English term *outsourcing*.

Outsourcing occurs when a company agrees with another organization to stock up on goods or services that were typically produced in-house and that will now be purchased outside. It is still one of the most adopted strategies by companies to support their competitiveness.

In recent decades, companies have found themselves coexisting with a rapidly changing competitive environment, with the introduction of new production technologies, the standardization and diffusion of communication technologies accompanied in many places by an increase in deregulation. All these things have often led to a reduction in costs transaction, that made outsourced production cheaper.

Furthermore, the increase in disintegration strategies is designed as response to the intensification of global competition, rapid technological change, the shortening of the life cycle of products as well as the demand of consumers increasingly oriented towards differentiated and customized products. In these circumstances, the company's resources become overloaded and can no longer respond

efficiently, so that to reduce the risk and increase the flexibility the company decides to outsource part of the production.

Among the main advantages deriving from the adoption of this practice there are:

1. the possibility of reducing costs as external suppliers, specializing themselves, have lower costs;
2. the reduction of capital investments,
3. the increase in quality;
4. the transformation of fixed costs into variables;
5. the increase in flexibility;
6. the increase in speed of processes;
7. access to more technologies;
8. access to more talents and skills;
9. refocusing on core activities;
10. possibility of imitation of the competitors.

From a survey of the Deloitte consulting firm, in 2016, it emerged that even today the main reason for outsourcing some activities is the reduction of costs (59% of companies), followed by the desire to relocate on the core business of the company (57%).

Other important reasons are related to the resolution of problems on internal production capacity, the search for a higher quality of services, the simplification of the business management, facilitating access to third party intellectual capital, and having to outsource to implement a broader change in the business.

The complete situation described above is summarized in the next graph.

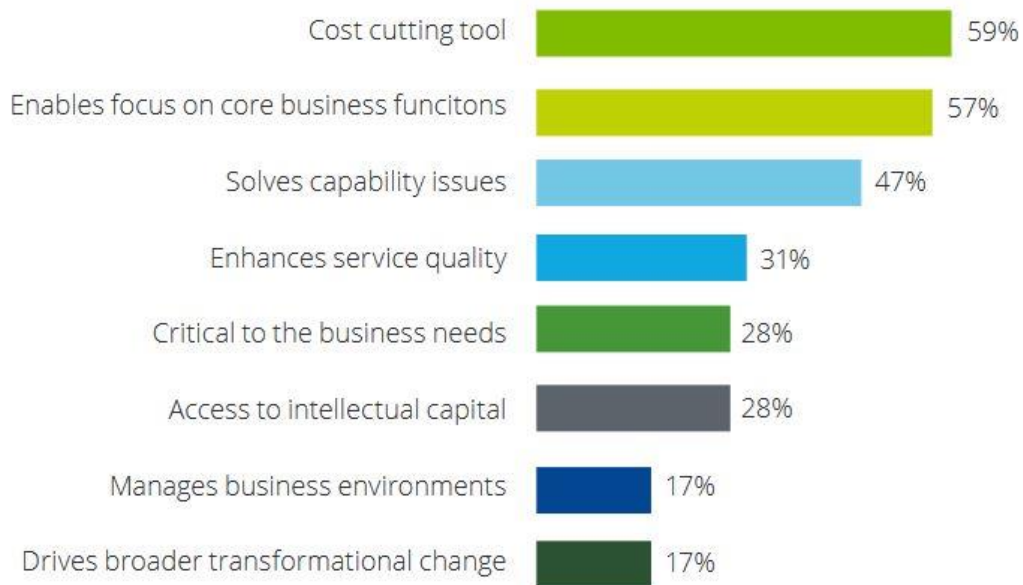


Figure 3. The main reasons for outsourcing

However, disintegration also presents risks that, if underestimated, can also cancel the benefits completely.

Among the most widespread is the overestimation of benefits partly due to the fact that external suppliers have higher performances initially only to make a good impression. Other risks and disadvantages seem to be the lack of methodology by managers, particular problems related to outsourcing IT, problems with employee morale, dependence on suppliers, loss of knowledge or the possibility of exploiting future opportunities, dissatisfied customers and lack of stable relationships with suppliers.

Belcourt, in his article "*Outsourcing - The benefits and the risks*" emphasizes in particular how the outsourcing could have a very negative impact on the employees of the company. The organization normally creates in employees a sense of identification, security and belonging that can be eliminated with the implementation of outsourcing policies. During disintegration, employees may be transferred to the new supplier (or customer), or re-allocated to other

functions, licensed or retired. Outsourcing can therefore generate distrust and hostility that can lead to the loss of organizational culture.

2.7 OFFSHORING E RESHORING

Another recent trend closely related to vertical integration is that of offshoring or even, in Italian, delocalization.

Offshoring occurs when companies decide to import goods or services from abroad that were previously obtained in their country of origin.

Regarding this practice, we can identify three possible cases in which it manifests:

1. The first is when the company goes from producing in the country of origin to produce in a foreign country: in this case, we could say that the degree of vertical integration of the company does not undergo changes.
2. The second case is that of a company that moves from buying goods and services in the country of origin to obtain supplies from a foreign supplier. Also in this case, the degree of vertical integration does not change.
3. The third case is when a company switches from producing internally in its country to buy goods or services from a foreign supplier while simultaneously implementing a vertical disintegration and a delocalization.

In fact, since it is possible to move components and intermediate goods in a simple and economic way and since it is possible to assign tasks and give instructions electronically in real time, companies can exploit the differences in the cost of production factors between different countries without sacrificing the gains deriving from their specialization.

Companies that decide to move abroad can do it, other than for advantages on the cost of production, also for other reasons. To investigate these, it may be appropriate to refer to the famous eclectic *paradigm of Dunning*. The author identifies four main thrusts for internationalization:

1. *Resource seeking advantage*. It involves the presence in the foreign country of raw materials, infrastructures and resources easily accessible to the company.
2. *Marketing seeking advantage*. It concerns the availability in the foreign country of talents and suppliers with a low cost, thanks also to the presence of specific policies implemented by the government.
3. *Efficiency seeking advantage*. It refers, at the same time, to the combined presence of contained production costs and factors of production, specialized industries and the removal by the government of commercial barriers.
4. *Strategic asset seeking advantage*. It refers to the development of knowledge concerning, for example, the market and consumers, being able to create, exploit and maintain tangible or intangible synergies.

However, despite the advantages of offshoring in recent years there has also been an inverse phenomenon called reshoring. We have this practice when companies decide not to import goods and services from abroad but to buy them or produce them in their area of origin. We can identify four cases of reshoring:

1. *In-house reshoring*, in which a company that produced internally abroad relocates the production always internal in the country of origin, maintaining the same degree of integration.

2. *Reshoring for outsourcing*, in which a company that internally produced outside moves its supply in the country of origin by buying from local suppliers. In this case, the enterprise disintegrates vertically during reshoring.
3. *Reshoring for insourcing*, where a company that bought products or services from foreign suppliers decides to produce in-house in its country of origin; the degree of vertical integration in this case increases.
4. *Outsourced reshoring*, in which the company purchased from foreign suppliers and decides to switch to local suppliers without changing the level of vertical integration.

Among the major causes for the adoption of this policy we can find the increase in transport costs, the increase in labor costs in the countries defined low-cost, the slowdown in the global supply chain, the growth of attention towards the environmental problems, the increase in exchange volatility, the increase in intellectual property theft that there can be in many countries of the world and the rapid response of the supply chain if it is located close to the final consumer.

3 THE EYEWEAR INDUSTRY

Given the considerations made so far, the time has come to adopt a more practical approach.

To do this, we decided to analyze the Luxottica Group, since it has the characteristics necessary for a complete analysis, in historical, qualitative and quantitative terms, relative to its degree of integration. Before moving on the specific analysis of the company and how it organizes its production and distribution, it is preferable to look briefly on the general picture of Italian companies operating in the eyewear sector. In this way, it is possible to understand the origin of the strategic choices of the Luxottica company and analyze them more consciously.

3.1 THE BIRTH OF EYEWEAR

The eyewear sector boasts a centuries-old tradition and a deep bond with the territory that has been the cradle and still is its main district: Veneto and, specifically, Cadore.

The first written testimony of the existence of the glasses dates back to 1285 and attributes its manufacture to a Venetian glass factory. From the XII century, the first models were produced in leather, then replaced by wood, the natural horn and, finally, the metal.

Nowadays, instead, the materials used in the production of frames are essentially cellulose acetate and injected plastic. In fact, the introduction of the latter has allowed the producers to respond promptly to the demand for variety and originality expressed by the market since the beginning of the XX century.

3.2 ITALIAN PRODUCTION AND THE DISTRICT OF BELLUNO

Between the end of the XIX and XX century the production of eyewear on an industrial scale began thanks to the birth of the first eyewear laboratories, which assembled components mainly imported from Germany. These laboratories became the basis of the production fabric of small and medium-sized artisans, which specialized in the production of lenses in the following decades, frames and complementary products such as cases.

Currently, the eyewear district extends over the whole territory of the province of Belluno, where it is possible to identify three main areas of concentration: the Cadore, a historical settlement in which about 50% of the companies are located, the Agordino, the main office of Luxottica and, finally, the areas of Longarone, Alpago, Feltrino and Val Belluna.

The determining factor of the success of the Belluno's district was the development of the production of sunglasses and the birth, at the end of the 80s, of signed eyewear.

This historical shift also had significant repercussions on the distribution logic and on the integration policies of large groups in the sector. In fact, as long as the production was mainly determined by eyeglasses, the relationship with the final consumer was dictated by the optician, able to guide him in choosing a medical product that meets specific requirements. Instead, the sunglasses are closer to the typical clothing's consumption logics. Consequently, consumers pay more attention to factors such as the brand, the aesthetics and the intrinsic quality of the product. This means that the specialist advice provided by the optician is no longer strictly necessary.

The consequent agreements between the specialized companies and the big names in fashion and luxury have indeed opened up production to an international market but have also led to a painful process of reorganizing the district: this process has favoured large and medium-sized enterprises to the detriment of the smaller one, less flexible and

unable to withstand the competition of the emerging Far East countries.

At the moment, in the district two industrial realities coexist in apparent contradiction: on the one hand, the major leaders of the sector are located here, which tend to monitor all the critical phases of the production process (although with different degrees of integration), including the downstream phases related to the sale and distribution of the finished product. On the other hand, there are hundreds of SMEs specialized in the production of components or individual processing steps, such as galvanizing and painting of semi-finished products, certainly functional in absorbing excess demand. In order to remain competitive, these SMEs should therefore specialize in high value-added activities, addressing the market niches and trying to introduce product and process innovations that could differentiate them from their competitors.

That of eyewear is a growing industry, made up of two large branches: the lenses sector and the frames industry. The sub-sector of the frames is also usually divided into two categories, that of optical frames and that of sunglasses.

From a global point of view, there are two main geographical areas of production: Southeast Asia and Latin America on one side and the western one with American, European and Japanese producers on the other side.

Regarding the lenses industry, we find a market consisting mainly of foreign companies, of which the leader is certainly the multinational company Essilor International SA, with a market share of 30.6% in 2015, followed by the German Carl Zeiss AG, with a share of 8 % of the market, and by the Japanese Hoya Corp, with a market share of 6.2%. Instead, as regards the segment of frames, Italian companies play a main role. In fact, among the leaders of the sector, in addition to Luxottica, there are also Safilo, De Rigo and Marcolin. In addition to Italian companies there are also important foreign players, among which the most important is of course the American Marchon.

According to estimates updated to 2016, world exports of sunglasses and prescription frames have reached a value of approximately 15.7 billion euros.

China is the leading exporter in absolute terms, while Italy holds a 22% of market share. However, considering only high-end products it emerges that Italy is the major exporter in the world, with a market share of around 70%.

After two years of record, exports continued to grow but according to a new one dimension: in fact, in 2017, the production of eyeglasses, lenses and optical frames grew "only" by 2.9%, reaching 3.805 million euros (Italian exports grew by 3.7% in 2016, 12.3% in 2015 and 11.8% in 2014).

The overall growth in export recorded in 2017 was solely attributable to two geographical areas, Europe and Americas, which respectively accounted for 50% and 31.5% of the industry export. However, the analysis of both products macro-segments reveals the differences with regard to optical frames, where growth is solely driven by American market.









VALUE AND MKT SHARE	CHANGE IN VALUE			
1,7% 61,6 ml € 	AFRICA	-1,6%	+20,4%	-8,2%
16,2% 590,3 ml € 	ASIA	-4,3%	-3,6%	-4,5%
31,5% 1,15 bl € 	AMERICA	+5,3%	+16%	+1,5%
50% 1,82 bl € 	EUROPE	+4,7%	-0,5%	+7,7%
0,6% 23,2 ml € 	OCEANIA	-23,5%	+20,9%	-32,2%

Figure 4. Global eyewear market, year 2017

As can be seen from the data summarized in the previous figure:

- A. The main market for eyewear exports in 2017 continued to be Europe, with a growth trend of 4,7%, even if with a decrease in a frames' sales.
- B. In 2017 sunglasses – frames exports to the Americas were 5,3% higher than 2016. We can note that this market increment is driven by principally by the sunglasses' sales.
- C. Asia, which account for 16,2% of Italian export, recorded a negative result, both in sunglasses and frames sectors.

However, if we focus our attention on the internal market, after a positive growth in 2015 and 2016, the last year the sales are back down.

In fact, the economic momentum seemingly regained by the country was not felt in this sector: consumption remained anemic, and the sector overall performance dipped slightly.

This domestic market trend is in contrast with the global market data, as can be seen below, where there has been growth in all economic indices up to 2017.

	2012		2013		2014		2015		2016		2017	
	Euro	var. %	Euro	var. %	Euro	var. %	Euro	var. %	Euro	var. %	Euro	var. %
Turnover	3.639	2,8%	3.767	3,5%	4.122	9,4%	4.634	12,4%	4.807	3,7%	5.060	5,3%
Output	2.799	5,3%	2.898	3,5%	3.171	9,4%	3.565	12,4%	3.697	3,7%	3.805	2,9%
Export	2.622	6,6%	2.782	6,1%	3.064	10,2%	3.453	12,7%	3.579	3,6%	3.731	3,2%
Import	844	4,4%	885	4,9%	988	11,6%	1.146	16,0%	1.184	3,3%	1.247	4,3%
Domestic Mkt	963	-4,5%	941	-2,2%	932	-1,0%	985	5,7%	1.007	2,2%	995	-1,2%

Figure 5. Main economic indices of Italian eyewear

The Old Continent, with an export share close to 50%, has confirmed to be the main market for Italian production, with positive results in almost all European countries, including those that don't particularly affect the overall picture of the sector's exports (Norway, Poland, Croatia and Hungary) but which show how in Europe there are still some growth potentials to be monitored.

On the other hand, in the United States, which has always been the leading reference country for the sector (with a share close to 25%) growth was significantly lower than in the previous years, even if in line with the previous year: while the increment in sales of 2014 was +13.3% and + 22.8% in 2015, the 2016 and 2017 have seen much more moderate growth, with +2% and +3,6% respectively.

The performance of exports in emerging countries is on the rise if compared to 2016. Indeed, since the 1990s, the share of sophisticated consumers, i.e. consumers willing to pay a premium price for "Made in Italy" products, has increased, especially in these countries. This phenomenon induces more and more companies in the sector to start reshoring processes, i.e. the return home or in neighbouring countries of the production phases previously relocated to countries with low labor costs, in order to guarantee greater control of the production chain and a qualitative level of high-profile processing.

Frames			Sunglasses		
1	United States	23,8%	1	United States	26,7%
2	France	16,0%	2	France	10,6%
3	Germany	8,7%	3	Spain	6,7%
4	United Kingdom	6,2%	4	United Kingdom	6,7%
5	Spain	5,8%	5	Germany	6,0%
6	China	4,3%	6	China	5,8%
7	Netherlands	3,0%	7	Turkey	2,5%
8	Brazil	2,1%	8	Swisse	2,4%
9	Mexico	2,0%	9	South Korea	2,3%
10	Hong Kong	1,8%	10	Netherlands	2,2%

Figure 6. Market share data for major country in 2017 – Optical frame and sunglasses

3.3 CHANGE FACTORS IN THE EYEWEAR SECTOR

The eyewear sector, which until this moment was free of radical changes and essentially controlled by two groups - Luxottica for the frames segment and Essilor for lenses - has recently been shaken by a series of M&A operations.

It is, in fact, a sector that enjoys incredible opportunities for growth, being the natural meeting point of trends that affect both fashion and health. It is affected by two main factors: the increases of the share of consumers willing to spend a large part of their discretionary income in luxury goods and the aging of the population (which for many sectors represents a very serious source of concern, but for eyewear remains an important market).

Consequently, on the one hand a consolidation strategy is underway by the incumbents, which aim to achieve an increasingly significant and profitable market share, on the other the emergence of interesting growth opportunities in very specific segments has made the entry attractive for some new players into some particular sectors. It is therefore with the proposition to strengthen its market position that the recent Essilor - Luxottica merger should be read, which led to the creation of an industrial group with a stock market capitalization of 50 billion euro, an aggregate gross operating margin of 3,5 billion and more than 140 thousand employees in 150 countries worldwide.

The union is also an unequivocal sign of a phenomenon that has affected the sector for several decades: the global macroeconomic context has long favoured large companies, more structured and quicker to grasp the changes.

Instead, it undermines the medium-small district realities that are voted for internationalization, but less organized and flexible in adapting to market demands.

In conclusion, even if the vertical integration processes under way testify the dynamism of this sector and the existing opportunities for potential new entrants, they represent also a real threat to some incumbents.

Secondly, the entry of the big luxury groups in the eyewear sector goes over what has already happened in other fashion sectors and is a clear indicator of the potential of this product category. In terms of size, the eyewear sector already exceeds other key categories of luxury such as watches, jewellery and perfumes and the premium segment accounts for 35% of the overall market for sunglasses and optical frames.

Finally, another phenomenon that testifies the vitality of the sector is the recent rise of the "mass cool" segment: these are glasses that are sold at a retail price of less than one hundred euros and which respond to the buying preferences of c.d. "*millennials*".

The possibilities offered by this segment, and at the same time by digital technologies, have allowed some innovative start-ups to penetrate in a market controlled exclusively by a handful of big players until a few years ago. An interesting case is represented by Italia Independent, a brand founded in 2007 by Lapo Elkann, it is aimed directly at consumers of what its founder has defined as "*affordable luxury*".

3.4 DEMOGRAPHIC FACTORS

It is possible to identify a series of specific factors that emphasize the potentiality of the sector, including some key demographic factors: it is estimated that about 63% of the world population suffers of problems related to vision but that, of these, only 1.9 billion have purchased glasses, contact lenses or have undergone corrective surgery. As a result, industry players can count on a large pool of potential consumers.

Furthermore, these numbers are destined to increase due to the increase in phenomena such as the aging of the population and the increase in the level of schooling: in fact, a study recently published in *The Ophthalmology Journal* seems to confirm the existence of a positive correlation between the incidence of myopia in a population and the level of schooling of the same.

According to the study, the number of myopic is more than doubled over a generation: only 27.5% of European citizens aged between 50 and 59 suffer from this disorder, while the percentage rises to 47.2% among those aged between 25 and 29.

Even more interesting is the data concerning the level of education achieved: of European citizens aged between 40 and 49 years only 26.3% of those who dropped out of school before the age of 16 suffer from impaired vision, while the percentage rises to 51.4% for those who have achieved a higher level qualification.

However, the convergence of different trends does not concern only the sector seen, but it affects also the sunglasses segment: the growing concern related to prolonged exposure to UV rays has, in fact, transformed them from a fashion accessory to a real "*must have*". It should also be pointed out that, apart from the prescription frames, the sun sector boasts an outlet market corresponding to the total world population.

3.5 WHO ARE THE "BIG FIVE" OF THE EYEWEAR INDUSTRY?

Traditionally, the eyewear sector has been dominated by five major players: Luxottica, Safilo, Marcolin, De Rigo and Marchon Eyewear. Over the years these "*big five*" have developed according to three main strategic guidelines:

- A. The direct control of downstream activities of the value chain and, in particular, of those relating to the sale and distribution of the finished product, by searching higher margins. This strategy was mainly pursued through the acquisition of proprietary retail networks.

- B. The global extension of their operations systems, in order to obtain important cost advantages, relocating medium-low quality production to emerging countries.
- C. The consolidation of proprietary brands, on the one hand, and the signing of licensing agreements with the world's leading fashion houses, on the other.

Seen above the general strategies of the major players, we now move on to a more in-depth analysis of each of them.

3.5.1 LUXOTTICA

Leonardo del Vecchio founded Luxottica in 1961 and began selling the first eyewear lines within the years immediately following.

From the 1980s, the company started a series of policies aimed at consolidating its leadership position in the market.

In 1988 the first licensing agreements were signed with the big fashion brands (Valentino, Giorgio Armani, Yves Saint Laurent, Prada, Chanel, Versace).

This allowed the company to expand its turnover and to guarantee sufficient profitability to start a strategy of acquisitions of established brands in the eyewear sector: the Italian brands *Vogue* and *Persol* in the early 90s and in 1999 the American brand still sold the most in the world, *Ray-Ban*. At the time the Ray-Ban were sold at \$ 38 a pair, the real challenge was therefore to bring them back over \$ 78 through a policy of repositioning of the brand.

Another unique aspect of the Luxottica's value proposition is the direct control of distribution activities: in fact, the company has more than two hundred thousand wholesale doors and eight thousand owned points of sale all over the world.

Regarding the strategy of the company, the path followed was that of acquisitions: starting from the 1990s, Luxottica acquired important

distribution chains in the United States and in the rest of the world (LensCrafters, Sunglass Hut International, Salmoiraghi & Viganò, etc.). Furthermore, the recent merger with Essilor will also allow the group to achieve perfect vertical integration and will confirm its leadership in the sector.

3.5.2 SAFILO GROUP

The Safilo Group is the second player in the sector. It was founded in 1934, by Guglielmo Tabacchi. Although Safilo is the world's second-largest eyewear manufacturer, its turnover remains significantly lower than that of Luxottica, being just over one billion euros compared to 9 billion of Luxottica.

The company is a leader in the segment of high-end eyewear and is one of the three leading manufacturers and distributors of sports eyewear. It also has a network of commercial subsidiaries in 39 countries and a network of independent distributors capable of reaching around 100.000 selected points of sale worldwide.

Safilo has set its strategy according to a series of essential guidelines: first of all, direct control of the entire production chain and, above all, of the design and product development phase, in order to guarantee a perfect combination of innovation and craftsmanship. This has always been a primary source of competitive advantage for the company. Secondly, a well-diversified brand portfolio, with brands of absolute prestige in the luxury segment and strong brands, on the other hand, in the lifestyle, sport and mass-market segments.

Safilo holds the Carrera, Polaroid, Safilo, Oxydo and Smith brands, while it produces glasses under license for MaxMara, Elie Saab, Fendi, Fossil, Givenchy, Marc Jacobs, Kate Spade and Tommy Hilfiger.

3.5.3 MARCOLIN

Giovanni Marcolin Coffen founded the "Artisan Factory" in 1961 in Longarone. In 2016 Marcolin recorded a 5% growth, reaching a total turnover of 450 million euros and an EBITDA of 11% on revenues. The company also ranked first in the "fastest growing companies" ranking drawn up by Deloitte, recording a CAGR (compound growth rate) of 2013-2015 equal to 43,1%.

An important element of differentiation compared to its main competitors is represented by the choice not to diversify in direct retail, but to sign partnerships (*joint ventures*) with local high-level operators, in order to obtain a selective distribution without too much over-exposure from a point of financial sight. The joint venture recently signed with LVMH will also allow the group to significantly expand its turnover: from 2018, Marcolin will start producing eyewear for the Louis Vuitton and Céline brands and the same should happen for other important brands at the end of the period of the licensing agreements that LVMH still has with other companies in the sector.

3.5.4 DE RIGO

De Rigo is a recently founded company born in 1978 by the De Rigo brothers: it was the first company in the sector to define its strategy in sunglasses and to see its potential. The company has grown rapidly over the years, so much so that in 2015 it achieved a total turnover of 403 million euros with a net profit up by 13.6%, to 14.7 million.

The development strategy of De Rigo requires careful management of its brand portfolio: it includes some historical property brands such as Police, Lozza (founded in 1878, is the oldest eyewear brand in Italy), Sting and, finally, Lozza Sartoriale, a project born in 2014 in partnership with the Milan Polytechnic. The objective of the project is to create highly personalized and calibrated glasses on the needs of individual consumers.

De Rigo also produces and distributes a series of highly prestigious licensed brands such as Chopard, Trussardi, Carolina Herrera, Furla and Mille Miglia. From the distribution point of view, the company presents an organization similar to that of Safilo Group: in fact, it manages 16 branches worldwide, 5 retail divisions and a network of over 100 independent distributors.

3.5.5 MARCHON EYEWEAR

Marchon Eyewear, a manufacturer founded in 1983 based in New York, boasts a well-diversified portfolio of brands, both owned and licensed. These include Calvin Klein, Chloé, DVF, Karl Lagerfeld, Lacoste, Liu - Jo, Nike and Ferragamo.

The company closed 2014 with a turnover of 892 million euros, consequently it is the third player in the sector, followed by De Rigo and Marcolin.

4 THE LUXOTTICA CASE: A COMPANY WITH A HIGH DEGREE OF VERTICAL INTEGRATION

4.1 OVERVIEW AND COMPANY DATA

Today, Luxottica is the world leader in the production and sale of sunglasses and prescription frames, offering high quality products with a refined style.

The company's mission is presented in the following words: *"Luxottica's mission is to dedicate itself to the protection of the eyes and to the enhancement of the faces of women and men in the world, creating the best possible glasses to satisfy customers, interpreting tastes and consumer aspirations"*.

Among the strengths of the company there are certainly the brand portfolio and the business model. Luxottica presents itself on the market with proprietary brands such as Ray-Ban, Oakley, Persol, Vogue Eyewear, Oliver Peoples and Alain Mikli and with licensed brands Giorgio Armani, Burberry, Bulgari, Chanel, Dolce & Gabbana, Michael Kors, Prada, Ralph Lauren, Tiffany & Co., Versace and Valentino.

The focus of its business model is the vertical integration associated with internationalization that allows Luxottica to be present in the phases of design, product development, production, logistics and distribution in more than 150 countries worldwide.

The production is located in six production plants in Italy, one in Brazil, three in China, one in the United States dedicated to the production of sports glasses and one of smaller size in India to serve the local market. For distribution, Luxottica is present in the wholesale, retail and e-commerce channels. In particular, the retail network consists of approximately 8.000 stores worldwide.

Considering all the steps taken by Luxottica, at a global level the group's employees are about 85.000.

Looking at financial data, Luxottica closed 2017 with a turnover of 9.157 billion euros, up +2,2 % at constant exchange rates compared to 2016 (9.036 million euros), after +3,9% in 2016. Of this result, around 39% is attributable to the wholesale division while the remaining 61% to the retail division.

If we look at the second quarter of 2018, Luxottica's net sales grew up by 1.4% at constant exchange rates. These results were driven by the strong performance of the Retail division and e-commerce platforms. Another factor that contributed was the solid growth in North America

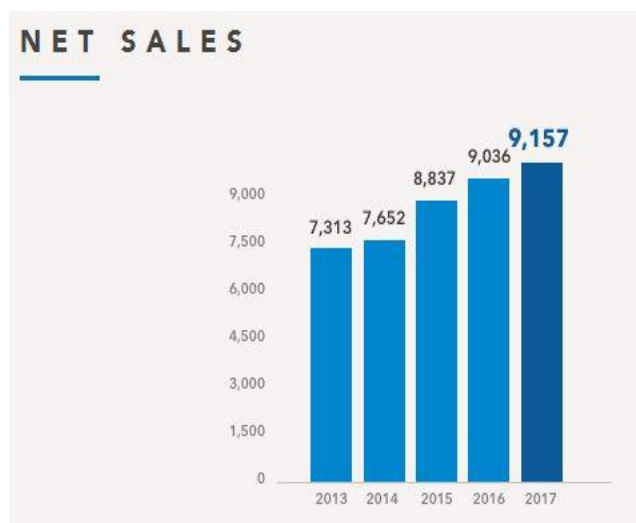


Figure 7. Luxottica's net sales in the last year

and Asia-Pacific.

However, the Wholesale division's net sales in the second quarter were down 3.1%, impacted by a temporary slowdown in Europe due to new commercial policies and a delayed sun season.

Regarding the Retail division's net sales, they grew by 4.3%. This

confirmed the effectiveness of strategic initiatives aimed at improving the operating model and the ability of the Group's retail brands to execute them. Indeed, for the third consecutive quarter, Sunglass Hut, with sales up 5.5% at constant exchange rates, grew in its main geographies. Retail brands in China, including Ray-Ban stores, and Australia confirmed a strong increase in sales. In North America, LensCrafters' sales were back to growth.

Furthermore, Ray-Ban.com confirmed that is the main driver of the Group's digital business. This brand drives the improvement of the e-

commerce, considering that the net sales from Group's e-commerce platforms in the second quarter were up by 16%.

Regarding the geographical distribution of sales, it is clear by looking the table below that the North American is the company's leading market (with a quote of 56% of the net sales).

Net sales (millions of Euro)	2Q 2017 restated ⁶	%	2Q 2018	%	Change at constant exchange rates ²	Change at current exchange rates
North America	1,432	56%	1,368	57%	+3.4%	-4.5%
Wholesale	261	10%	255	11%	+5.5%	-2.1%
Retail	1,172	46%	1,113	46%	+2.9%	-5.0%
Europe	628	25%	590	24%	-4.5%	-6.1%
Asia-Pacific	290	11%	294	12%	+7.5%	+1.5%
Latin America	143	6%	128	5%	+2.3%	-10.3%
Rest of the World	47	2%	36	2%	-19.4%	-23.2%
Group total	2,540	100%	2,417	100%	+1.4%	-4.9%

Figure 8. Detail of net sales divided by geographical area

4.2 COMPANY'S HISTORY

The year of the birth of Luxottica was in 1961, founded by Leonardo Del Vecchio, initially as a company in a simple partnership and subsequently transformed into a joint-stock company, with the name of Luxottica s.p.a..

Initially, the company was a small mechanical laboratory that had about ten people working in the production of eyeglass components (molds, irons, small metal parts and semi-finished products) on behalf of third parties operating in the optical sector.

About ten years later, in 1969, Leonardo Del Vecchio expanded the range of processes and launched the first frames with the Luxottica brand on the market, transforming the company from a third-party manufacturer to an independent producer. While these were initially marketed through wholesalers, in 1971, the first frames produced entirely within the company were presented at the Milan International Optics Exhibition. This is considered the initial event that consecrates the success of the company.

From the 1974, the company decided to take the path of vertical integration, with the aim of directly distributing his own frames on the eyewear market. In fact, the first step is the acquisition, in the same year, of the company Scarrone s.p.a., a distribution company of Turin, which gives Luxottica not only direct access to the final consumer, but also an important know-how related to the Italian market.

In the '80s, the company's expansion took on international importance, with the creation of joint-ventures and commercial agreements in foreign markets. The first commercial affiliate was created in Germany in '81 and culminates with the international expansion also in the US market, with the acquisition of Avant Garde Optics Inc., a wholesale distributor. It is clear as the goal of Del Vecchio is to have a commercial presence in all the weights that have a profitable optic market.

The image that the owner wanted to give to the company was linked to high quality Made in Italy. In fact, in the same years Luxottica continues to invest in the product and, through the acquisition of the Sferoflex brand, the company continues to elevate its image on both the Italian and European markets.

At the end of the eighties, Luxottica Group is a world leader in the production and marketing of spectacle frames.

The turning point occurred in 1988, when there was an evolution of eyeglasses' perception. In fact, until that year, the glasses had been considered simply as an instrument to correct vision; since those years, however, is seen more and more as an aesthetic and connected to fashion.

Right in 1988, Luxottica makes a licensing agreement with Giorgio Armani. In 1990, the company acquired the Vogue Eyewear brand and, as an event that establishes its global importance, was listed in the same year at the New York Stock Exchange, obtaining great visibility and encouraging the growth process.

Subsequently, it is listed on the Italian market, specifically on the Milan stock exchange, and with this Luxottica becomes part of the basket of thirty main Italian equities.

During the 1990s, the company increased its investments to develop the distribution network, with the aim of reaching the global consumer, wherever there is a demand.

New commercial branches are created, among which the Japanese subsidiary Mirari stands out. Furthermore, in 1995 Del Vecchio acquires US Shoe Corporation, owner of Lens Crafter, the largest retail optical services chain in North America.

Consequently, Luxottica became the first eyewear manufacturer to enter directly into retail distribution, by exploiting the synergies between production and distribution and increasing its penetration in the world market through the 870 stores owned by Lens Crafter.

Regarding the brands handled by the company, after the first experience with Giorgio Armani in 1990, Luxottica has acquired over time a portfolio of important licenses including: Moschino (1995), Bulgari (1996), Salvatore Ferragamo (1998), Chanel (1999), Prada and Versace (2003), Donna Karan (2005), Dolce & Gabbana and Burberry (2006), Polo Ralph Lauren (2007) and Tiffany (2008).

In addition, Luxottica expands its portfolio of proprietary brands, acquiring Persol, an historic Made in Italy brand that retains all the characteristics of uniqueness, aesthetics and excellence, while maintaining the artisan production in the historic Lauriano plant, near to Turin.

However, the most iconic acquisition occurs in 1999, when Ray-Ban passes under the control of Luxottica. The acquisition of Ray-Ban was the key to consecrate the sun segment with one of the most famous and representative brands of the entire market.

The first decade of the year 2000 is characterized by the expansion of its presence in the retail sector. If in 1995 with the acquisition of LensCrafters Luxottica had entered the optical retail, in 2001 thanks to the acquisition of Sunglass hut, and its future development, it also enters the retail of sunglasses.

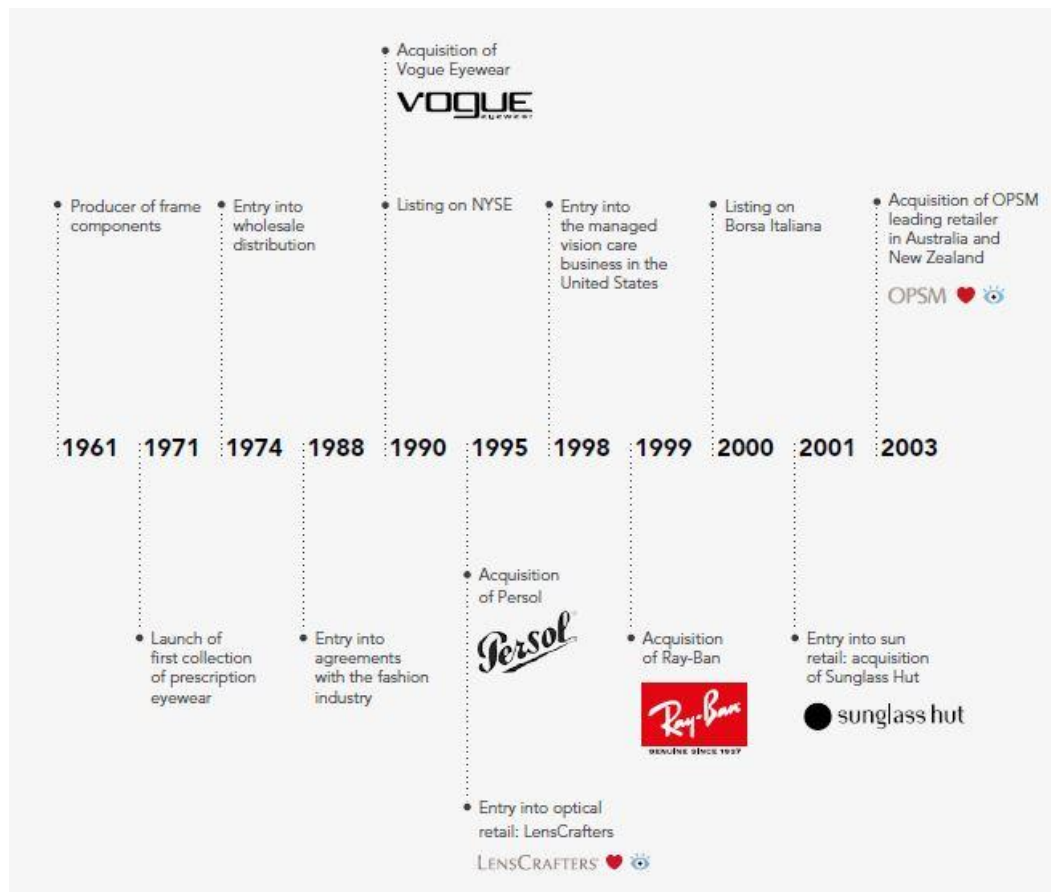


Figure 9. First part of the timeline of the most important events that have favored the growth of the giant Luxottica

In 2003 the expansion continued with the acquisition of OPSM, one of the leading optical chains in Australia and New Zealand. In 2004 it was strengthened in North America by acquiring Cole National and became the owner of the Pearle Vision, Sears Optical and Target Optical chains. In 2005, however, the Chinese retail market interested Luxottica with the acquisitions of Xueliang Optical, Ming Long Optical and Modern Sight Optics. In 2009, instead, it will be the turn of GMO, the optical chain in Latin America. In 2007, The portfolio of proprietary brands continued its expansion with the addition of Oakley, an American company specializing in the design and manufacture of sports eyewear and accessories. In addition to eyewear, Oakley also produces visors, masks, ski goggles as well as sportswear and other accessories. With the acquisition of Oakley, its stores of sports products in North

America and its luxury eyewear brands, Oliver People and Paul Smith, also become part of company.

The company, until now present only in the wholesale and retail distribution, decides not to stop and take advantage of the new trends and also enter the e-commerce. It does so first in 2008 by creating dedicated platforms for Sunglass Hut, Oakley and Ray-Ban and then in 2014 by purchasing Glasses.com from WellPoint Inc. The website is one of the most advanced platforms for the digital optical sector that allows consumers to try the glasses thanks to a try-on technology managing to capture the customer's face in 3D and then add the frame.

In recent years, the brand portfolio has also been expanded by purchasing Alain Mikli (2013), operating in luxury eyewear, and licensed with Starck Eyes (2013), Michael Kors (2015) and Valentino (2016).

In 2016 there have been an important event for Luxottica: the complete acquisition of Salmoiraghi and Viganò, the first Italian chain of eyewear and optics with four hundred and thirty stores and behind them more than one hundred and fifty years of history.

A second event that had an enormous resonance was the announcement of the merger with Essilor, a French company world leader in the production of ophthalmic lenses and optical equipment. With this announcement, Luxottica enriches its range of action by producing a complete eyewear, from the frame to the prescription lenses, and then also distribute it. The new giant Essilor-Luxottica will have a capitalization of over fifty billion euros with an expected annual turnover of more than fifteen billion and one hundred and forty thousand employees. These are the words used by Del Vecchio, who will be the future executive president of the new reality, to describe the operation: "*With this operation my dream of giving life to a fully integrated and excellent champion in every part of the optics is realized*".

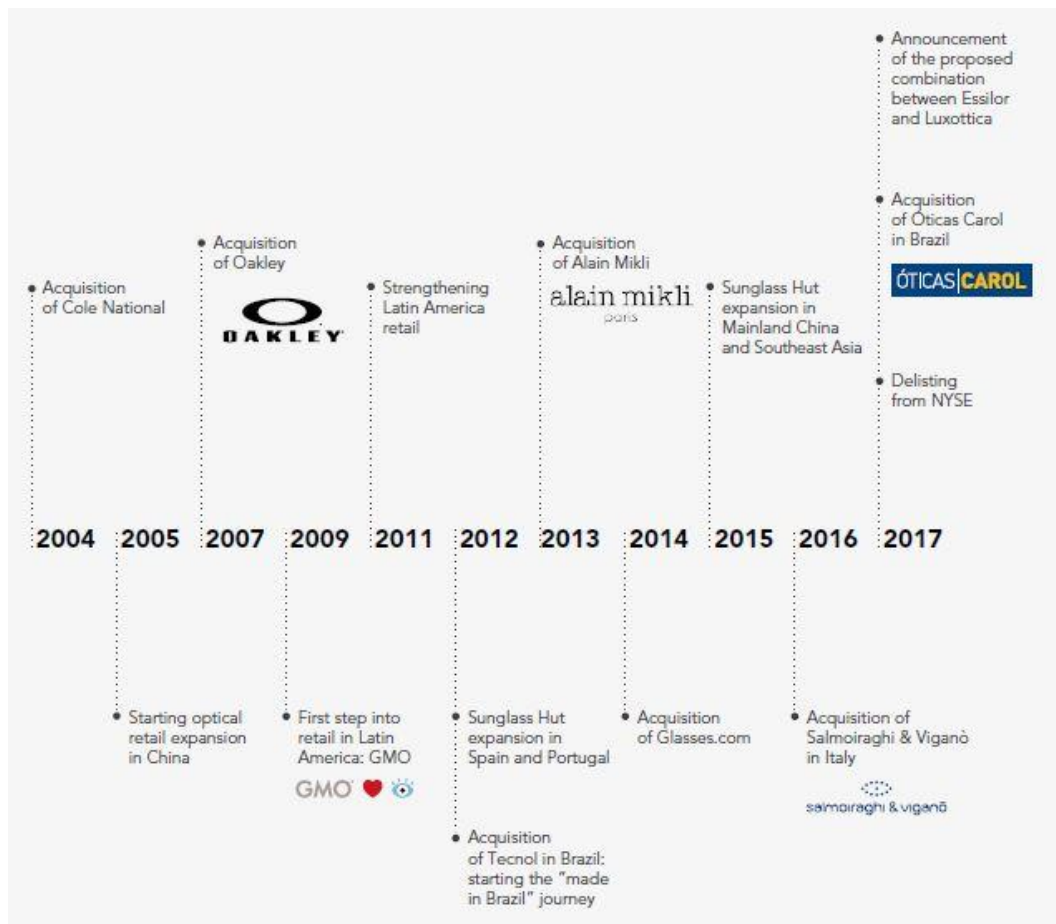


Figure 10. Second part of the timeline of the most important events that have favored the Luxottica's growth

4.3 VERTICAL INTEGRATION IN LUXOTTICA

As mentioned above, one of the central pins of the Luxottica business model is vertical integration.

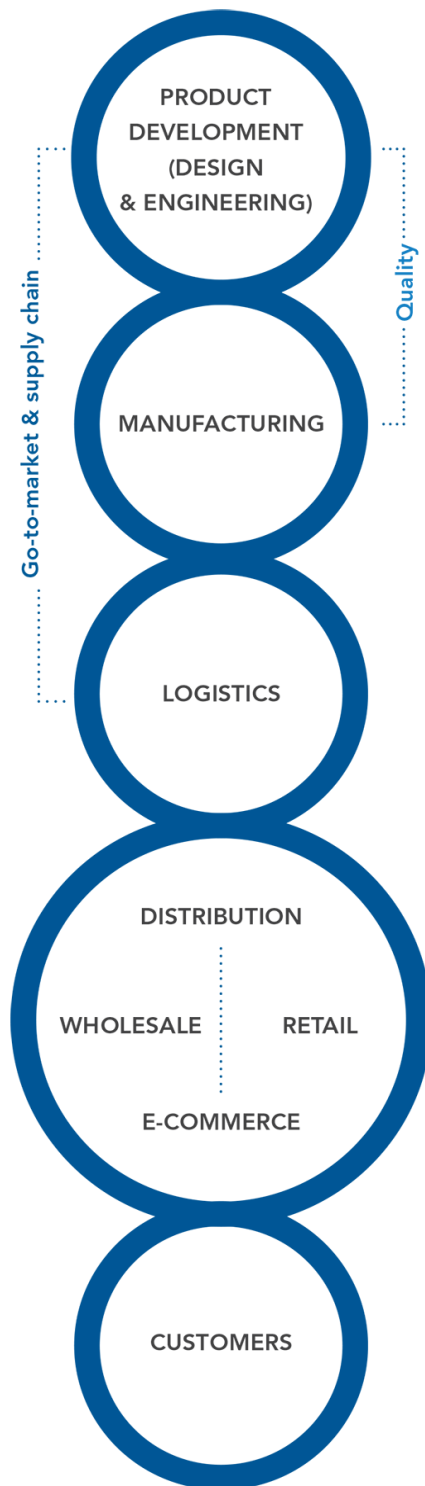


Figure 11. Activities carried out by Luxottica with a view to vertical integration

The current organization, as can be seen in the adjacent chart, is the resulting vision of the entrepreneur who sensed the importance of producing an entire frame and then distributing it, first in the wholesale segment, then in retail and e-commerce.

Last step is the entry into the processing of lenses, high added value segment.

The essential motivations can be found on the one hand in the possibility of guaranteeing high quality products and processes, exploiting synergies, introducing innovations and optimizing costs and times, possibility given by the control of all the production phases. On the other hand, downstream, distribution makes it possible to identify and study consumer trends and tastes. This factor is also considered in Luxottica as an advantage to attract new licenses as designers, that can count on the company's ability to satisfy the needs of the final consumer.

The first advantage sought through upstream integration in production was that of innovation and quality. Del Vecchio explains how at the end of the '70s Luxottica bought most of the components and then only assembled them internally, but this caused many problems related to the quality of the final product and was therefore decided to internalize the production. Del Vecchio explains that *"we have found that this internalization has produced results that exceeded expectations, because many process innovations were created inside. Thus, an improvement in quality and organization was achieved at the same time. [...] the subcontractor is not stimulated to improve the quality of the pieces and, moreover, never seeks innovation. [...] inside you are forced to improve. We realized that we had done some extraordinary changes inside and we concluded that external work blocks innovation. At this point we have gradually brought the most important operations inside."*

Indeed, as regards the downstream integration in distribution, the main advantage sought was to overcome the uncertainty and opportunism due to the profound difference in interests between producer and distributor. Here is the role played by the wholesaler in the vision of Del Vecchio: *"the wholesaler is the brake of companies. The wholesaler sells your product if it is interesting for him, but feels free to sell others [...] if you have an interesting product, it works well for you. However, if the next day you find a product that is more convenient for you, it will leave you and you will lose that market. And then there is also a speech related to investments and organizational efficiency, because if you are in the hands of a distributor you cannot program production, nor the growth. [...] The wholesaler is the death of companies because it forces them to live for the day."*

In addition, for Del Vecchio it is also important to have direct contact with the final consumer as it is only in this way that you can have the necessary information to develop new models and respond to customer needs.

In fact, to use his words again, *"it is extremely important to acquire direct and timely information on the market. The wholesaler, instead,*

is a filter that allows you to see less the final market. The wholesaler is the brake of company development.”

The words reported so far by Del Vecchio give a clear and strong impression of how the strategy of vertical integration is rooted in the soul of the enterprise and constitutes the very core of its development.

4.4 VERTICAL INTEGRATION: FROM DESIGN TO FINISHED PRODUCT

For a better understanding of the activities carried out by Luxottica within the value chain, the individual phases set out in the previous figure will now be better analyzed.

Every year in Luxottica about 2000 new models are created that are added to those already existing. These new models are born from the creativity and vision of internal designers to respond to the fashions and the needs of consumers. The process is carried out internally, from the creation of the first sketch to the start of the mass production, passing through the creation of prototypes. Consequently, converging craftsmanship and new technologies they are tested and those that meet the quality, cost and production time standards are chosen to be destined for launch in the market. During these phases, meanwhile, the tool shop creates and prepares all the tools that will be necessary for the production of the new models. The actual production of each model takes place in one or more of the plants located in Italy, China, the United States, Brazil and India. The six Italian plants (Agordo, Sedico, Pederobba, Cencenighe, Rovereto and Lauriano) represent about 40% of global production and are mainly used for the production of luxury models.

It is precisely in these Italian plants that we observe the combination of the efficiency of new technologies and machinery with the tradition of craftsmen.

The Chinese factory since 2010 deals with the production of plastic sunglasses to be assembled to the frames produced in the same place

as well as the production of details and decorations for frames. In California, sports eyewear and optical frames and lenses for the Oakley brand are made. The factories in Brazil and India, on the other hand, satisfy the respective local markets. The graph below shows the geographical distribution of the Luxottica group's production.



Figure 11. Luxottica in the world: the numbers regarding production and logistics sites

The models designed and produced are mainly based on three types of material: metal, acetate and nylon fiber materials.

- A. Acetate is a thermoplastic resin, from which slabs are produced by pulverizing the cellulose of cotton, acetic acid, plasticizer and natural dyes. It is used in the production of frames as it is

waterproof, has plant origins and therefore is antiallergic (unlike some metals for example), it is very strong and durable over time.

- B. Nylon fiber is a thermoplastic polymer also known as *Grilamid*, which is part of the polyamide family. It is used in the production of frames for its longevity, ease in its maintenance, ease to color during production so as to obtain multiple variations and different patterns and finally it is very light and resistant.
- C. The most used metals are stainless steel, monel, nickel silver and bronze. The qualities that the metals give to the frames are high malleability during use, ductility and versatility.

After creating special molds and models based on the different materials, the production differs right on the basis of the latter.

For the metal frame there are about seventy different phases that start with the creation by printing of the essential components such as the profiles of the frames, the rods and the nose pads. These will then be welded and assembled to obtain the final frame. At the end of the process the frame undergoes different treatments to improve its resistance and aesthetics so as to be ready to receive the lenses and be packaged.

The plastic frames can be produced through two main processes that of milling or that of injection molding. In the first, the various components such as rods, bridges and the profile of the frame are obtained from plastic sheets, usually of acetate, of different colors through a computerized machine. The various components will then be assembled and finished. With injection printing, instead, the plastics, usually made of nylon fibers, are first liquefied and then injected into molds where they are made to solidify. The components thus produced are also in this case assembled, finished and packaged.

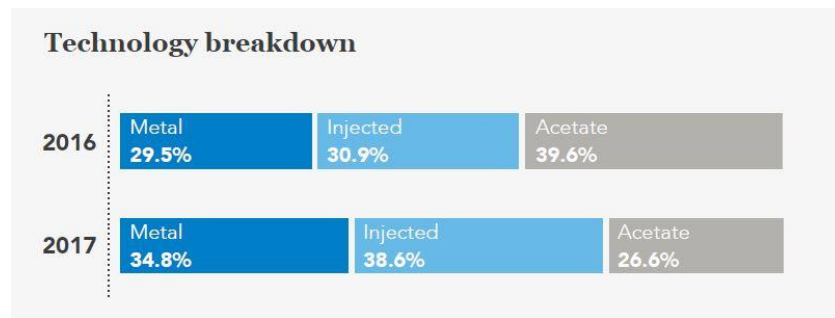


Figure 12. Technology breakdown of the three types of materials: the increase in the proportion of acetate material

Important at the end of the production process are the finishing and decoration phases. The importance of the latter grows and becomes fundamental in the case of luxury models. Behind the finishing and decoration processes as well as innovative technologies, in many cases, there are expert artisans who could use a whole day for the decoration of a frame.

We have therefore seen how a frame in Luxottica is born, but this is only a part of the glasses to which the lenses will be added. The production of lenses in Luxottica is concentrated on the sunglasses lenses, while for the ophthalmic ones only recently a domestic production has been started. From this point of view, the merger with a giant of the sector like Essilor becomes fundamental, pursuing a continuous search for the highest degree of vertical integration.

The only brand for which the production of ophthalmic lenses has been active for some years is Oakley. Oakley graded lenses are in fact produced at home in the plant located in California.

The production of sunglasses in Luxottica begins thanks to the various knowledge and skills accumulated with the various acquisitions, including especially those of Persol, Ray-Ban and Oakley, leader in the sun segment.

Production for proprietary brands takes place mainly in the Lauriano plant and the materials used in production are both crystal and synthetic resins. The crystal is a particular type of glass that still today has the best optical qualities and, thanks to the modern and innovative production, it is also resistant and long lasting.

Right in the last months, a mainly supplier of the crystal lenses, Barberini, has been acquired.

This strategic move allows not to continue to have a share of internal production and a share produced by an external supplier. The decision to acquire Barberini, the world's largest producer of crystal lenses, brings with it different consequences and advantages:

1. The possibility of acquiring the entire know-how of the company, further breaking down the production costs and getting even closer to the supply chain upstream. In fact, the company has direct control of the entire supply chain: from raw materials to machines that produce lenses;
2. To be able to exclude access to a recognized quality product important competitor of the company, such as Safilo and Marcolin (formerly Barberini's customers)

4.5 VERTICAL INTEGRATION: FROM LOGISTICS TO THE FINAL CONSUMER

The finished product is entrusted to the efficient logistics organization that has the task of managing orders and shipments to and from around the world, serving both the wholesale and retail channels. The distribution centers of Luxottica's international network are eighteen and of these four are those that act as hubs, by placing themselves in a leading position. The entire system is managed in a centralized way at an international level where hubs send to smaller distribution centers and sometimes to customers, maximizing efficiency and minimizing stocks held in the warehouse. The first hub of these is located in Sedico, in the province of Belluno. It ships about two hundred and forty thousand units per day, mainly to Europe, Africa and the Middle East as well as to some specific areas of North America

and the minor distribution centers. In China, in Dongguan, there is the hub that manages the Asia Pacific region with about two hundred thousand units shipped per day and with a continuously growing capacity thanks to the investments that the company is making in this region. The third hub is located in the United States, in Atlanta, to manage the North American market with around one hundred and sixty thousand units per day of shipment. Finally, in Brazil, in Jundiai near San Paolo, there is the last hub that serves the local market with about twenty-six thousand units shipped per day.

As has been repeated several times, Luxottica operates directly downstream in the channels of wholesale, retail and e-commerce distribution. Being so vertically integrated downstream, both in mature and emerging markets, allows Luxottica to exploit multiple advantages, first of all the enhancement of brands and the understanding of the needs of end consumers.

As regards the wholesale sector in particular, it operates in about one hundred and fifty countries in the world with fifty commercial branches in mature countries and around one hundred independent distributors in developing markets.

The customers served in this segment are above all independent opticians, optical chains, duty-free, online operators, department stores and stores specializing in the sale of sunglasses. To these are added special customers for specific brands such as sports shops for the Oakley brand.

Therefore, given that part of the products is offered to the final consumer through their own sales points, while the other part is sold to independent distributors and retailers. For this reason, the vertical integration in this field is only partial.

Turning to retail distribution, at the end of 2017 the entire Luxottica network had 7.102 stores and 1.811 franchised locations. The network consists of various types of shops, with different brand in different segments. It does not only sell Luxottica products but also offers frames, lenses and products from other companies, thus outlining a

model of partial vertical integration also in the retail segment as in the wholesale.

In 2017, Luxottica's proprietary and licensed brands represented about 90% of the total net sales of frames by the retail division.

One of the most important signs of the vertical integration in the distribution channels is LensCrafters, which brings together eye care, finishing laboratories and eyewear workshops under the same banner operating in North America and China.

In North America, Luxottica also operates through Pearle Vision, Sears Optical and Target Optical, while in Latin America it is present with GMO. Another important sign is Sunglass Hut, specialized in the offer of sunglasses and operates in both mature and emerging countries including Brazil, Chile, India, Mexico and in many areas of Asia. In Australia and New Zealand, the group is present with the retail brands OPSM and Laubman and Pank that offer both prescription and sunglasses. The most specialized brands include Eyemed, the second US operator of Managed Vision Care, offering insurance services for vision care. Then there is Oakley, which with its "O" brand stores offers glasses, clothing and Oakley brand accessories, and in the luxury segment there are Ilori brands, Oliver Peoples, Alain Mikli and David Clulow.

Furthermore, at the end of 2016, Luxottica also acquired Salmoiraghi & Viganò which represents the largest Italian optical chain, of which it held a minority share since 2012.

It is also important to observe how Luxottica, in many sales outlets in which it has an offer dedicated to the vision segment, also offers special eye care services of the latest generation.

We have to remember the e-commerce, the third distribution channel in which Luxottica operates. Luxottica's e-commerce strategy is based on the penetration of different and always new markets. In particular, it is directly active in sales with the websites of Ray-Ban, Oakley and Sunglass Hut. Recently, they have been added Oliver Peoples, Persol and Vogue Eyewear e-commerce websites.

Ray-Ban.com was launched in 2009 in the United States and, after an internationalization process, is now operating in twenty-four countries. Finally, Oakley.com allows in addition to the purchase of glasses also the customization of some models, and it is active today in twenty countries.

In addition to these platforms, Luxottica operates in e-commerce through Glasses.com: acquired in 2014, it is positioned as one of the leading e-commerce websites in eyewear and is characterized by the high online shopping experience offered to consumers also thanks to the application that allows you to try out various 3D models with your own face.

4.6 INNOVATION IN LUXOTTICA

In addition to the integration that constitutes its cornerstone, fundamental for Luxottica's business model is innovation. All phases of the value chain carried out at Luxottica are flanked by projects for the development of innovation from the technological, product and business point of view.

These are the words of Leonardo Del Vecchio used to describe the company's relationship with innovation: *"We must be open, never think of having arrived, look at the world as the only point of reference. In the market we must enter and know how to stay, changing, innovating and constantly improving, while maintaining our DNA, our fundamental characteristics"*.

Indeed, many scholars find a link between vertical integration and innovation produced by the company. With this in mind, we want to describe the areas of innovation in which Luxottica is active because it is considered necessary to have an overall vision in relation to the integrated business model of the company.

However, it must first be made clear that Luxottica is not fully integrated in the execution of research and development. In fact, in this field, Luxottica often uses external partners specialized in particular activities or collaborates with raw material suppliers. This is because the company of Agordo lacks certain skills (for example the development of electronics, software, cloud, data systems, etc.).

Therefore, for some activities it must rely on external collaborators and then a research and development context are in some cases not completely vertically integrated. Instead, in other activities of the new product development cycle, Luxottica has the necessary skills: the qualification operations, the new design tests, the evaluation of possible surface treatments are activities that Luxottica is used to doing well internally eliminating the external management of process. In the next paragraph, the company's main areas of innovation will be highlighted from the birth of new products to the development of new business.

Innovation begins in the product creation and development phases, anticipating consumers' tastes and their needs through the design of innovative products. In these phases, innovation concerns the aesthetic aspect, the materials used and the functional aspect, improving the usability and wearability of the glasses on one side and the optical properties of the lenses on the other.

In fact, more than one thousand registered patents testify the propensity of Luxottica in the development of innovation and product technologies, which make the company one of the innovative leaders in the eyewear segment.

The innovative process continues in the production phases, in which Luxottica has adopted a lean production system. It is aimed at eliminating waste, maximizing efficiency through automation and optimal design of production spaces. In particular in Dongguan, China, there is an innovation center dedicated to operations to study and develop new automated technologies. The use of 3D printing for the production of prototypes as well as small components of the frames is also innovative.

Innovation continues in logistics: with a component, product and shipment management system integrated all thirteen distribution centers are managed. In particular, very innovative is the use of smart mobility technology in which there are smart robots (Automated Guided Vehicle) which, managed by a software, can pick up and deliver parts in the factories, speeding up the flows inside the plants and being able to also replace people in the most dangerous activities.

However, innovation also embraces distribution. Above all, the development of customer services and the offer of a better shopping experience are the best components of innovation in this sector.

For example, try-on technology allows you to virtually try the eyewear during your shopping online or the possibility that the customer today has to customize their own Ray-Ban pair by choosing colors, rods and frames with the Ray-Ban Remix service.

However, innovation at Luxottica can also be traced in business innovation that has enabled the company to develop and extend globally in markets that are sometimes very different and far apart.

An emblematic case in this sense is the business model used by Luxottica to penetrate the Asian market.

Internationalization is one of the company's success factors, but it is not always easy to achieve success in different markets. It is for this reason that a particular innovative business model has been implemented in Asia that involved two main elements:

- A. *Physical presence of Luxottica in the region through the opening of production facilities in Asia.* This allowed to implement an innovation of the products offered. From this point of view, adaptation to the local market was on the one hand through the use of preferred materials, shapes and colors in the Asian region and on the other by innovating in the wearability of the product for Asian people. In fact, in Asia there are more than fifty different face types that Luxottica has tried to satisfy by designing glasses that best fit the needs of Asian consumers.

B. From an organizational point of view, special local teams have been created to allow to grasp local needs and then adapt fashions and international products to the Asian market. The combination of local adaptation, innovation and internationality can for example be seen in the Ray-Ban line designed by some Chinese designers since 2009. In this case, part of the collection has been designed to exclusively meet the needs of the local market while another part is made up of the most classic and international models of the brand but modified in some parts to better adapt to Asian faces.

However, Luxottica has not only adapted the products to the local market but, in some cases, has learned from local markets by developing particular components and products which it then extended to other countries and other areas. An example can be the Ultem, a particular material very flexible born in Korea.

Another example of business innovation is the STARS project launched by Luxottica as a supply efficiency system for its wholesale customers that can be interpreted as almost vertical integration. The following paragraph is reserved for this aspect.

4.7 STARS

STARS is an acronym that means Superior Turn Automatic Replenishment System which is a project born in the wholesale division in 2002 at Luxottica. The aim of this project is that of making the planning and replenishment process of Luxottica customer assortments more efficient, so as to create benefits for both customer and the company. The program, which at the end of 2016 encompassed about 7,500 stores in Europe, the United States, the Middle East and emerging countries, offers a partnership by offering to the costumers the most suitable products and ensuring adequate levels of stocks in the individual stores.

STARS, in fact, manages on behalf of the customer all the activities of product selection, supply planning and automatic replenishment of Luxottica products within the store through specially developed IT systems, as well as sophisticated planning tools and techniques.

The customers usually selected for this program are chains, large independent customers and department stores.

There is, however, an important disadvantage: the program in fact requires less autonomy and independence, something that until now has kept both very small and artisan shopkeepers away from the Stars circuit.

But there is an entire intermediate range of shops or chains, even with very important sales volumes, for which Stars is seen as a true blessing, a tool that strongly helps to sell more and to have only what is needed in the store.

What is going to be outlined is therefore something very similar to an almost vertical integration in which Luxottica manages part of the store as if it were owned. Furthermore, this practice gives the possibility to have access directly to the sales information provided by the store itself.

In fact, among the advantages that Luxottica acquires through this project the most important is certainly the acquisition of information relating to the sale so as to be able to analyze and monitor consumer trends even where it has no direct sales points. Other important advantages are the real-time control of store stocks, the creation of a direct link between the stores and the site, the certification of the delivery of the goods and therefore also the control of any couriers used.

On the other hand, as mentioned above, the store takes advantage of Luxottica's experience and its ability to plan and analyze market data. In this way, it is possible to have an assortment able to maximize sales and, at the same time, reduce the warehouse given the direct connection with the company that allows an automatic replenishment in case of sale of some products. The selection of products for the creation of the assortment will thus be based on the best seller in the market, being able to vary the planning based on the customer's

profile and seasonality. In addition, the retailer will also periodically update his assortment with the new models which will correspond to a possible withdrawal of the less-sold products.

The store also gets a useful tool to monitor inventory, sell-in and sell-out as well as a direct communication tool with Luxottica to receive assistance and support.

4.8 LUXOTTICA'S COMPETITORS

In relation to vertical integration, in order to have a more complete view of the eyewear sector, now we want to analyze the strategy pursued by the major competitors of Luxottica: De Rigo, Safilo, Marcolin e Marchon.

De Rigo

Born as a subcontractor, today it is one of the most important companies for the production and distribution of eyewear. It also implements a strategy of vertical integration, even if with smaller dimensions than Luxottica. Upstream in the production chain, De Rigo oversees the phases of design, industrialization and production. Raw materials are purchased from outside by specialized companies and then processed internally to create the individual components and assemble them. Downstream De Rigo is one of the most integrated realities after Luxottica: it directly oversees wholesale distribution with sixteen foreign branches, but at the same time also relies on over one hundred independent distributors. Furthermore, after several acquisitions today it owns over nine hundred own stores and thirty franchises in Spain, Portugal, Turkey and the United Kingdom with the Grand Optica, Mais Optica, Opmar Optik and Boots Opticians brands.

Safilo

This company is the second operator in the frames market after Luxottica. It presents a more complex situation in terms of vertical

integration. The company is integrated in research and technological innovation, design and product development, production, marketing and communication up to sales and distribution. Its production process covers almost all production phases and is characterized by high innovation and the use of modern technologies.

Production takes place in seven production plants, four of which are in Italy, one in Slovenia, one in the United States and one in China. However, the vertical integration model used in production is not completely integrated: in fact, the company internally produces the expected production while relying to external contractors in the event of surpluses.

As regards distribution, the group has announced a strategy based almost exclusively on the wholesale channel with an owned distribution network in thirty-nine countries and three main distribution centers in Padova, Denver and Hong Kong. In the past, however, Safilo attempted integration also in the retail segment, acquiring around three hundred points of sale, but renouncing the project due to family disagreements at the top of the company. Today it has only about 125 retail outlets with the Solstice brand. However, it is necessary to report an interesting possibility of greater integration in the retail sector: the majority stake of the company was purchased in 2010 by HAL Holding NV, a Dutch international investment company, which owns one of the largest retail chains in the optical segment: GrandVision. Even if the current company policy is directed towards wholesale channel, in the future possible synergies between Safilo and GrandVision could be exploited.

Marcolin

Founded as a "Handicraft Factory" specializing in the production of gold laminated eyeglass rods, over the years the company has grown internationally through acquisitions and strategic agreements. Marcolin is present in the production and wholesale distribution phases with a weaker vertical integration strategy than the other companies mentioned above. In production, the company does not carry out all the steps required to obtain the finished product

internally but buys some components and semi-finished products from external Italian and Chinese suppliers. The production phases carried out internally take place in the two plants owned in Italy and partly in China. For the commercial area, the company has twenty-five branches with which it carries out direct distribution activities and four showrooms but, at the same time, it also relies on one hundred and sixty-one independent distributors. Finally, like Safilo, the company does not operate directly in the retail segment.

Marchon

The company is headquartered in New York where it also has its own stylistic center. Regarding its market offering, in addition to the production and distribution of frames, are provided services of optical/ophthalmic assistance and ophthalmic lenses, management and process software for the optical industry. In fact, Marchon is part of the VSP Global group, a leader in the field of health insurance specializing in ophthalmology.

Marchon produces in two factories in Italy as well as some in other countries, including China, appearing in the world as an international producer of Italian Style.

The conclusions that can be drawn after this brief focus on the use of vertical integration by the major frame manufacturing companies is that not all market leaders have implemented the same verticalization strategy. For example, Luxottica and De Rigo are integrated, as well as in the production and wholesale distribution also in retail, unlike Safilo and Marcolin, which instead are present only in wholesale distribution. Marcolin and Safilo, as we have said, are also less integrated, considering that they purchase some components from external producers. Marchon, on the other hand, is a special case due to the fact that it belongs to a well-rounded group in the optics industry that offers insurance products, software, lenses and frames, somehow escaping from the perimeter of eyewear alone.

4.9 PERSOL 2.0: A WHEN VERTICAL INTEGRATION HELPS INNOVATION

In the previous chapters we have analyzed the impact of vertical integration on innovation and how there is a relationship between them. In fact, let's remember how there is a possibility of innovating between different phases of the production chain and how there is usually the need to acquire in the market the technology knowledge possessed by the other phase that the company does not carry out.

By integrating vertically, we can have the chance to eliminate costs, asymmetries and possible opportunism by placing the different phases and the knowledge under the same property.

Consequently, by doing so, a company that performs all the production phases will be more able to introduce new production technologies or new products quickly and efficiently according to future expectations. Exactly taking up these concepts, Luxottica has seized the possibility of internalising the production of specific components, thus allowing an innovation process of the same. Thanks to continuous product improvement projects, Luxottica is succeeding, year after year, in progressively reducing its product costs thus increasing profits from sales.

Simply by comparing the data between 2017 and 2018, this result is visible in the table below.

2017							
Collection Mix	Sales	Avg Price	Frames	Lens	Packaging	Avg STD Full Cost	Margin %
Sun	562.922	394,59	139,50	26,94	9,59	176,03	55,4%
Optical	242.936	293,20	124,44	0,31	9,42	134,16	54,2%
Clip On	3.498	160,22	41,08	14,98	3,02	59,09	63,1%
Total	809.356	363,15	134,55	18,88	9,50	162,94	55,1%

2018							
Collection Mix	Sales	Avg Price	Frames	Lens	Packaging	Avg STD Full Cost	Margin %
Sun	503.262	397,88	139,63	25,54	8,54	173,71	56,3%
Optical	228.851	307,96	126,58	0,31	8,19	135,08	56,1%
Clip On	1.740	160,66	43,10	15,46	2,85	61,41	61,8%
Total	733.853	369,28	135,34	17,65	8,41	161,40	56,3%

Figure 13. Comparison between 2017 and 2018: sales prices, production costs and margin

Taking a cue from these concepts, we analyze the project *Persol 2.0*: it is a product improvement project adopted on one of the most expensive brands in the group's production.

4.9.1 BRAND HISTORY

Persol eyewear has crossed decades and generations and has established itself as an accessory of style and elegance, combining the most aesthetic part of the product with careful and constant technological and design research.

The story of these small masterpieces of optical design, initially conceived for sportsmen and aviators, starts from Turin in 1917. In that year Giuseppe Ratti, owner of Berry optics, decides to start production. The first model, the "Protector", characterized by rounded smoked lenses and a comfortable rubber frame, will soon be adopted by the Italian Air Force and shortly thereafter by the US, bringing the Turin production to be one of the most widespread and appreciated in the world.

The subsequent evolution of the Protector model, guided by intuition and the determination to create a truly revolutionary pair of sunglasses in terms of quality and fit, led to the creation of the Persol brand (i.e. "for the sun" in order to emphasize the protective function of the sunrays).



Figure 14. Persol logo

Another historic turning point for the brand was in '57, when the 649 model was born, made for the Turin tram drivers who needed ample glasses to protect themselves from air and dust. The originality of its design leads him to be a very successful eyewear, imitated over the years by numerous competitors, to become a legend in 1961 when Marcello Mastroianni wears it in the film "*Divorzio all'italiana*".

In the 1960s the deep bond between Persol and the cinema began, which continues today. The brand's glasses were the protagonists of some of the most representative films of Italian cinema and was chosen by great actors and directors who wear them on the set and in private life.

Over the years, this exclusive relationship has resulted in prestigious collaborations with the Venice International Film Festival, the San Sebastián International Film Festival, the Taormina Silver Ribbons and many others.

In the 1980s Persol continues its vocation for research and technological development by creating increasingly innovative glasses. Participation in mountaineering expeditions, motor racing in the desert such as the Paris-Dakar and other events in extreme environmental conditions make it possible to check the performance of lenses and glasses and experiment with the use of new materials.

In 1995, Persol is acquired by Luxottica. Luxottica invests and enhances this extraordinary heritage, transforming Persol into one of the most important brands in the world of eyewear in respect of its roots: it will continue to produce Persol glasses in the historic Lauriano factory (near Turin) where they are still made with the same care and attention as always.

4.9.2 VERTICAL INTEGRATION AND COST ANALYSIS

After this brief introduction to the history of the brand, let's now proceed with a detailed analysis of the costs related to Persol eyewear. However, we must clarify one thing: in order to protect the business secret, all the data relating to the costs that will be analyzed (even those previously exposed) will be multiplied by a fictitious multiplier. Thanks to this, the coherence and the real proportion between the various data presented will be maintained.

The table below shows the standard costs faced by Luxottica, detailed by brand.

As can be seen, the Persol variable direct costs are significantly higher than the Italian average (162,63 €/pcs versus 123,84 €/pcs). However, the incidence of overhead costs is in line with the group average (32% versus 33%).

Consequently, this makes it clear to us that it is fundamental to act principally on the first.

Brand	Avg FC	Dir Var	OVH tot	
	€/pcs	€/pcs	€/pcs	% on FC
Alain Mikli	177,43	117,30	60,14	34%
Arnette	45,68	28,86	16,82	37%
Armani	119,00	77,39	41,61	35%
Burberry	121,98	82,08	39,90	33%
Chanel	164,51	112,17	52,34	32%
Bulgari	162,63	113,35	49,28	32%
Dolce&Gabbana	116,64	78,10	38,54	30%
Miu Miu	149,71	101,09	48,62	33%
Oliver Peoples	136,61	93,34	43,27	32%
Persol	162,63	110,64	51,99	32%
Prada	118,92	75,95	43,01	36%
Ray-Ban	64,52	43,67	20,85	32%
Ralph Lauren	90,36	59,74	30,62	34%
Sferoflex	76,47	51,07	25,40	33%
Starck Eyes	156,45	110,90	45,55	29%
Tiffany & Co.	143,36	96,93	46,43	32%
Valentino	149,88	101,84	48,05	32%
Versace	121,72	79,06	42,66	35%
Vogue-Eyewear	74,50	45,25	29,26	39%
Totale	123,84	83,09	40,75	33%

Figure 15. Luxottica's standard costs detailed by brand

To do this, four different actions have been undertaken, some interconnected with each other. Three of these are based on the introduction of automation within the process, while the remainder is based on an internalization of components previously produced by third parties. All have brought significant savings to the direct costs of the production of finished glasses, but only two are generated by a vertical integration action.

In this paper we will focus only on these two.

Before going to expose them, it is necessary to go briefly to see the work phases that are involved, so as to have a basic knowledge of the workings.

Hinging: after milling the front - the pantographs begin to give shape to the front of the glasses - the next step is the insertion of the hinge, the metal component that allows the assembly of the front of the glasses with the eyeglass temple. This activity is performed thanks to the pre-heating of the interested part through an electrode and the subsequent insertion of the metal hinge,

In the figure below, the parts circled in red indicate the position of the hinge.

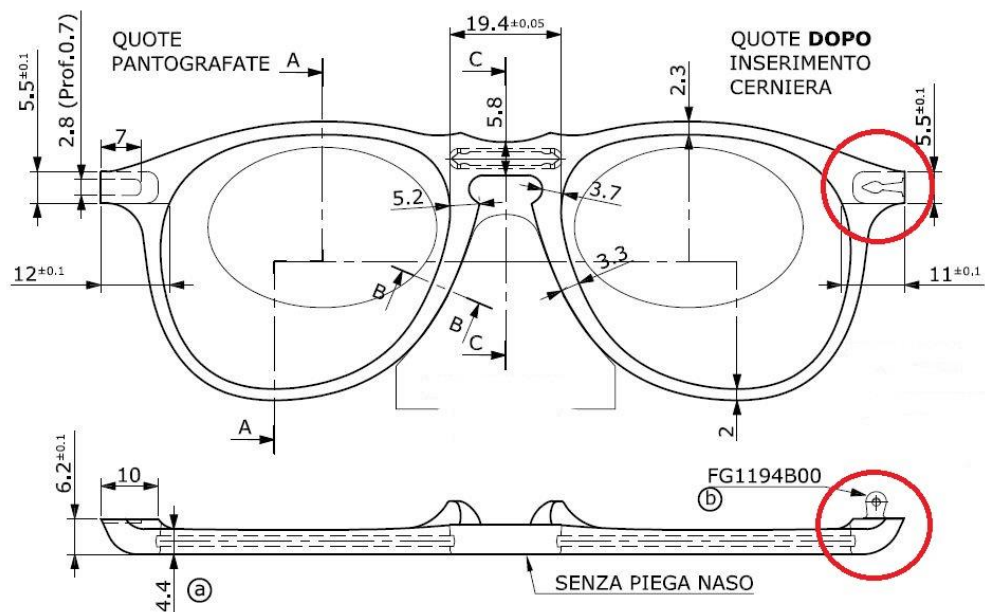


Figure 16. Technical drawing of the eyewear front

Temple core-shooting: after the cutting of the plastic strip, thanks to this process, what is called *core* is inserted into the temple.

This happens thanks to the pre-heating of the strip through an electrode and the subsequent insertion of the metal part. We can specify that, for the Persol models, the hinge is an integral part of the metal component that is inserted inside the temple.

In the figure below it is possible to see the various components inserted inside the plastic strip in the phase of temple core-shooting. The subsequent shaping process will then give the shape to the temple, which we see outlined inside the rectangular figure.

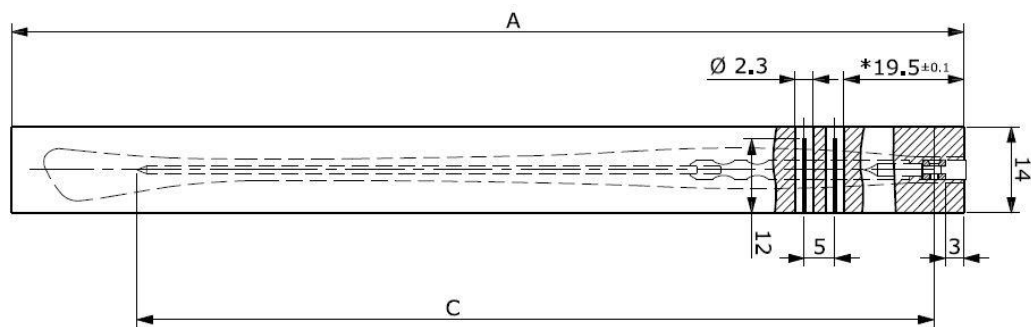
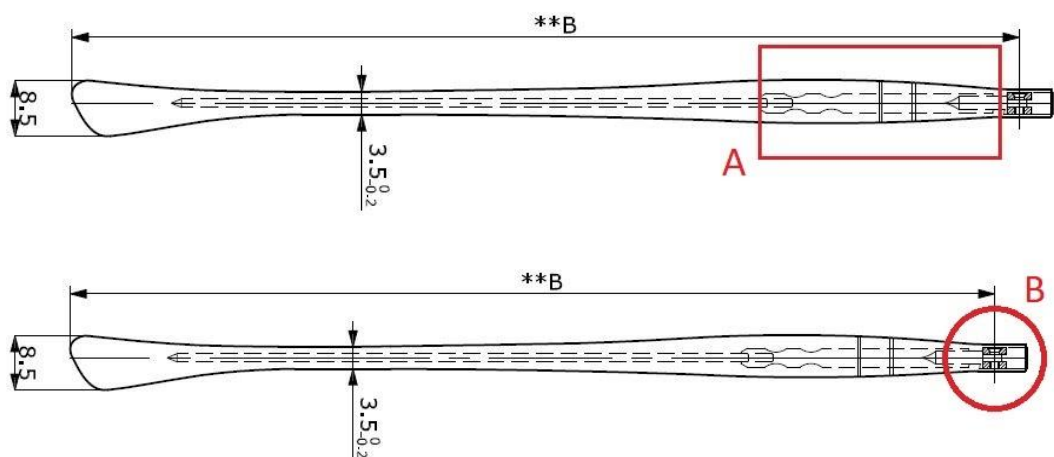


Figure 17. Technical drawing of the raw profile of a temple, with all the details of the components inserted inside

Specifically, the temple core-shooting phase involves the presence of three different metal components: the core itself (indicated with the letter A in the figure below), the hinge (indicated with the letter B) and the stem (indicated with the letter C).



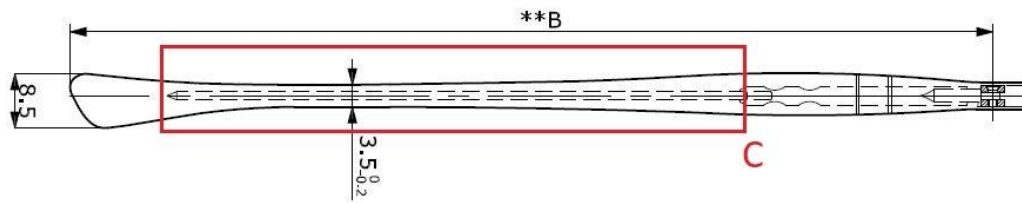


Figure 18. The three different metal components – core, hinge and stem - involved in the temple core-shooting phase

The importance of the distinction of these three components will be seen later.

Galvanic treatment: This is basically a series of operations carried out with aqueous solutions at room temperature or slightly higher, which contain salts of metals, bases, acids and specific additives and which are carried out in tanks aligned in sequence.

Galvanic treatments are electrochemical depositions of a thin layer of a metal or an alloy so that the surface properties of the component are modified, both from a technical and an aesthetic point of view.

Through galvanic treatments, it is possible to improve certain characteristics of the product, such as resistance to corrosion (that produces negative effects both in terms of aesthetics and in terms of function).

This treatment is fundamental for the durability of the famous and iconic *Persol arrow*.



Figure 19. The iconic arrow that characterizes all Persol model

As mentioned previously, the purpose of the Persol 2.0 project is to lead to a reduction in variable direct costs, as well as to general improvements in production flow.

In order to see how this happened, and on which phases of the production cycle had an impact, we will analyze in detail the cost split of a specific model of the Persol line: the 0PO9649S.



Figure 20. Persol sunglasses model 0PO9649S

In the detail of the costs below, we can see a direct variable cost in line with the average of the brand (€ 111,69 versus € 110,64).

In red the materials and workmanships influenced by the vertical integration process are highlighted. We can see that these costs impact 10,60 €/pcs, corresponding to 9,5% of the total.

	Materials	Costs	Labor	Costs	Direct Cost
Front of the glasses	Material	14,94	Phase	43,89	58,82
	Acetate (17,54 €/kg)	9,33	Cutting and shimming	0,83	
	Lamellae VFX	1,49	Cutting and welding of VFX dowel	3,24	
	Hinge	3,94	Cutting and gluing of fins	0,57	
	Capsules	0,04	Pantograph	3,24	
	Screws	0,13	Hinge insertion	4,16	
			Sanding of the front	0,96	
			Tumbling and washing	1,45	
			Front and temple butting	1,49	
			Screwing	0,79	
			Front and temple junction	11,39	
			Galvanic treatment	1,31	
			Frame testing	2,89	
			Logo hot stamping	2,72	
			Temple stamping	1,10	
			Lens mounting and recording	5,65	
			Final check	2,10	
Temple	Material	7,577	Phase	9,899	17,48
	Acetate (17,54 €/kg)	3,29	cutting and shimming	0,31	
	Core	2,72	Drilling and cylinder insertion	0,74	
	Cylinders	0,74	Manual temple core-shooting	2,63	
	Stem	0,83	Forming	0,48	
			Combing and roughing	1,14	
			Sanding	1,23	
			Shimming	1,27	
			Temple bending	0,57	
			Tumbling and washing	1,53	
Lenses (buy)	Material	26,72	Phase	0	26,72
Packaging	Material	7,709	Phase	0,964	8,67
Total	Material	56,94	Phases	54,75	111,69

Figure 21. Costs detail of the OP09649S model

The components in question are the hinge of the front and the core of the temple, with respective management codes *1FG1194B00* and *1AN1399C00*.

Of these two components we had anticipation in the previous part, with the specification of which are the processes that are involved. The two components mentioned were produced by the *Visottica* supplier, one of the Luxottica group's historic subcontractors. These and other metal components necessary for the production of Persol glasses are supplied by the company, but it was decided on *1FG1194B000* and *1AN1399C00* to carry out an insourcing process. This has been seen as a possibility of technological and qualitative improvement, in a general perspective of vertical integration. Hinge and core are now produced in Tristar, the Luxottica group plant located in China.

Thanks to the insourcing process of two components previously produced at an external supplier, it was possible to reduce the costs mentioned above by over 50%.

In addition to this, thanks to a technological upgrade, a decrease in human contribution and a decrease in lead time of the finished product was produced.

We will now proceed by explaining what this insourcing process actually is, which has led to an increase in the degree of vertical integration.

The two components previously produced by Visottica consisted of Alpaca material: it is a family of copper-zinc-nickel alloys, with 50-60% copper, 15-30% zinc and 10-30% nickel, having good mechanical and corrosion resistance characteristics. The presence of nickel improves these characteristics and gives the alloy an appearance very similar to that of silver. Once used for the production of cutlery, it is today appreciated in the construction of small mechanical parts. Galvanized alpaca is also known as Chinese silver.

It is precisely the phrase above the crucial point of the improvement in production: the Alpaca has a fair resistance to corrosion, but in the case of the production of luxury eyewear, it needs a further galvanizing intervention in order to last over time.

This was the reason why, once the internalization of the component was decided, the production material and technique were changed, facilitating the reduction of direct production costs.

The technology used, called *MIM*, will now be shown below.

Metal Injection Molding (MIM) is a well-defined, unique and superior process, able to offer components of complex geometry with high tolerance classes at low production costs. MIM uses selected metal powders mixed with polymer binders to form a single dough called feedstock.

The feedstock is injected into a mold in order to obtain the desired shape and subsequently after a polymer separation treatment from the metal (debinding); the sintering in a controlled atmosphere takes place at a temperature lower than the melting temperature.

After sintering the obtained density will guarantee equivalent mechanical characteristics of particular printed precision casting.

High precision is thus obtained, eliminating subsequent mechanical processing and complicated geometries such as threads, inscriptions, helical profiles, undercuts, etc.

Stainless steel is certainly the metal that is used the most, and also that used for the production of hinges and cores in Tristar.

The reason for this popularity is due to its excellent resistance to corrosion, high ductility, high toughness and impact resistance (even at low temperatures) and excellent weldability. These properties derive from the particular chemical composition of the steel, characterized by a chromium content of about 16-19%, which allows the formation of a thin passive surface film that protects the rest of the material from corrosion.

Consequently, it is clear that the galvanic treatment previously performed on metal components is no longer necessary at this point. In fact, this is the first advantage of the insourcing process carried out on these components: excluding nickel plating there are advantages in terms of costs and reduction of productive lead time.

The quantitative details at the level of cost reduction will be exposed shortly, not before having exposed the last advantage following the insourcing process.

As previously mentioned, the MIN production method is able to offer components of complex geometry with high tolerance classes at low production costs.

In fact, the reduction of production costs is certainly an additional advantage present, but it is not the last: the possibility of creating components with high geometric complexity with a high degree of precision has allowed the realization of the component 1AN1399C00 with core and stem integrated between them.

In fact, previously the core and the stem were supplied separately from Visottica, and only subsequently assembled manually.

In the figures below you can see the difference between the Visottica core (the first one) and the Tristar one (the second one) with integrated stem.

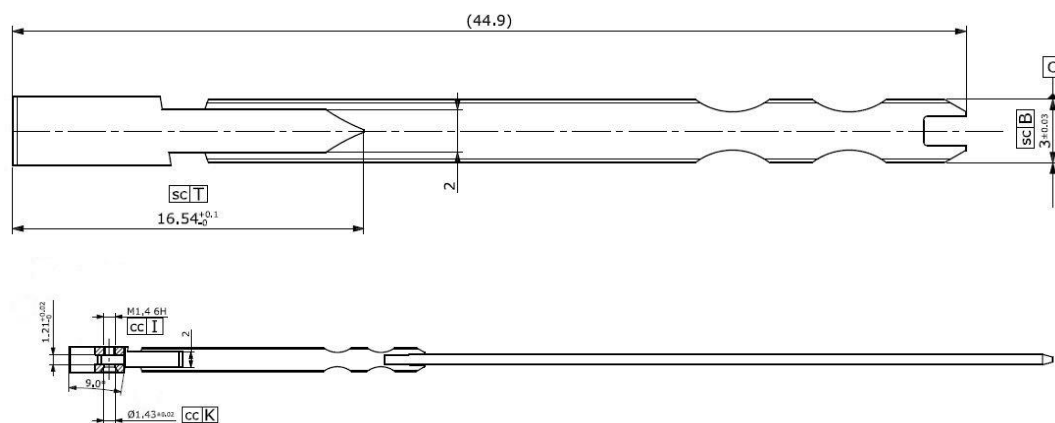


Figure 22. The Visottica core (the first image) and the Tristar one (the second image). We can note how in the component produced by Tristar the core and the stem are integrated

This fact has a further positive aspect: in fact, being previously a core and stem separated from each other, the processing was performed on manual temple core-shooting machines.

This was necessary because the assembly was performed manually by the operator, who subsequently positioned the components inside the

core loader. Since there is a need for this manual processing and being able to place only one component at a time inside the machine loader, the operator-machine ratio was necessarily 1:1.

Instead, with the introduction of the new component it is possible to change to a more automated type of machine. In fact, the one currently used is a fully automatic machine, equipped with feeders for the temple and for the core.

The core loading unit consists of an anthropomorphic robot which, by means of pneumatic grippers, picks up the previously selected core from the relative group and inserts them in the special roller guide. Particular advantages are the simplicity and speed of changing the model in this machine, thus allowing it to be used more flexibly, even for small batches.

This obviously translates into a clearly lower man-machine ratio of 1:3, with a consequent saving in labour force.

In the figure below this type of machine is represented.



Figure 23. Automatic temple core-shooting machines

Going now to recapitulate all the present advantages deriving from this decision of insourcing, with consequent internal development of the product.

1. Production material variation from alpacca to stainless steel: the following modification allowed the elimination of the galvanic phase, having the new material greater corrosion resistance and durability. Consequently, it was allowed to annul the cost and the time of the work involved.
2. Transfer to the MIN production technique: this change has allowed the reduction of the production cost of the components, being this a process with lower economic impact.
3. Transition from manual to automatic processing: the integration between stem and core has allowed the use of an automation that has considerably reduced the workforce contribution, causing a reduction in the cost of the same.

The three advantages shown above are valued in terms of cost reduction in the table below.

Visottica make		Costs	Luxottica make		Costs	Saving
Hinge	3,94		Hinge	2,19		1,75
Core	2,72		Core	1,53		1,18
Galvanic treatment	1,31		Galvanic treatment	0,00		1,31
Manual temple core-shooting	2,63		Automatic temple core-shooting	1,01		1,62
Total Cost	10,6		Total Cost	4,73		5,87

Figure 24. Cost reduction of the processes involved in the insourcing process

As can be easily seen, the choice of vertical integration in this specific case has caused a 55,4% reduction (final cost of € 4,73 with an initial cost of € 10,60) in the processing/materials taken into consideration.

Obviously, in relation to the decision to internalize the production of a component, there is also the big advantage of reducing transaction costs and react promptly to the sudden change in volumes required to satisfy market demand, as seen in the dedicated paragraph.

Considering the difficult evaluation of the impact of these costs in the present context, they will not be analyzed in detail. However, there is no doubt that the decision in view of a vertical integration has taken into consideration numerous advantages also in relation to transaction costs.

Taking a further step, wishing to estimate a weekly output of all Persol models interested in this modification of the components, we could evaluate the annual saving deriving from the internalisation of the hinge and core production:

- A. Assuming a constant market trend compared to the current one on the six models affected by the change, we can estimate a production of 5,000 pcs/week
- B. We can consider an average of 47 working weeks within the year
- C. The saving is the one calculated above, i.e. 5,87 €/pcs

The annual saving consequent to the insourcing process of this components could be:

$$5.000 \text{ pcs/week} \times 47 \text{ week} \times 5,87 \text{ €/pcs} \approx \textbf{1.379.450 €/year}$$

Taking up again the thought of Del Vecchio:

“We have found that this internalization has produced results that exceeded expectations, because many process innovations were created inside. Thus, an improvement in quality and organization was achieved at the same time. [...] the subcontractor is not stimulated to improve the quality of the pieces and, moreover, never seeks innovation. [...] inside you are forced to improve. We realized that we had done some extraordinary changes inside and we concluded that external work blocks innovation. At this point we have gradually brought the most important operations inside.”

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