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Company valuation process and techniques in an M&A deal: Prysmian acquiring General Cable

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Introduction

Understanding the value of something that we are planning to buy is usual in our everyday life. Deciding which computer, smartphone, car or house is better in terms of value is pivotal in purchasing habits, indeed preference for one item over others is due to the imaginary rank value that everyone builds in his mind (Lebreton, Jorge, Michel, Thirion, & Pessiglione, 2009). Therefore, the valuation process begun by humans, when they are in front of choices, is natural and governed by the brain, which encodes the values underlying revealed preferences: choosing option A over option B means that the value addressed to A is higher than the value of B (Lebreton, Jorge, Michel, Thirion, & Pessiglione, 2009).

The described natural valuation process is what leads also analysts trying to address a value to a company: is it better to acquire shares of company A or B? Is it better to acquire, or being acquired, by company C or D? Which firm has the greatest value? Even in these more complex decisions, the final choice is made on the base of an estimation of value.

Firm valuation is something more challenging than the daily life purchase choices, anyway the background needed information are the same: measurable characteristics, a method for value estimation and comparability with other options. These elements were part of what I learned in my Master's Degree during the Financial Reporting and Performance Measurement course: enterprise valuation has its bedrock in financial documents which provide the analyst with the measurable and comparable accounting data. In addition, the analyst needs to use a valuation technique which is able to summarise financial information in one single value. This is where the interesting part come from, each company has one single version of performance data in its annual reports, but anyway, the corresponding enterprise value can be different on the base of the valuation method used.

I decided to understand better these differences and therefore to base my master thesis on the analysis of valuation methods. Anyway, this would have been a very broad analysis and further point of interests were needed to formulate an appropriate research question: Merger and Acquisition has been the answer. Enterprise valuation is always performed when a company decides to acquire another one, because, as previously stated, even this acquisition choice is made on the base of value estimation.

Companies willing to expand and grow can decide to act internally or externally, exploiting internal resources or draw them from outside. One of the external growth strategies is the M&A in which a company decides to take over another firm on the base of an acquisition price, determined through a value estimation process.

With this in mind, I decided to combine the two elements in one single argument: the estimation of company value in M&A transactions through different valuation methods. Precisely, this master thesis is going to analyse these arguments aiming at answering to the following research question:

"In the specific context of M&A deals, which are the most representative and effective valuation methods in the estimation of share prices?"

To this purpose I selected one M&A transaction already concluded and I used the actual share price payed in the acquisition as a reference point. I performed the enterprise valuation exercise with different valuation techniques, comparing the results with the reference point, in order to understand which result would have been nearer to the actual price.

More precisely, the selected M&A is the acquisition of General Cable by Prysmian, which represents one of the biggest transactions in the history of Wire and Cable industry. It has been awarded as the best deal "Italy-to-Foreign countries" by KPMG Advisory S.p.A. (KPMG Advisory S.p.A., 2019) in the M&A Award, as it resulted in a overall price of approximately $ 3 billion ($ 30 per share), building a group made of 31.000 employees spread out in 50 different countries.

Master thesis's structure

In order to have the best knowledge possible to answer to the abovementioned research question, this writing is divided in the following parts:

- In the first chapter there will be a theoretical analysis of M&A deals and of business valuation process.
- In the second chapter the presentation of Italian and foreign valuation techniques will build the bedrocks to the selection of the best fitting methods used later in the valuation exercise.
- In the third chapter the analysis will shift to the Wire&Cable industry and to the two protagonists of the chosen transaction, General Cable and Prysmian, as well as to the financial characteristics of their M&A.
- The fourth chapter will be entirely devoted to the showing of the valuation exercise performed through Excel spread-shits. Starting from General Cable past data, the chapter will lead the reader to the estimation of three different share prices obtained through different techniques.
- Finally, the fifth chapter will present the comparison between the results, showing which valuation method will result to be more effective than the others.

Chapter 1: M&A and business valuation, literature review

The aim of this chapter is to present and analyze what was said by previous authors regarding the process of merger and acquisitions (M&A) and the business valuation practices. Indeed, the chapter will start with an introduction of the practices of M&A and then, of the business valuation process and techniques. In conclusion, the attention will be shifted on some particular themes related to the business valuation, which are discussed in some academic articles and that could be of particular interest.

1.1 Merger and Acquisition: definition and characteristics

When a CEO wants to increase corporate performance and to give birth to a long-term growth path, the most effective and rapid way is to take-over other smaller or weaker companies. That's why on average every year companies spend more than 2$ trillion on Mergers and Acquisitions (M&A) (Christensen, Alton, & Waldeck, 2011).

Even though these two terms are often use together and interchangeably, they mean two different things:

- *The Merger*: it is the transfer of both assets and liabilities from one or more companies to another. Thus, one or more firms can merge with another existing one (through a process called "absorption"), or they can merge forming a new company (through "consolidation"). The common element is that the acquiring company takes over the ownership of the others and combines their operations all together (Aluko & Amidu, 2005).

- *The Acquisition*: this can be described as an act of acquiring complete and effective control by one company over assets or ownership and management of another company without any combination of the two firms, which remains independent. In fact, they maintain their legal entity but there may be a change in their control. The term acquisition is used interchangeably with the term "take-over", but both are differentiated from merger (Aluko & Amidu, 2005).

Having explained the difference between the two practices, it's now important to explain the different types of M&A that are commonly made by companies. In fact, there are three main forms of business combination (Brealey, Myers, Allen, & Sandri, 2015):

a. *Vertical integration*: the two businesses are in the same industry but at different levels of the value chain, therefore one is, for example, producer and the other a distributor. In order to

gain more control on the entire process, the producer can merge or acquire firms that are after or before itself.

b. *Horizontal integration*: two or more companies in the same level of production, distribution or area of business and that decide to join their forces to gain more power.

c. *Conglomerate integration*: these are the strangest combinations because the business combination is done between two or more firms which operate in completely different business that are unrelated or indirectly related.

Whatever is the type of M&A, they are all made in order to have a better use of resources, increasing profitability in wealthy companies or saving operations in problematic firms. Moreover, companies are using more and more M&A deals for faster growth and aggressive expansion as an alternative to internal and organic growth (Nachescu, 2010).

"*Any company may be compared with a live organism which is born, it fights for its survival, it grows and reaches maturity only to die at some point, either due to natural causes or as a result of being swallowed by a predator*" (Nachescu, 2010). In this view, the M&A is the mean by which the "predator" is able to reach is goal and absorb a smaller or weaker company, with the transfer of assets from one firm to the other.

Anyway, this process is not casual, and history showed that M&A happened in waves, when some particular conditions in the market pushed companies, for several reasons, to cooperate together or to increase their scope through take-over (Nachescu, 2010). As an example, during a recession phase, a natural step in each economic cycle, large companies, which are not significantly affected by the crisis, may think to acquire other companies afflicted by economic difficulties. The prices are lower and the need for help is higher, in these conditions big firms are incentivized to enlarge their scope through M&A. Even when the capital markets are wealthy, the economic environment is more stable and prosperous, thus it will be easier for companies to find suitable partners (Nachescu, 2010).

Nowadays, globalization and changes in international economic and regulatory environments increase the overall competitiveness, economic growth and the presence of always higher numbers of countries, which become emerging markets and augment competitive pressure (Caiazza & Volpe, 2015). In this complicated environment many companies understood that they need to internationalize and combine their forces with others in other to maintain the competitive edge. This is why, in this particular phase of economic cycles, M&A are increasing, they are an important alternative to respond quickly to challenges in the fast-changing environment (Caiazza & Volpe, 2015).

Until 2000 USA and Europe were the dominators in these integrations, but since 2010 emerging countries have played an important role both in an active and passive way. China, India and Southeast

Asia represent a way to enter in new markets and new customers, but at the same time some of their companies are becoming so strong to be able to take-over some of the western firms.

These new global flows of M&A investments pose new challenges in terms of compliance with new and different rules, adaptation to new cultures, values, religions and behaviors requiring more attention in the selection of the partner and in the implementation phase. In fact, there are some factors affecting M&A decisions: macroeconomic trends, structural cross-national differences in terms of capital and labor, resources, culture, legal systems and accounting rules, such as investment rules and antitrust, culture and values (Caiazza & Volpe, 2015).

Notwithstanding these complicate issues, cross-border M&A, according to the resource-based view, "*are realized to use existing resources to achieve a competitive advantage in the destination market or to obtain new resources imperfectly mobile across countries to reinforce firm competitiveness in the home country*" (Caiazza & Volpe, 2015).

Taking into account all these positive and negative factors, companies must select their best partner and start to negotiate the condition for an optimal agreement for both parties. The aim is of course to make a deal that will satisfy both firms, but the processes to arrive to this final goal can be different, long and tortuous, with various and interconnected steps.

In general, the two more used and frequent M&A processes are the *auction* and the *typical negotiation* (Marquardt & Zur, 2015):

- *The auction*: the typical process is started by the future acquired company, which select a certain number of possible bidders among competitors, suppliers, customers, and acquisition-oriented conglomerates. These firms receive a set of documents with initial information about the target company and the auction, then, in turn of a confidentiality agreement, deeper information are distributed. After this first phase, interested companies submit an initial non-binding "indication of interest" (Marquardt & Zur, 2015) in order to be invited to the next step in which more important and crucial information are given, even if these are accurately selected by the target company in order to reveal information that might threaten relationships with partners, suppliers or employees.

  At this point the bidders present their sealed bid and the winning one is chosen. Therefore, the winning and the target companies execute and sign the merger agreement, with all the details of the deal and the MAE clauses (material adverse effect) (Marquardt & Zur, 2015), that allow to both parties to terminate the process before the actual closing. At this time, the merger is announced and following, through a series of additional due diligence processes, the deal is completed.

- *The typical Negotiation*: on the other hand, a negotiated M&A is started by a bidder, interested in taking-over another company. Thus, an informal meeting between the two firms is the starting point in which they agree to explore the possibility of the business combination and to sign a confidentiality agreement. Indeed, in this phase a long process of due diligence is carried on, studying and analyzing a series of crucial information and data. The bidder then prepares a letter of intent in which are stated all the key elements of interest and the main characteristics of the transaction. Moreover, the bidder might require a "no shop" agreement
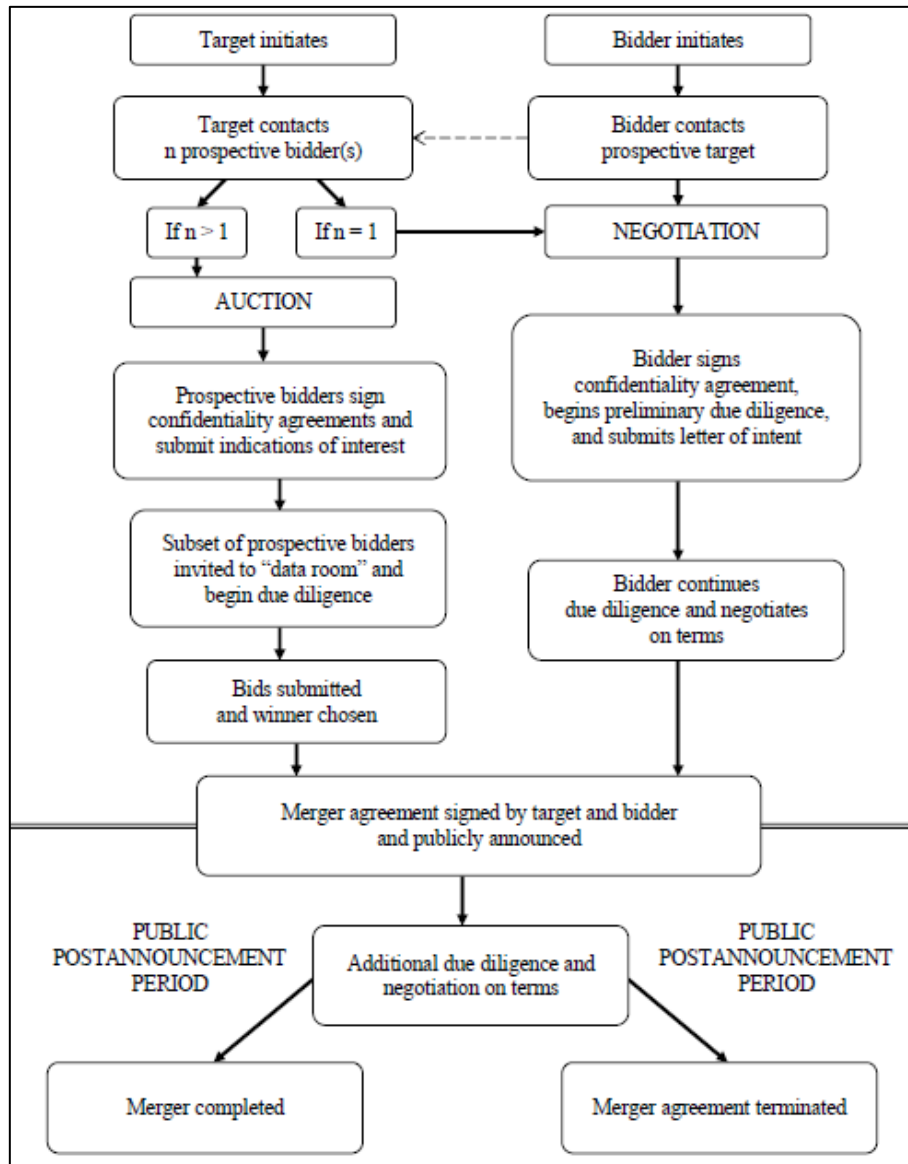
Figure 1: Auction and Negotiation Processes. Source: Marquardt & Zur, The role of accounting quality in the M&A market (2015).

with the target company to prohibit it from negotiating with other parties (Marquardt & Zur, 2015). After the due diligence period, the terms of the final merger agreement are defined such as the price, warranties, MAEs, fees, obligations and so on. In conclusion, when the deal is approved by both companies' board, the deal is publicly announced.

In Figure 1 there is a scheme of the two M&A processes, underlying the fact that normally the auction is initiated by the target company, but sometimes it might be started indirectly by the bidder when, for example, the target firm decide to contact other possible bidders (Marquardt & Zur, 2015). In conclusion, both the two processes terminate with the sign and public announcement.

Now the question is, why these firms should combine their forces through an M&A? Different are the motives why companies should start an M&A, but it is all based on the general idea that *the two firms worth more together than alone* (Brealey, Myers, Allen, & Sandri, 2015). In fact, as Brealey et al. explain in their book (2015), there are several motivations bringing added value and that can justify an M&A:

I.   *Economies of scale*: these are the main objective of horizontal, and sometimes conglomerate, combination. The effect is the reduction of costs resulted from the sharing of central services in terms of general administration, financial control but most of all production facilities and machines.

II. *Economies of vertical integration*: of course, these are achievable only through the vertical M&A and have as goal the creation of higher coordination and management of activities along the whole value chain, from raw materials to distribution to final customers.

III. *Combination of complementary resources*: there are a lot of small enterprises with exclusive products or business models which are acquired by bigger companies that are able to give the missing ingredients to gain the success, like financial or organizational capabilities. In this case, the two firms obtain something that they both didn't have before increasing their value in a cheaper way than the internal development of the same capabilities.

IV. *Excess of funds*: this is the case of a big company acting in a mature industry and that is generating positive liquidity without investments possibilities. The solutions are to distribute it to the shareholders, start to purchase own stocks or acquire other companies as a way to redistribution of their capital.

V.   *Inefficiencies elimination*: here we are dealing with companies with unexploited opportunities, possibilities to cut costs or earnings to improve. These firms are the natural objective for M&A propositions by companies with a better management that has the strategy to improve operations and results.

VI. *Consolidation of sectors*: there are some sectors which have a huge number of companies and that, at the same time, is mature, resulting in low revenues for everyone. Usually in such conditions a number of M&A starts, bringing firms to reduce overcrowding in the market and gain new capital sources for new investments.

Moreover, Aluko and Amidu (2005) in their article add two more motivations to the M&A process which are *diversification* and *growth possibilities*. The former is strictly related to conglomerate integration because firms acquiring businesses in unrelated markets are able to diversify their risk and so reducing it. The latter, instead, deals with the possibility to find new ways of growth by expanding its existing market or entering in new ones through the combination with other companies.

As it is possible to understand by the motivations abovementioned, the M&A are made to add value to all companies involved in the process, in fact, as said before, the firms have to worth more together than alone to justify the integration processes. Business combinations add value to the new entities more than physical and financial asset previously owned by the separate entities. Therefore, in order to understand the possible benefits, it is important to understand and evaluate the possible sources added value. This leads to the strategic importance of *valuation* in business investment decisions, like merger and acquisition (Aluko & Amidu, 2005). In this environment becomes of pivotal importance the figure of the professional valuer, which cannot be just an accountant, but an interpreter of financial and physical information, analyzing both the market and nature of the business under consideration in the M&A (Aluko & Amidu, 2005).

When trying to understand the relevance of a business combination Brealey et al. (2015) explain that the first thing to understand is if there is an *economic benefit* arising from the M&A, which can be investigated with the next formula:

$$\text{Economic benefit} = PV_{AB} - (PV_A + PV_B)$$

If the result is positive there is a justification to the integration process, even if, at this point, it is important to take into consideration the cost of combination too. In fact, in a M&A the acquiring company has to pay the price of acquisition in two ways: payment in cash (the simplest and most used way) or exchange of stocks. In the case of cash payments, the acquisition cost is equal to the price payed minus the present value of the acquired company (Brealey, Myers, Allen, & Sandri, 2015):

$$\text{Acquisition cost} = \text{Cash payment} - PV_B$$

As a consequence, the final net present value for the acquiring company, related to the M&A, is:

$$NPV = \text{economic benefit} - \text{acquisition cost} = PV_{AB} - (PV_A + PV_B) - (\text{Cash payment} - PV_B)$$

If the final NPV is positive, as for every investment decision, the M&A will be convenient, and the acquiring company should take-over the other firm (Berk & DeMarzo, 2017).

As it is possible to see from the several formulas, the recurring element is the PV that is the present value of future cash flows that are generated by the different companies: PV_{AB} is, for example, the present value of all future cash flows arising from the combined operations of firm A and B, while PV_A and PV_B are the actualized values of cash flows granted by the two companies divided and alone. Considering these factors, it's easy to understand, again, how much it is important the understanding of firms' value through the use of the numerous techniques of business valuation.

These valuation methods highly rely on accounting documents such as the balance sheet and the income statement. In fact, all the values needed to compute the business value are the result of operations and management of several data taken from accounting papers. That's why Marquardt and Zur (2015) highlighted the importance of accounting quality in M&A processes. In particular, they found that accounting quality is related to the choice of sales method, the length of the process and the decision to complete or terminate the proposed deal.

Considering the sales method choice, accounting quality will be determinant because the more uncertain the true value of assets will be and the more likely the M&A will be decided thruough auction, because the uncertainty increases the expected value of winning the bid (Marquardt & Zur, 2015).

Moreover, the quality of accounting information will reduce the time needed to the conclusion of the deal, in fact the due diligence phases will be faster and more precise.

In conclusion, the likelihood that the M&A deal will be completed was found to be higher in case of higher accounting quality, because it would be less likely that new information about true values of the target firm will come up between the announcement and completion dates (Marquardt & Zur, 2015).

1.2   What is Business Valuation, and which are the main methods

"Business valuation is the task of forecasting the present value of the stream of expected payoffs" (Lee, 1999). In his article Lee (1999) outlines the main concepts related to the business valuation, highlighting the use of accounting information to estimate shareholder value. In his view the main characteristics of the valuation process are (Lee, 1999):

1. *Valuation is prospective*: This means that the process is based on the estimation of the present value of expected payoffs arising from the business. Of course, future will be always uncertain and thus the discounting subjective and imprecise. Therefore, several and better methods may reduce the degree of imprecision, but any valuation technique will deliver a single correct measure. That's why business valuation is as much art as it is science (Lee, 1999).

2. *Valuation is interdisciplinary*: In firm valuation every reported accounting number will be useful but not alone. Every other information regarding the market, the business, the past, the present and the future will always be joined together to give a more comprehensive view of the whole picture. In fact, valuation involves skills belonging to accounting, finance, economics, marketing and corporate strategy.

3. *Accounting systems are crucial to valuation*: In fact, accounting systems have three fundamental roles in firm valuation. First of all, they give a language for forecasting, in other words, they give some measures, like revenues and earnings values, that are at the base of analysts' forecasts. Secondly, accounting systems are source of information related to the company that are helpful to forecast future payoffs to shareholders. Thirdly, accounting systems are also useful as "ex-post settling-up methods", in fact forecasts will be compared with actual results obtained in future, ensuring system's integrity and well-functioning.

4. *Valuation models are the direction to be followed*: The techniques used to valuate a business are really helpful for analysts because they specify what is to be forecasted and directs the analysis to the information really needed and finally helps to understand how to convert a stream of future cash flows into a present value.

After presenting these pivotal characteristics, Lee (1999) also defines the business valuation as the *Fundamental Analysis*, that is the art of using present and past information, like historical financial statements, to make the most correct forecasts. This activity is not only related to financial values and their relation to the future, but it includes information from outside the firm like industry performance and benchmark, macroeconomic values and market competitive trends that can give help in the definition of future expected results.

Another point of view on this theme is given by Steiger (2008) which defines the goal business valuation as "*give owners, potential buyers and other interested stakeholders an approximate value of what a company is worth*" (Steiger, 2008). Furthermore, given that companies are normally financed by equity and debt, valuation methods can focus on one or on the other source of capital. Techniques that rely on valuing the equity will give as a result the equity value, while on the other hand, techniques that rely on liabilities will result in enterprise or firm value. Anyway, it will always possible to go from one value to the other using the following formula:

Enterprise value – Net Debt – Corporate Adjustments = Equity value

Considering again another idea from another author, "*business valuation requires a working knowledge of a variety of factors, and professional judgment and experience. This includes recognizing the purpose of the valuation, the value drivers impacting the subject company, and an understanding of industry, competitive and economic factors, as well as the selection and application of the appropriate valuation approach(es) and method(s)*" (Barnes, 2017).

This view is similar to the first one, in fact this definition is similar to the interdisciplinarity concept expressed by Lee (1999). Moreover, Barnes (2017) analyses deeper the concepts related to business valuation, in fact, in his article he underlines the purpose of firm valuation which can be for an M&A, litigation, taxation or financial reporting, just to say some. Purpose's selection it's very important to know which method best fit the situation. In fact, while all valuation techniques share some common attributes, there are of course differences that must reflect the single valuation case taken into consideration, because these differences can have significant impact on the final outcome of the valuation.

1.2.1 General presentation of business valuation methods

In the valuation process there are several techniques that can be used, each of them has different characteristics, requirements and application methods. There are several studies which have tried to draw the whole picture of these valuation models, or at least tried to understand which are more effective, precise or better to use. Penman (2001) stated that the Residual Income method is better than the DCF one (Penman S. , 2001), while Copeland et al. (2000) sustained that between these two methods there isn't too much difference and that is better to use them together to have a more precise understanding of the valuation (Copeland, Koller, & Murrin, 2000). In general, the review of several articles on this theme underlines the fact that the Discounted Cash Flow technique (DCF) is the most widely used in practice, but that the Residual Income Valuation (RIV) is gaining always greater

importance and relevance among practitioners. Therefore, the choice of one method against the other is mostly driven by the analysts' instinct and preference.

Furthermore, Palepu et al. (2000) were more impartial in their analysis stating that both RIV and DCF are well applied will lead to the same final valuation, but even them acknowledged that the choice will be driven by some external factors such as, in this case, the ease to collect the needed information (Palepu, Healy, & Bernard, 2000). In summary the three articles abovementioned prefer and present multiperiod valuation models rather than the techniques defined as single-period, such as the comparable or comparatives one. However, the single-period methods are widely employed by practitioners (Barker, 1999), as an example the PE (price earnings) model was found to be of primary importance.

Another interesting study highlighted the important fact that the valuation model is chosen on the base of industry's characteristics, in fact analysts appear to vary their valuation approach with the context that they are facing, but always taking into account their familiarity with the several models (Demirakos, Walker, & Norman, 2004). Furthermore, Demirakos et al. (2004) discovered with their surveys that multiperiod valuation are mostly used in sectors such as electronics and pharmaceutical, while in the beverage one, more stable and with more conventional accounting values, single-period techniques are preferred.

The review of articles just showed that there are several valuation techniques but it's important to organize and try to group them in clusters of models, on the base of shared characteristics, in order to clear minds and have a better understanding for the next chapters. That's why the academic articles' review shifted on this theme, bringing the chapter to a classification of valuation methods.

In general, three different clusters of valuation methods are considered:

1. *Income Approach*: In this cluster all methods are forward-looking, that is they discount in the present the future economic benefits that will come from the company's activities. Measure for income (such as free cash flows or earnings) are projected in the future and then discounted back through a certain rate of return. Common methods are the Discounted Cash Flow (DCF) or the Residual Earnings Valuation (RIV). Their validity relies on the expected economic income in the future and the discount rate used, in fact even small variations in these variables can have a huge impact on the final estimation. Indeed, the weakness of these models is their dependency on forecasts, which are subject to a great deal of subjectivity (in the selection of the future growth rate, as an example) (Barnes, 2017).

2. *The Market Approach*: In this cluster all the valuation methods use measures, such as price-to-earnings or price-to-book ratios, based on companies that are publicly traded to estimate

their value or the value of comparable, not traded, private companies. The relevant information used are generated by market transactions and are considered to benchmark the value of the firm valuated. Three of these methods are the Guideline Transaction Method, the Guideline Company method and the more known Comparable (or Comparatives) method, they use various ratios and financial metrics in order to estimate future values for the subject firms (Barnes, 2017).

The most important characteristic in this cluster is that the comparability between companies considered has to be real and significative. In fact, the identification of guideline companies, the selection of the most appropriate multiples requires a deep understanding of the history, outlook and business of both guideline and target companies (Barnes, 2017).

3. *Asset-Based Approach*: Even the methods in this cluster, like the ones in the market approach, don't take into consideration future earnings and outcomes, but just relies on present data and information. Indeed, here the methods basically try to valuate a company by computing the total value of assets and liabilities to their fair market value (Saastamoinen & Savolainen, 2018). Two techniques are the Adjusted Book Value method and the Asset-Based Valuation, they are used by different analysts, especially for start-ups which are at the beginning of their business, thus not easy to forecast and to compare to other businesses. Anyway, they are said to be too conservatives and have been criticized because they don't take into account the future and intangible assets (Saastamoinen & Savolainen, 2018).

Moreover, this approach can be also defined as *Cost Approach* (Barnes, 2017), considering the assets not form a positive but negative way, that is considering the cost of their acquisition and the cost needed to replace the assets (replacement cost). In this view, entrepreneurs think of the value of their assets in terms of the investments that would be required to replace them (Barnes, 2017). Again, this is really important for start-ups where comparisons are unreliable and future predictions would be too subjective.

Now, taking into account the Income Approach that is, as seen before, more subject to subjectivity and fluctuations we analyze two more important elements that characterize these techniques: The *Terminal Value* and the *Scenario Analysis*. They are two important tools that are used to reduce the volatility of results brought by forecasts.

1.2.2 Terminal Value and Scenario Analysis

All the methods related to the Income Approach, as said, are based on future predictions of earnings or cash flows, assuming an infinite forecasting horizon. This assumption is really problematic because

it isn't possible to forecast for an infinite period of time, even considering the fact that all companies won't operate forever (Lee, 1999). Even if all the methods would bring to a similar value considering an unlimited future, it is not possible to consider an illimited period of time. Therefore, analysts decided to reduce the future to a finite-period horizon and taking into account future possible further earnings through the computation of the *Terminal Value* or *Continuation Value* (Penman S. H., A synthesis of equity valuation techniques and the terminal value calculation for the dividend discount model, 1998).

Its calculation serves to adjust the error brought by the truncation of the forecasting horizon, error that arises from the omission, in the discounting procedure, of all the future cash flows that will happen after the pre-set horizon.

Therefore, the Terminal value is the NPV of all future cash flows that accrue after the time period that is covered by the business valuation (Steiger, 2008), it is based on an average growth rate which will determine the rapidity of growth of future earnings. The idea behind is that from a certain point in the future the company will continue to grow constantly, thus the growth rate and the discounting rate are the key for the evaluation of the continuation value.

$$TV = \sum_{n=1}^{\infty} \frac{FCF_{TV} * (1 + g)^n}{(1 + r)^n} = \frac{FCF_{TV}(1 + g)}{r - g}$$

Where g is the growth rate and r is the discounting rate. In most cases, the perpetual growth rate has to be between 0% and 5%, it has always to be positive because in the long term the economy will always grow, even if a value higher than 5% won't be sustainable (Steiger, 2008).

Another important factor, in valuation techniques that are based on future predictions, is related to the need of the creation of different possible future scenarios, which are pivotal in the reduction of errors related to uncertainty and subjectivity. In fact, a *Scenario Analysis* is usually conducted to examine the effects of changes in the underlying assumptions (Steiger, 2008).

Normally, the *Scenario Analysis* is based on three different scenarios:

1. *Bear case*: This has very low assumptions in terms of growth rates, in order to build the most pessimistic possible future and create the lowest level possible.
2. *Bull case*: In this case the scenario is the opposite than the bear case, in fact all assumptions are very optimistic, and the growth rates are the highest possible. The first two cases here described represent the boundaries in which the fair value of the company should be with high certainty (Steiger, 2008).

3. *Base case*: This is the most important one because here every assumption is not brought to some extreme, it is instead based on analysts' idea, studies and considerations.

In conclusion, another item that is usually taken into account in the valuation of a company, during an M&A, it's the value of possible *synergies*. In fact, in some cases, the acquirer and the acquired are very similar and together they can have strong synergies able to increase the value of the acquisition leading to an higher price than the normal standalone value of the firm (Steiger, 2008).

1.3   Particular cases of Business Valuation

What has been presented until now is related to the neoclassical studies of business valuation, anyway there are more facts that have to be considered when valuing a company. The aim of this part is in fact to deal with a different idea of value that analysts should take into consideration, the *Emotional Value*. Furthermore, here will be presented what is defined as "the dark side of valuation", that is the business valuation in the case of companies with no earnings, history and comparables.

1.3.1 Emotional Value

In some academical paper, it's argued that the value of a business is not only represented by the financial worth computed with all the methods above presented. This is the traditional view of classic financial theory, but every shareholder, which has not the aim to maintain its shares for trading purposes, will consider other components in his valuation: *emotional returns* and *emotional costs* (Astrachan & Jaskiewicz, 2008).

This consideration is particularly true for privately and family held businesses where the owner and shareholders have also nonfinancial goals which are normally not considered in valuation.
Indeed, in these specific companies some decision can be taken even if they don't have a real financial sense, or some investment can be made just because they increase the value of the owning family or, again, when shareholders are particularly bound to the territory in which they operate and continue to employ local people, even if outsourcing would be cheaper. In all these cases, it is possible to say that people are considering the *emotional returns*, rather than financial ones (Astrachan & Jaskiewicz, 2008).
On the other hand, shareholders or family members can experiment also some *emotional costs*, when for example their decisions are driven by negative feelings, rivalry or stress which can bring to negative outcome because the more rational and financial part of human being wasn't considered when deciding (Astrachan & Jaskiewicz, 2008).
Then, both financial and emotional returns and costs can be expressed in the company total value:

Total Value = NetPresentValue + (Emotional returns – Emotional Costs)

Considering this formula, we can have two different scenarios:

1. If (ER – EC) is positive, then the value of the company perceived by shareholders will be greater than the pure financial value (TV > NPV), and thus an higher price will be needed to acquire the firm.

2. If (ER – EC) is negative, then the value of the company perceived by shareholders will be lower than the pure financial value (TV < NPV), and thus even a lower price than the business valuation result will be enough to acquire the firm.

In conclusion, the idea presented by Astrachan & Jskiewicz (2008) is really useful in the determination of acceptable offer price in M&A processes.

1.3.2 Companies with no earnings, history and comparables

The value of a firm is the present value of expected cash flows generated by its activities, discounted back with a discount rate. This is the general form that is applied to every company, anyway the ease with which all the needed information are collected can be different in different companies' situations. At one end of the continuum, we have "easy" firms with long history, positive earnings and a lot of comparative companies making the estimation of values easy and more straightforward.

On the other hand, there are young firms, or companies which registered negative earnings, with short history or in sectors in which there aren't numerous comparables. Thus, the estimation of discount rate, cash flows and growth rate become really hard and difficult, representing what is defined "the dark side of valuation" (Damodaran, The Dark Side of Valuation: firms with no earnings, no history and no comparables, 1999).

Negative Earnings firms: Companies that are losing money in the last years create numerous problems to analysts: earnings growth rate cannot be estimated and used for future predictions, in fact using a growth rate taken from negative past earnings will just make future values even more negative. Moreover, the tax computation becomes harder, in fact companies with negative earnings have the loss carry-forward possibility, covering them with future earnings. Thus, analysts must keep track of this process and remember to use future earnings as a shield for past losses. Then, the final problem is related to the going concern assumption, in fact these companies have the risk to go bankrupt and break the assumption of future life, making meaningless the estimation of the terminal value (Damodaran, The Dark Side of Valuation: firms with no earnings, no history and no comparables, 1999).

Solutions:

1. Normalizing earnings: When considering this hypothesis, it's implicit the assumption that the current year, or at least few years, are not the normality and that the company will return wealthy quickly. Under this assumption, the simplest solution is to normalize present losses using an average of past earnings, particularly for firms with long history and with same size of past periods. Another approach, to take into account of possible different scale in time, is to use, instead of average past earnings, the average return on capital, which multiplied for the current capital, different from the past one, will give a more reliable estimation of present normalized earnings. One last solution is to use return on capital or equity of comparable firms, multiplied by the capital of the target company and arrive to an estimation of earnings for future periods (Damodaran, The Dark Side of Valuation: firms with no earnings, no history and no comparables, 1999).

2. Use of Revenues and Margins: this second approach uses past revenues, which are normally always positive, and margins in past years to arrive to future predictions of revenues and then earnings. Even here the approach to arrive to these data is double, it's possible to use past data from the company itself, or to use data from comparable firms (Damodaran, The Dark Side of Valuation: firms with no earnings, no history and no comparables, 1999). When
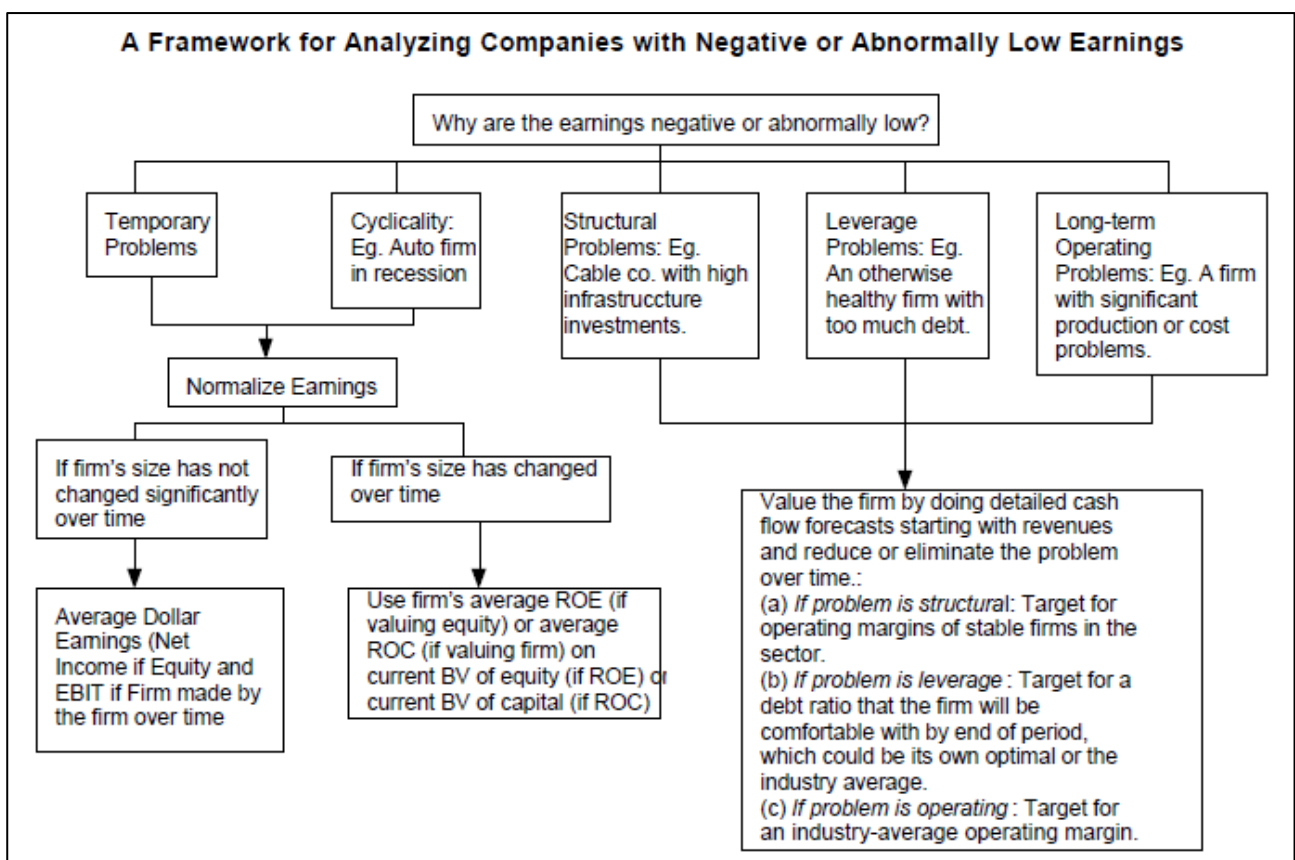

Figure 2: How to select between the two approaches when valuing firms with negative earnings. Source: Damodaran, The Dark Side of Valuation: firms with no earnings, no history and no comparables (1999).

considering the use of margins, will be also important to estimate the adjustment period: how long would it take to the considered, current and negative margin to adjust to a positive level? The greater is the distance from the sustainable level and the longer will be the adjustment period.

Absence of Historical Data or Comparables: past data are pivotal for the estimation of the needed inputs in valuation methods. Risk parameters like the beta are computed with a regression function using historical stock returns, variables that change year by year, such as working capital, are estimated using an average of past periods. Finally, even when parameters are not computed with historical data, these are used as a "check" to understand the goodness and reasonability of values (Damodaran, The Dark Side of Valuation: firms with no earnings, no history and no comparables, 1999).

On the other hand, the use of comparable firms is important when the number is significant and when the characteristics are very similar. In fact, some values, such as the beta, can be computed by comparative companies with a process of un-leverage and re-leverage to consider the debt/equity structure of both firms. If, instead, the number of similar firms is not sufficient or the fundamental business characteristics are not the same, this process will be difficult and incorrect (Damodaran, The Dark Side of Valuation: firms with no earnings, no history and no comparables, 1999).

Solutions:

The two problems are treated and solved together because one is used to solve the other, and vice versa. In fact, if a company has not a significant number of comparables, or it cannot be compared to other companies, the only way to value it is to use its history and, thus, its past data. While, on the contrary, when a company has not long history the only solution is to use comparative firms in the same sector/industry. In this case, it is needed to consider firms' similarity in the business, the richness of information available and the different stage in their life cycle that the comparative firms are facing in the valuation period (Damodaran, The Dark Side of Valuation: firms with no earnings, no history and no comparables, 1999).

Chapter 2: Business Valuation and Valuation techniques

The business valuation is a process aimed at the estimation of a firm's value using some specific methods. It is a common idea, that a company has to be valuated on the base of its future cash flows, but anyway, in Italy, there are historical debates regarding this consideration. Given the specific M&A process that will be analyzed in the last chapter, involving an Italian and an American company, the aim of this chapter is to present the most important methods used in the two countries. The final goal will be to determine the best three approaches to perform a business valuation taking into account firms' characteristics and the M&A process in which they are involved.

In general, the goal of a valuation process changes in relation to the context in which the valuation is performed. The measurement of the value is really relevant in operations such as M&A, listing, investment in other firms and for internal purposes too.

Dealing with the listing process, through which a company begins to sell its stocks on financial markets, the valuation is needed to the pricing process, in order to determine the best price for the stocks sold to investors. The reasoning behind the valuation process is really fundamental in order to have a successful operation and image on the financial markets. In this context, the valuation is based on financial and markets methods, in particular on the market multiples method, which allows a rapid comparison with already listed companies in the same industry (Borsa Italiana S.p.A., 2014). In fact, investors base their investment choices on the base of these multiples because they allow to estimate the company's fair value without knowing the industrial plan. Moreover, investors usually apply an IPO discount to the company's fair value, quantified on the base of banks' considerations regarding the firm, given that it would be more rational to invest in companies with the same risk profile but already present on financial markets. Indeed, in a listing process are offered stocks of a company with a "new equity history", with a management unknown to the investors and, thus, in a condition of information asymmetry (Borsa Italiana S.p.A., 2014).

Considering valuation for investment purposes it's important to consider operation of Private Equity and Venture Capital, in which preliminary analysis are finalized at the determination of the right amount of equity injection in order to gain the best profitability results possible over the time period considered. Therefore, the valuation process has as a goal the determination of the possible price that would be received in case of sale of the acquired participation (exit value), obtaining a predetermined internal rate of return (IRR) (Borsa Italiana S.p.A., 2014).

Sometimes, the valuation process is performed for internal purposes when a company is experiencing extraordinary financial operation or it is making important management decisions. Indeed, the estimation of the company value it is fundamental for strategic planning and for the measurement of

economic value created by strategic decisions. Moreover, for listed companies, its own equity capital measurement is important to make a comparison with the stocks' price on financial markets.

Dealing with merger and acquisition (M&A), the valuation process is fundamental in the first phases of negotiation between seller and acquirer to define a basis price for the transaction closing. This price is then adjusted to arrive to the so-called "strategic value/price", which reflects the ability of the acquired company to generate future cash flows plus the valuation of possible synergies arising from the merger with the acquiring company (Borsa Italiana S.p.A., 2014). In fact, a company is normally acquired due to its strategical benefit to the acquirer, which is therefore willing to pay the "acquisition prize", the positive difference between what is actually payed and the company stand-alone price.

Notwithstanding the reason why a valuation process is performed, the analyst that wants to valuate a company has always the duty to firstly understand the business, the industry in which the firm operates and its competitive advantage compared to the competitors. Consequently, the understanding and use of financial statements is important to make a business valuation (Barth, Beaver, & Landsman, 2001), which is possible only through "converting tools": the valuation techniques. These methods can be simple or more complex, involving forecasting, and they have pros and cons, which must be considered by the analyst when choosing the best one to use (Penman S. H., Financial Statement Analysis and Security Valuation, 2013). Having this in mind, the goal of this chapter is the understanding of valuation methods both in the Italian and International context, while the next chapter will focuse on the description of the companies performing the M&A analyzed in this master thesis, accompanied by an analysis of the industry in which both operates.

2.1 Italian Valuation methods

Historically, and differently from other countries, in Italy there has always been an higher usage and preference for methods based on the analytical determination of firms' asset value ("Metodo Patrimoniale"), on the determination of a normalized economical result ("Metodo Reddituale") and on the use of a mix of these two methods ("Metodi Misti/Patrimoniali-Reddituali") (Borsa Italiana S.p.A., 2014).

1. **Metodo Patrimoniale**: This method is based on the idea that the economical capital of a company is equal to its equity rectified, given by the sum of assets' current value minus the value of borrowed capital (Borsa Italiana S.p.A., 2014). This method and its estimation process can be defined as: *analytical*, because referred to every single element of company capital, both material and immaterial (through the complex Metodo Patrimoniale) (Guatri, 1997); *at current values*, because it refers to the market value for each capital component; *of substitution*, because the underneath hypothesis is the repurchase for assets and renegotiation for liabilities. Moreover, the Metodo Patrimoniale is highly objective, given the few assumptions and hypothesis needed to be performed and the absence of cash flows evaluation and actualization, reducing the uncertainty of the result.

   Anyway, this method has its downturns: in fact the company value is determined on the base of an algebraic sum between assets and liabilities' historical values, without considering the firm ability to generate future cash flows; in addition, it is attributed a current value to any items of the balance sheet, without considering its belonging to company's operability.

2. **Metodo Reddituale**: This technique aims at the determination of a normalized income, discounted, using the perpetual annuity model, using an interest rate in line with the specific risk of the company (Zanda, Lacchini, & Onesti, 2013). In fact, this method evaluates the ability of the company to generate future income that is then discounted in three different possible ways:

   a) Perpetual annuity: $V = R/i$

   b) Limited life: $V = R \times a_{n-i} = R/(1+i) + R/(1+i)^2 + ... + R/(1+i)^n$

   c) Limited life plus a terminal value: $V = R \times a_{n-I} + TV \times v^n$

   Where R is the expected average income, i is the discounting interest rate, TV is the terminal value and v^n is the discounting factor for the last year.

   As already said, before the discounting process the income has to be "normalized", that is purified by all the extraordinary items, net of financial expenses and taxes. The goal of this

practice is to determine the real and stable firm's ability to produce income, not considering occasional, non-repeatable and non-relevant events.

Dealing with the discounting factor, its selection is subject to some parts of subjectivity, which can generate some distortive effects on valuation results. Anyway, the general interest rate used must be computed taking into account risk-free assets yield summed to a risk premium, reflecting the general market risk and an industry/company risk.

3. **Metodi Misti**: All the techniques that use a mix between the Metodo Patrimoniale and Reddituale are considered mixed methods, which estimate the firm value summing up its rectified equity (as the Metodo Patrimoniale) to the goodwill, obtained as the discounted future cash flows produced by the company itself (as the Metodo Reddituale). These mixed forms try to join the benefit of the objectivity with the possibility to consider firm's ability to generate future cash flows. They are born to solve problematics of both the previous methods, in line with what Bozzolan (2016) said in his book "I Modelli Multidimensionali": In the creation of new model for performance measurement there is more attention to define measures able to combine final balance with projected values (Bozzolan, 2016). In this category of methods, one of the most important and used is the so called "**Stima Autonoma Dell'Avviamento**". This method, also known as UEC method because firstly recommended in 1961 in the historical valuation book of "Union Europeenne des Experts Comptables Economiques et Financiers", is relevant because it takes into account both material and immaterial assets guaranteeing a complete evaluation of the company combining pros from both Metodo Reddituale and Patrimoniale (Guatri, 1997). Specifically, this method express the enterprise value as the sum of the normalized equity capital and the value of goodwill, considered as the ability of the company to generate higher profits than its competitors. In fact, the value of goodwill is the discounted difference between the income generated by the company and its equity rectified multiplied by the equity cost of capital (Buongiorno, 2017).

Enterprise Value = Adjusted Equity Value + Goodwill

Goodwill = (Income – Adjusted Equity Value*Equity cost of capital) * [1/(1+rf)^t]

2.2 International Valuation methods

In foreign countries, there are numerous and different methods normally used to evaluate firms and generally divided in simple and complex approaches. The simple ones request a limited amount of information such as assets values or pricing multiples. Anyway, using these methods, analysts run the risk of ignoring more important elements contained in financial statements, from which are then extracted all the implications needed to evaluate the company. This paragraph will firstly present simple methods and then deepen the analysis with more complex techniques, all related to what is called "fundamental analysis" (Penman S. , 2001).

1. **Market approach**

The market approach is based on the comparison of a company asset with identical or comparable assets for which price information are available. This technique is highly relevant when the analyzed asset or similar ones have been recently sold in other transactions, or they are actively traded on financial markets allowing the analyst to gain precious information on current values. In this framework, the most common methods are based on elements of comparison called "multiples", that are a ratio between two elements, some of them include EBITDA multiples, earnings multiples or book value multiples, but the list is of course longer (International Valuation Standards Council, 2017). The advantages of these methods are their simplicity of application, the possibility to use them frequently, even in the short term, and their use of highly representative information, obtained by actual public negotiations, without any kind of assumptions or forecasting.

The mostly used methods are: *comparable companies multiple* and the *comparable transactions multiple.* These two techniques are similar but the only difference is that the former considers ratios gathered from companies, whose stocks are publicly traded, while the latter considers transactions (M&A or similar) between companies already concluded, thus obtaining ratios from the price payed in each transaction. In both methods, once the relevant companies/transactions and multiples are selected, these are multiplied for corresponding items of the valuated company. Example:

- The analyst would like to evaluate the stock price for company Alpha;
- He determines companies Beta, Gamma and Delta as relevant comparable;
- The P/E (Price-Earnings) multiple is considered relevant and it is gathered from companies Beta, Gamma and Delta, or from transactions happened between them;

- After the computation of an average P/E multiple, this is multiplied by the Earnings of company Alpha, obtaining consequently a proxy value for Alpha stock's price.

Therefore, as it is possible to understand by the example, the most important phases in market approach methods are: the selection of comparable firms or comparable transactions (taking into account the industry in which companies operate, the dimension, financial risks, historical trends and future expectations etc.) and the selection of the most relevant multiples (bearing in mind that "the higher" are the performance items selected, the lesser they are influenced by discretional accounting policies, being more representative) (Penman S. , 2001).

2. The Cost approach or Asset Based Valuation

The techniques in this cluster valuate the firm's value through the identification and sum of its assets, successively obtaining the equity value by deducting the amount of debt issued by the company: Value of Equity = Value of the Firm – Value of Debt (Penman S. , 2001). The process underlining the cost approach is to recreate the balance sheet by gathering and using current market values for assets and liabilities, identifying similar items traded on the market. Even if this idea may be considered simple, analysts pointed out several problems:

- Company's assets may not be traded often, having market value not always available or perfectly reliable;
- Market prices collected may not be perfectly representing of real intrinsic value of assets if markets are imperfect;
- Even if available, market values may not represent the importance and the value that an asset represents for the company in a going-concern point of view;
- The omitted assets in the balance sheet or those included under intangible assets indicates a very difficult cluster of items in terms of identification and measurement;
- Most importantly, even if all the precedent problematics are avoided, the sum of the value of each single asset may not be representative of the real combined value of all the assets together. In fact, the idea is that a company uses its assets in a strategical way, combined them in a unique way in order to create "synergies" and increase their overall value (Damodaran, The Value of Synergy, 2005).

Notwithstanding the several problematics and doubts on this approach, when it is used by analysts they identify the value of assets and liabilities in three different ways:

a) Replacement cost method: the asset value is determined through the cost of a similar asset offering equivalent utility (International Valuation Standards Council, 2017);

b) Reproduction cost method: the value of assets and liabilities is obtained by calculating the cost to recreate a replica of both (International Valuation Standards Council, 2017);

c) Summation cost method: here the value is computed as the sum of the separate values of the component parts (International Valuation Standards Council, 2017).

In general, no matter the cost method selected, the value computed as representative should take into account all of the costs that would be incurred, direct and indirect, in replacing/recreating the asset at the valuation date (International Valuation Standards Council, 2017).

3. Fundamental Analysis

All the methods abovementioned have a common characteristic, they do not involve any forecasting activity. This is positive in terms of complexity, in fact these methods are simple and require the use of few information, anyway, a firm's share value is based on the future payoffs that it is expected to generate, so to have a more precise evaluation it is needed the use of forecasting techniques (Penman S. , 2001). In this regard, it is pivotal to talk about the *Fundamental Analysis* that is "the method of analyzing information, forecasting payoffs from that information, and arriving at a valuation based on those forecasts" (Penman S. , 2001).

Dealing with Fundamental Analysis, it is important to define its different steps needed to deploy an effective valuation of the company, indeed at the end of the process investors must be able to decide with the highest certainty possible if accept or not the investment, buy or not the shares. If the valuation is higher than the market price, the investor should buy, if less the investor should instead sell.

Thus, the value computed through fundamental analysis will be the main criterion in investment decisions, but behind the final value there are several steps and actions that are pivotal: *forecast*, because the final value is the sum of the discounted value of all future cash flows that the company is expected to generate; *identify and analyze information*, because the forecast cannot be done without knowing perfectly the business, the industry and the strategy of the company for future years; thus, at the beginning of all the process, the first important step is *to know the business and the strategy* to generate reliable and reasonable forecasts of future payoffs.
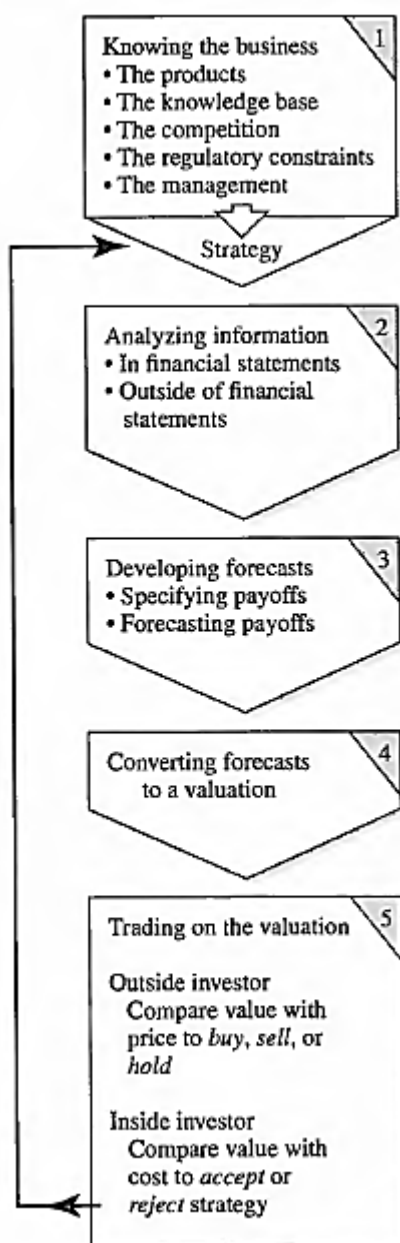
Knowing the business
• The products
• The knowledge base
• The competition
• The regulatory constraints
• The management

1

Strategy

Analyzing information
• In financial statements
• Outside of financial statements

2

Developing forecasts
• Specifying payoffs
• Forecasting payoffs

3

Converting forecasts to a valuation

4

Trading on the valuation

5

Outside investor
Compare value with price to *buy*, *sell*, or *hold*

Inside investor
Compare value with cost to *accept* or *reject* strategy

Figure 3: The process of Fundamental Analysis. Source: Penman S., 2001

As it is possible to see from Figure 3, Fundamental analysis can be divided in 5 different steps:

1.   Knowing the business: As said before these steps are important to have the most important information regarding the company strategy, the base for good forecasting.

2.   Analyzing information: To know the business at the best, it is important to gather and analyze information from different sources, the numerical one from financial statements and the qualitative one based on consumer tastes, technological evolution and management characteristics and capabilities.

3.   Developing forecasts: On the base of previous information, develop a forecasting strategy, specifying how the future cash flows are measured and projected over the forecasting period considered.

4.   Converting the forecast to a valuation: To complete the firm evaluation, the projected cash flows has to be reduced to a single current value, thus a discounting process is needed. Moreover, the expected future gains are not certain, therefore they must be discounted taking into account the risk associated with their realization. This risk is represented and considered through the use of a discounting factor, the discount rate or required return or cost of capital.

5.   The investment decision: At the end of the whole process, the outside investor can make his decision by comparing the estimated value to their price, while the inside investor, that is a person deploying the valuation exercise for internal purposes, will compare the value estimated for an investment to its initial cost.

In order to use information in the most effective way, it is relevant to describe the process of using financial statements to create reliable future forecasts. In fact, as previous described, available financial statements are the main source of forecasting (Barth, Beaver, & Landsman, 2001), but at the same time, they are also what has to be forecasted. Cash flows derives from revenues produced by companies and financial statements report all the items needed to generate them: The income statement describes sales, the cost of production and other necessary expenses,

while the balance sheet presents the assets employed in the operative phases and the sources of capital. Therefore, to have precise future cash flows it is pivotal to create also future financial statements, and this process is commonly called **Pro Forma Analysis**, because it involves preparing pro forma financial statements for the future.

The fundamental analysis, as described until now, is the general category of the numerous possible methods involving forecasting that can be used. In fact, on the base of the method selected the information needed and the analysis to be performed can change: the most important difference in the techniques involving forecasting is that they can be "Equity side or Asset Side". The result of valuation will be representative of Equity value/Market Capitalization (in case of Equity side) or of Firm Value/Enterprise Value (in case of Asset side), underling also that the discounting factor used will be the Return on equity in the first case and the WACC (weighted average cost of capital) in the second one. In general, the most important methods used in this category are:

a) **Equity Side**
   - **Dividend Discount Model**: This method uses as base of calculation the dividends, considered as the future cash flows available for shareholders (Zanda, Lacchini, & Onesti, 2013). Therefore, the dividends are forecasted with the Gordon Growth Model taking into account a constant growth rate and then they are discounted using as discounting rate the equity cost of capital.

Gordon growth model

$$D_{t+1} = D_t * (1+g)$$

Where: D_{t+1} is the dividend expected in the next year;

D_t is the last dividend distributed;

"g" is the growth rate assumed.

Equity value/Market Cap valuation

$$\sum D_t/(1+K_e)^t + TV/(1+K_e)^t$$

Where: D_t is the dividend in year t;

K_e is the equity cost of capital, here used as discount rate;

TV is the terminal value, used to consider the continuation value over the explicit period.

- **Earnings Capitalization equity side**: this method is used both as equity side and as asset side measure. In this case, the method discounts the future net profits. In fact, the Net Income generated by a company is forecasted in the future increasing at a constant rate or on the base of a variable growth rate. Even in this equity side method, the discount rate used is the equity cost of capital, obtaining directly the equity value of the firm.

Equity value/Market Cap valuation

$$\sum NI_t/(1+Ke)^t + TV/(1+Ke)^t$$

Where: NI is the Net Income forecasted for each year t;

Ke is the equity cost of capital, here used as discount rate;

TV is the terminal value, used to consider the continuation value over the explicit period.

- **Residual Earnings Method**: This method is particular, because it discounts Net Income adjusted for an amount representative of common shareholders opportunity cost in generating net income. In fact, firms can increase their value by increasing their Net Income or by decreasing alternatively the Book Value of Equity and cost of equity.

Residual Income computation

$$Net\ Income - (Ke*BV_{t-1})$$

Where: Net Income is the net income at each year forecasted in the explicit period;

Ke is the equity cost of capital;

BV_{t-1} is the Book Value of equity in the year before.

Equity value/Market Cap valuation

$$BV_{t_0} + \sum RI_t/(1+Ke)^t + TV/(1+Ke)^t$$

Where: BV_{t_0} is the book value of Equity at t_0 date of evaluation;

RI is the Residual Income forecasted for each year t;

Ke is the equity cost of capital, here used as discount rate;

TV is the terminal value, used to consider the continuation value over the explicit period.

b) Asset Side

- **Discounted Cash Flow**: With this technique, the analyst discounts the free cash flows generated by the company through its operations forecasted for future years. Given that these cash flows are created through the use of assets owned by the company, the method gives a valuation of the Enterprise Value, discounting with the WACC rate.

-

Enterprise Value computation

$$\sum OFCF_t/(1+WACC)^t + TV/(1+WACC)^t$$

Where: FCF is the Free Cash Flow available and forecasted in the explicit period in each year t;

WACC is the weighted average cost of capital after taxes, a discount rate representative of the financing structure of the company, averaging the equity cost of capital and debt cost of capital;

TV is the terminal value, used to consider the continuation value over the explicit period.

- **Earnings Capitalization asset side**: the method here described is equal to the equity side one, but in this case the discounting process takes into account the EBIT (Earns before interests and taxes) instead of Net Income. Therefore, even the discounting factor used is now the WACC and not any more the cost of equity.

Equity value/Market Cap valuation

$$\sum EBIT_t/(1+WACC)^t + TV/(1+WACC)^t$$

Where: EBIT is the Earning before interests and taxes forecasted for each year t;

WACC is the weighted average cost of capital after taxes, a discount rate representative of the financing structure of the company, averaging the equity cost of capital and debt cost of capital;

TV is the terminal value, used to consider the continuation value over the explicit period.

2.3 The selection of the valuation methods for the study case

The goal of this section is to explain the choice of the valuation methods that will be used in next chapters to perform the valuation exercise related to the M&A analyzed as business case, following the suggestions given by Guatri, Fusa and Guatri in their book "La valutazione del capitale economico d'Impresa" (1999). Successively, I will present the selected valuation techniques in greater depth than before, describing the needed information and steps to carry out the valuation.

After having presented valuation methods used both in Italian and in international contexts, it is now important to define which are the most suitable for the study case that will be successively analyzed in this master thesis.

As will be discussed later, the two companies involved in the analyzed M&A are one from Italy (Prysmian, the acquiring company) and one from United States (General Cable, the acquired company), but notwithstanding their origins these are two international companies, both operating all over the world. Therefore, I decided to use international methods in order to reflect their scope of work and the two different stock exchange market where their shares were traded before the M&A process. As described before, international valuation techniques are divided between simple and complex on the base of the information used in the valuation exercise. Given the aim of this master thesis, understanding which method will be more effective, resulting nearest to the price effectively paid by the acquirer, I decided to use both simple and complex methods. In particular, I started a research process among relevant sources to understand which could be the more significant methods to use in business valuation and I found out that, as stated by Borsa Italiana S.p.A. in its document "Listing Guides" (2014), the principal methods used for M&A valuations are the Discounted Cash Flow, the Comparable Companies Multiple ad the Comparable Transactions Multiple.

The use of the first two methods allows me to make a comparison between the valuation results obtained from a more difficult, but more complete, method based on forecasting, and a simpler method, using less information but avoiding the subjectivity errors intrinsic in the forecasting process. Anyway, these two methods are not able to catch what is called "*Control Premium*". In fact, when a M&A process is concluded there is the transfer of control of a company to another, the buyer, which will have more flexibility and more options on how to create value in the future. Therefore, in these situations a control premium is recognized in addition to the base price, defined on the base of acquired firm valuation. In order to take into account the possible effect of this control premium, the Comparable Transaction Multiple method is the right way to ascertain the difference between the value of comparable companies acquired in the past before and after the transaction closure. In other words, this method is able to give a valuation of the difference between the market value of the

acquired company before the transaction and the amount paid by the acquirer. This difference explains the premium paid to obtain the control over the acquiree.

Having said that, the following sub-paragraphs will be used to present in deepness the three methods selected, in order to have a complete knowledge before using it in the last chapter.

2.3.1 The Comparable Companies Multiple Method

Also called Market Multiple method, it assumes that the value of a company could be computed on the base of indication obtained by the market, referred to companies with the same characteristics of the valuated one. The valuation uses "*multiples*" computed as the ratio between market values and economical-financial items of a group of companies identified as comparable. These multiples are then applied to the corresponding financial items of the target company, to verify if the result is in line with market levels. The method is divided in the following steps:

1. Determination of a reference sample

It is fundamental that the companies chosen as comparable are similar to the target firm, in terms of industrial and financial characteristics. In particular, the most widely used basis of comparison are the industry in which the firms act, the size, the strategy and operations. Furthermore, the selection of comparable companies should be carried out through three level of comparison:

- National infra-sector comparison, that is the research of similar firms in the same industry and in the same country. It is the simplest method, with the best results, in fact similar companies at this level of analysis have great possibility to be more representative of each other. Indeed, if this search produce satisfactory results, it is not worth proceed with other level of analysis. Anyway, this ideal situation is not always possible, especially in Italy, even because the comparable companies should be similar in terms of quantitative and qualitative measures. Firms' ability to create value (ROCE) and speed in the capital rotation are two dimensions that need to be analyzed together in order to catch profitability as well as business strategy information (make or buy, investments decisions etc.). In addition, it is important to consider other quantitative measures such as revenues size, growth capabilities, assets and liabilities composition. In terms of revenues, even if two companies are qualitative similar, they are differently considered by financial markets, the best one will be more appreciated due to its expected higher strength and stability. The same happens when comparing growth predictions, activities' risk profile and the financial structure.

In terms of qualitative dimension comparison, it is pivotal to consider the competitive positioning in the market, the innovative capabilities and the business model. It is important to have in mind that both qualitative and quantitative must be considered at the same time in order to create a coherent sample of companies.

- International infra-sector comparison; when it is not possible to identify comparable firms in national financial markets, or when the business is international, it is important to extend the research in foreign financial markets but in the same industry. The highest focus is on European and US economies, with financially evolved markets and with high liquidity levels, therefore excluding emerging markets and countries with completely different risk-return investment profile. Moreover, in the international comparison, it is important to eventually adjust some differences in terms of accounting policies, or to use multiples that can reduce these differences (such as the EV/EBITDA which avoids the diverse taxation reporting methods and the different depreciation policies).

- Inter-sector comparison; this third level of analysis becomes relevant when it is impossible to identify comparable companies in the same industry neither in national nor in international landscapes. In this particular condition, it is mandatory to compare companies with similar risk-return profile and characterized by similar or equal management ideology and strategy. As an example, when valuing companies producing luxurious cars, it could be reasonable to compare them with firms in the luxury ships' industry or even in the fashion segment, because they have a similar client base with similar source of revenues and product cycle.

2. Determination of meaningful multiples

The other fundamental choice in the use of this valuation technique is the selection of the right multiples that will be used when valuing the business. In fact, this method assumes that the enterprise value can be related to a significant variable as long as this is true also for other comparable companies. It is worth saying that multiples built with accounting items more affected by accounting policies are more subject to distortion, bringing to misleading results. For this reason, it is important to make some adjustments and normalizations or use items less affected by subjective policies, such as the EV/EBITDA instead of the EV/EBIT, as it does not suffer from the financial and tax structure. In some particular cases, such as companies with negative margins, analysts use also the EV/Sales multiple in order to obtain a result completely not affected by accounting policies.

When choosing the right multiple, the analysts has a wide range of possible alternatives, thus it is relevant to justify the selection of those multiple able to summarize the firm value and its ability to create future income (Zanda, Lacchini, & Onesti, 2013). Each multiple has its pros and cons, therefore

the selection is made in order to have few multiple with the right balance between positive and negative characteristics, justifying the selection process that led to the final decision. In fact, sometimes it is important to use the most widely used multiple combined with more customized ratios that are able to reflect industrial strategies: as an example, in markets where competitors are different in terms of make or buy ideas, with different margins and turnover ratios, it is normal to use the EV/CE (enterprise value to capital employed), instead of more classical ratios such as EV/EBITDA (Borsa Italiana S.p.A., 2014). In other situations, it is also practice to use multiples able to take into account growth expectations (i.e. PEG and EV/EBITDAG, P/E and EV/EBITDA ratio divided by the growth rate of net income for the next 3-5 years), such that the analysis is enriched by growth projections.

Moreover, these multiples can be built also on the base of non-accounting items, directly related to business value driver (these ratios are called business multiples) (Borsa Italiana S.p.A., 2014). As an example, in the airports' industry, revenues are strictly linked to passengers volumes, therefore sometimes are used multiples such as EV/passengers. This type of technique can be used only with great attention and when the relationship between the non-accounting item and firms' ability to create value it is direct and observable.

2.3.2 The Precedent Transactions Method

This method is similar to the previous one, in fact it is a multiple-based approach. Anyway, in this technique, the multiples are computed starting from previous transactions (similar M&A) that give information on prices paid for comparable companies, resulting in several indicative multiples.

Older transactions are considered if occurred within previous two or three years, under similar market conditions and possibly during the same target company's business cycle point. Under these conditions, this method is highly relevant valuing companies involved in M&A transactions because it is able to gather and express information that other methods ignore (Rosenbaum & Pearl , 2009):

a. *Control premium*: as previously stated, when the acquirer has strategic objectives, it is normally willing to pay an higher price in order to gain the control of the target company. Therefore, using multiples computed on the base of precedent transactions allows the analysts to take into account the control premium in its target transaction.

b. *Synergies higher purchase price*: an higher willingness to pay from the acquiring companies is also due to opportunity to realize synergies, the expected cost savings, growth opportunities and other economic benefits that arise from business combination.

Synergy is created when two firms are combined and can be either financial or operating

Operating Synergy accrues to the combined firm as

Financial Synergy

Strategic Advantages

Economies of Scale

Cash Slack

Tax Benefits

Diversification?

Higher returns on new investments

More sustainable excess returns

Cost Savings in current operations

Lower taxes on earnings due to
- higher depreciaiton
- operating loss carryforwards

May reduce cost of equity for private or closely held firm

Higher ROC

Higher Growth Rate

Longer Growth Period

Higher Margin

Higher Base-year Operating Income

NPV of projects that woudl have been rejected

Added Debt Capacity

More new Investments

Higher Reinvestment

Higher Growth Rate

Higher debt raito and lower cost of capital

Figure 4: Possible Synergies' source in M&A transactions. Source: The Value of Synergy, Damodaran 2005

When performing these techniques, the process is generally divided in three steps (Rosenbaum & Pearl , 2009):

1. *Identification of comparable acquisitions*: This step can be challenging because it requires a good understanding of the target and the sector of operation. The most effective way is to search through M&A databases, looking for comparable transaction among publicly traded companies because they disclose financial information due to law requirements. In this first step it is important to evaluate the purchase type of previous transactions, in order to identify the best correspondence. Indeed, the acquisition can be performed "all-cash" (when the acquirer pays all through cash), "stock for stock" (when the equity is payed in terms of other stocks on the base of either a fixed or floating exchange ratio, determining how many shares of the acquiring part are given in exchange of the acquired shares) or "cash and stocks" (when a mix of both previous methods are used to complete the transaction).

2. *Identify relevant transactions multiples*: the key ratios are similar to those used in the comparable companies method but the relevant difference is that in this case they are able to reflect the premium price paid by the acquirer for control and synergies purposes.

Notwithstanding this difference, the multiples are the same and are always calculated on the base of accounting items.

3. *Conclude the valuation*: once the multiples are identified they are multiplied for the corresponding items of the valuated companies, obtaining a valuation range for the target with the highest, lowest and medium value serving as reference points.

Apart from the abovementioned considerations regarding this method, it is commonly used because it is based on public information available after market verifiable transactions already concluded. Moreover, it is a simple method but at the same time objective, avoiding the analyst the risk of making assumptions related to forecasts and of course it is able to give the exclusive possibility to evaluate the price paid taking into account possible premium values, otherwise impossible to be considered.

2.3.3 The Discounted Cash Flow Method

The Discounted Cash Flow model relates the enterprise value with its ability to generate future cash flows able to satisfy investors' remuneration expectations (Tajudeen & Amidu, 2005). Therefore, the equity value is given by the algebraic sum of the following parts:

- The net present value of future operating cash flows, discounted using a weighted average cost of capital (WACC) in an explicit period of time plus a terminal value, representative of what the company will be able to generate after the explicit period considered;
- The net financial position expressed at market values;
- The market value of surplus assets not related to the operative activities of the company, thus not considered in the generation of future cash flows.

As a starting point, here it is represented the DCF formula, from which each item will be further analyzed in this paragraph (Borsa Italiana S.p.A., 2014):

$$Equity\ value = \sum [OFCFt / (1+WACC)^{\wedge}t] + TV - NFP + SA$$

Where:

"**OFCFt**" is the operating free cash flow generated by the firm, in a generic year t, through its regular operations;

"**WACC**" is the weighted average cost of capital, used as discounting factor and able to represent both cost of equity and of debt;

"**t**" is the generic year in the explicit period considered;

"**TV**" is the terminal value, representing a continuation value after the considered explicit period, therefore it is used to consider company's ability to generate value in the long term. Also this value is discounted using the WACC;

"**NFP**" is the net financial position of the firm, expressed as algebraic sum of financial debt and the available cash;

"**SA**" is the value expressing the surplus assets, those not considered in the determination of operating cash flows.

Items Analysis

a) *Operating Free Cash Flow*: these cash flows are directly originated from operating activities, specifically they are computed starting from the consolidated operating income, as following described.

EBIT
- Operating taxes
NOPAT
+ Depreciation
+ Delta Non-cash Expenses
+/- Delta Net Working Capital
+/- Capex
Operating Free Cash Flow

b) *Weighted Average Cost of Capital*: this is the interest rate used as discounting factor in the process of the determination of the net present value of future cash flows. This interest rate is highly representative of the whole company's source of funds because it considers both debt and equity remuneration.

$$WACC = Ke * E/(D+E) + Kd * D/(D+E) * (1\text{-}Tax\ rate)$$

Where:

"**Ke**" is the cost of equity capital, representative of the remuneration expected by the shareholders;

"**Kd**" is the cost of debt capital, representative of all the debt lines issued by banks in favor of the target company;

"**E** or **D /(D+E)**" are the two components expressing the weight of Equity and Debt on the total amount of capital sources (D+E).

"**1-Tax Rate**" represents the taxation shield granted by the debt, generated by the deductibility of interests payed on the outstanding debt.

In particular, it is pivotal to express also the computation technique used to obtain the equity and debt costs of capital. Indeed, the debt cost of capital, **Kd**, is determined as the weighted average of all interest rates requested by the different outstanding debt lines. On the other hand, the cost of equity, **Ke**, is computed through the formula of **Capital Asset Pricing Model (CAPM)**, in the following way:

$$Ke = Rf + \beta * (Rm - Rf)$$

As expressed by the formula, Ke is equal to the risk free rate (Rf) added to the difference between the market risk and the risk free rate (the additional yield expected by the investors betting in financial markets rather than in assets without risk) multiplied by the Beta factor. This Beta is the representation of the firm's systematic risk, expressed as the volatility of its shares in relation to market volatility. Usually, the Beta is estimated in comparison with comparable listed firms' Betas.

c) *Terminal Value*: this item represents all the cash flows hypothetically generated by the company after the explicit period considered in the valuation. These are mathematically computed considering the normalized cash flow of the last year and a growth rate named "g", combined in two possible ways:

- Perpetuity: the last year cash flow is incremented by the growth rate and then discounted at the last date of the explicit period.

$$TV = [OFCFt * (1+g) / (WACC - g)] / (1+WACC)^t$$

- Market multiple: a firm's economic item is multiplied by a value obtained from the comparison with comparable firms' market values. Then, it is always discounted back at the reference valuation date.

d) *Net Financial Position*: this is computed as the difference between market values of financial debts, both in the short and long terms, and the sum of the available cash and financial activities easily disposable. Normally, NFP is expressed as positive in case the debts are higher than cash, and negative in the opposite case.

e) *Surplus Assets*: these are usually financial assets, which are not directly related to the determination of operating cash flows, and therefore they need to be considered separately at the end of the valuation to obtain the firm's equity value.

Applicability consideration for the DCF

- *Reliability of forecasted data*: future cash flows are based on prospective data from the firm's economic and financial plan, which need to be coherent and sustainable in time and with current financial resources (French & Gabrielli, 2005). In subsequent years, hypothesis should be prudential and conservative regarding the growth rate of revenues and margins, always taking into account data from the industry life cycle. Indeed, it is important to have special attention for companies operating in cyclical industries due to the different recurrent phases of growth and decline, which have to be reflected in future projections.
The same attention is needed when dealing with restructuring companies, whose investments arise from turnaround strategies and thus historical data are not representative of present and future operations.
- *Identification of the right β*: as said before, the beta factor is fundamental in the determination of the systematic risk of the company and its usefulness is finalized to the determination of the discounting factor. Anyway, identify the right beta is not always easy. It is important to consider firms' size (the smaller is the company and higher is the associated risk, the beta), the competitive positioning (leading companies are less risky than followers, thus they have smaller beta) or the financial structure (higher is the overall debt, higher is the beta). Moreover, beta estimation is even more difficult with start-up, companies in restructuring phases, in emerging markets or entering in new business or geographical regions with higher and different risks that must be considered.
- *Time horizon selection*: as explained when presenting the Terminal Value, in valuation exercises there is always the consideration of an explicit period in which cash flows are

projected. The identification of the relevant years that has to be projected is really important and normally this period coincides with the year in which the firm is able to maintain its competitive advantage. Anyway, in the general practice the explicit period is considered to be between six and ten years and can be extended in particular cases. For example, when the company sustain huge investments which will produce benefits in the long term or when the company has a license expiring in a lot of years, the considered years can be even more than ten.

- *Terminal Value calculation*: Terminal Value has to be diligently computed, given its relevant weight in the determination of enterprise value. Indeed, it is the result of several components: firstly it is important to correctly determine the last year cash flow and the growth rate, taking into account that it is impossible to sustain continuous revenues growth for an indefinite period of time. In fact, it is more realistic to consider growth rate initially bigger and slowly declining near to zero. Furthermore, in the long term it is also reasonable to consider the increased pressure from new competitive sources due to bigger incumbent dimensions and new entrants.

These considerations have an impact in the determination of future revenues and margins, both needing a growth rate near to zero in the long term and that has to be reflected by coherent investments (Capex). In fact, it is impossible to sustain revenues without capital expenditures needed to continue operations, therefore when the analyst considers a long period of time it is norm to consider in the terminal value the achievement of the steady state: investments equal to its corresponding depreciation. This has consequently an effect on net working capital changes that, in steady state conditions, are considered to be null with no impact in the last free cash flow. All the latest considerations suggest using a prudential approach when determining the terminal value's growth rate, which should be near to zero.

Chapter 3: The Wire&Cable market and the two main actors: Prysmian and General Cable

This chapter is made to present the business case considered for this master thesis: the acquisition of General Cable by Prysmian. These two companies are among the biggest actors in the Wire and Cable industry and their merger has represented a big event in their market.

For this reason, I will firstly describe the industry and then the two companies, trying to present and analyze their business characteristics before and after the merger, and the reason why they decided to join their forces.

3.1 The Wire&Cable industry

The Wire and Cable industry has become one of the backbones of the modern information age. Indeed, power, light and communication increased their importance over time and thus "mean of transportation" for these products were always more and more fundamental. Moreover, this trend is going to continue and the demand for reliable, efficient energy and data communication will grow, strengthening the wire and cable industry (See Figure 5). In fact, the increase of economic activity and urbanization typical of our age (most of all in developing countries, see Figures 6 and 7) will augment the number of constructions and infrastructures, widening the operativity of residential, commercial, automotive, energy, power and telecom industries, which are all related and based on the use of wire and cables.

Due to the vast usage of wire and cable, today the industry is divided into several product segments (Winnik, 2017):

- LV energy: Used for the transmission of energy below 1kW;
- Power cable: All cables for the transmission of energy at 1kW and above;
- External telecom: These cables are made of metallic materials more appropriate for telecommunication networks;
- Internal Data: Different from the others, these are used for the transmission of voice/data, telephone and LAN communication ways;
- Winding wire: Cables which are use in motors and transformers, made of round and enamelled wires.

- Fibre optics: The most recent and modern cable for high-quality and high-speed communication made of the particular optical fibres; it is the most requested and used since 2008 due to its numerous pros (See Figure 8).
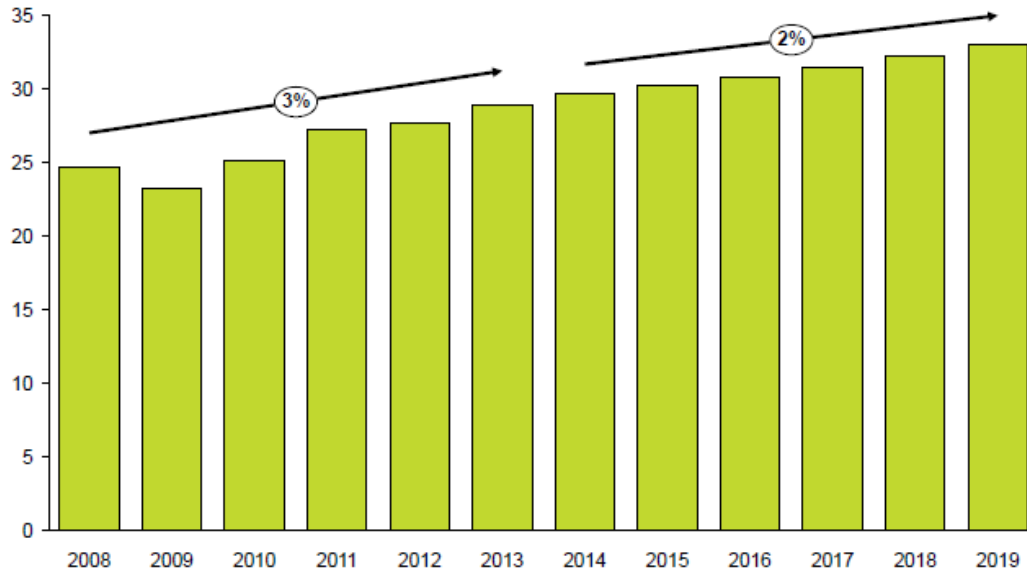

Figure 5: Global demand expected to plateau after period of recovery post-2009 (in million tons). Source: Integer Wire & Cable Data Service
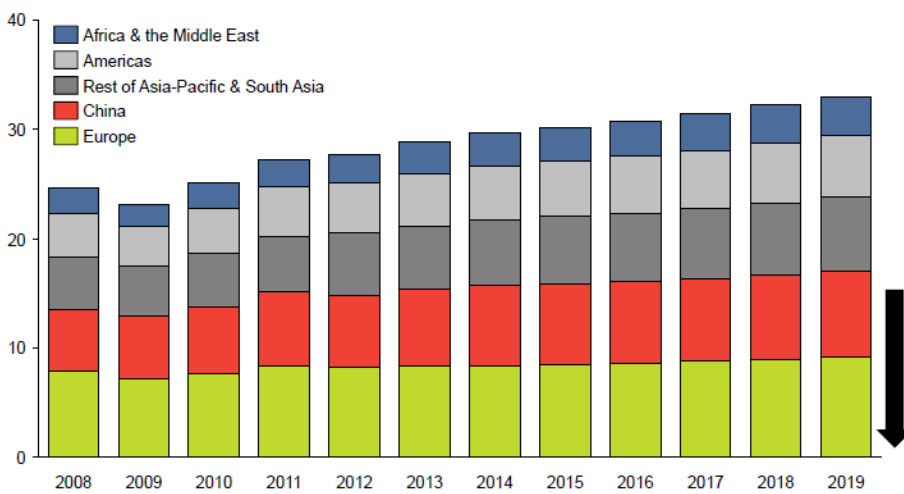

Figure 6: Slowdown of the largest consumers in Europe and in China (in million tons). Source: Integer Wire & Cable Data Service
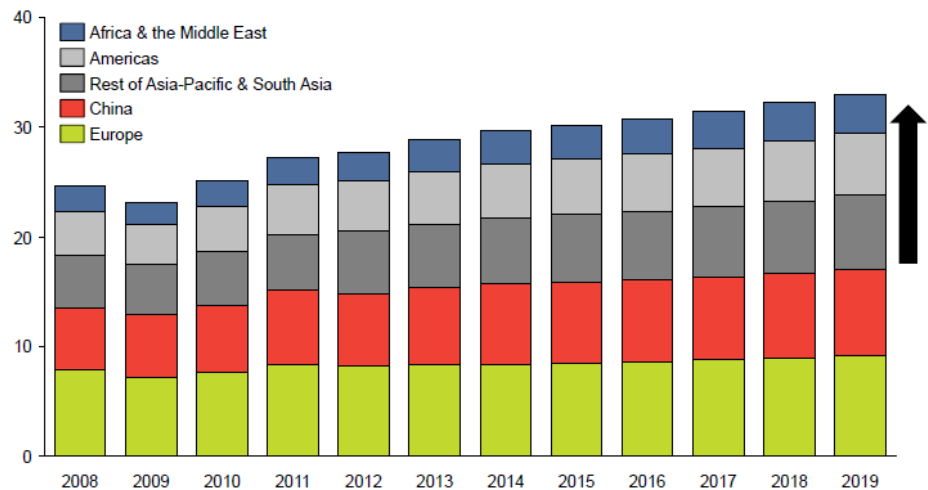
Figure 7: Growth expected in new markets (in million tons). Source: Integer Wire & Cable Data Service
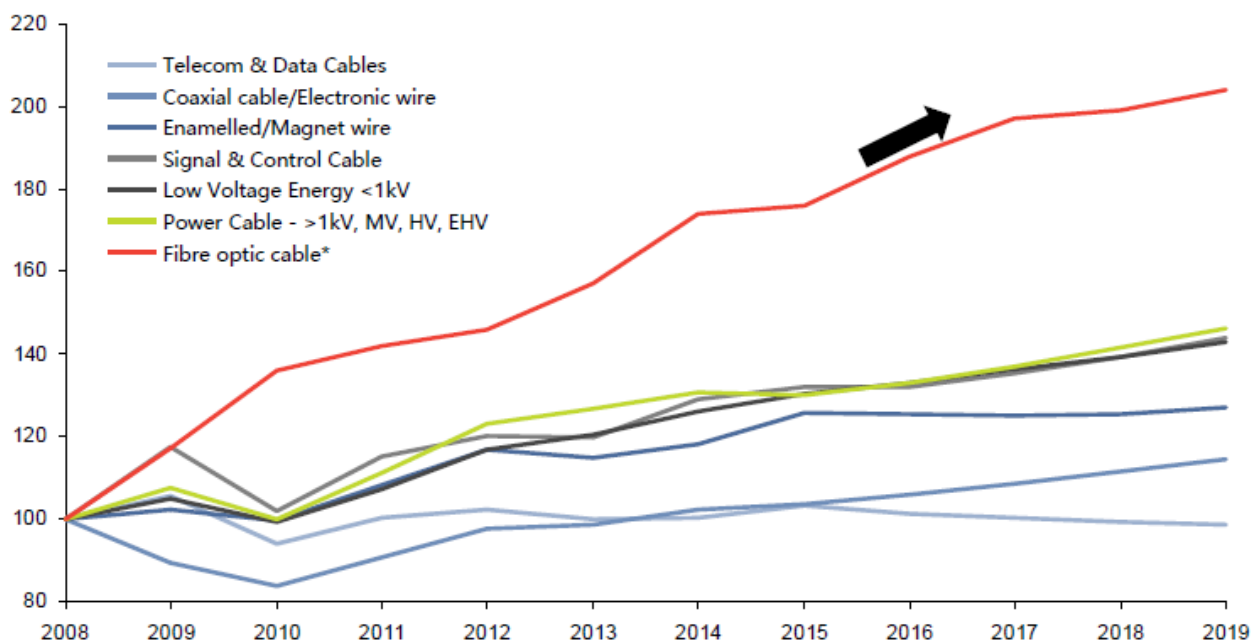
Figure 8: Wire & cable demand index by product segment. Source: Integer Wire & Cable Data Service

3.1.1 Industry Porter's Five Forces analysis

In 2010 the global industry was valuated at $127 billion and in the last two registered years, 2016 and 2017, it reached respectively $170.29 billion and $186.09 billion with a CAGR of 5,6% between 2010 and 2017. Moreover, according to Transparency Market Research and its investigation regarding the Wire&Cable sector, the global CAGR, through year 2026, will reach a value of around 4,1% (Transparency Market Research, 2018). Notwithstanding this continuous growth over years, the industry has strengths and weaknesses that can be understood and presented through the use of Porter's Five Forces analysis.

Overall (see Figure 9), the brand loyalty in this market is low and for this reason the buyer power is high, even if it is mitigated by the fact that their business is heavily reliant on cables. On the other hand, the suppliers are provider of raw materials which are subject to the variation of prices but anyway, they have strong bargaining power because there are few alternatives to copper and aluminium. In fact, this is the main cause of low substitutes presence in the market, because other systems of energy and power transmissions are rare and costly to be implemented. Finally, the moderate industry growth in the latest years is the reason why a lot of new entrants are attracted, even if the strong capital-intensity of the business is able to mitigate the entrance of new competitors (MarketLine Industry Profile, 2012).

In the following pages each of the five forces will be further analysed to define in the most comprehensive way the market in which the study case is set.
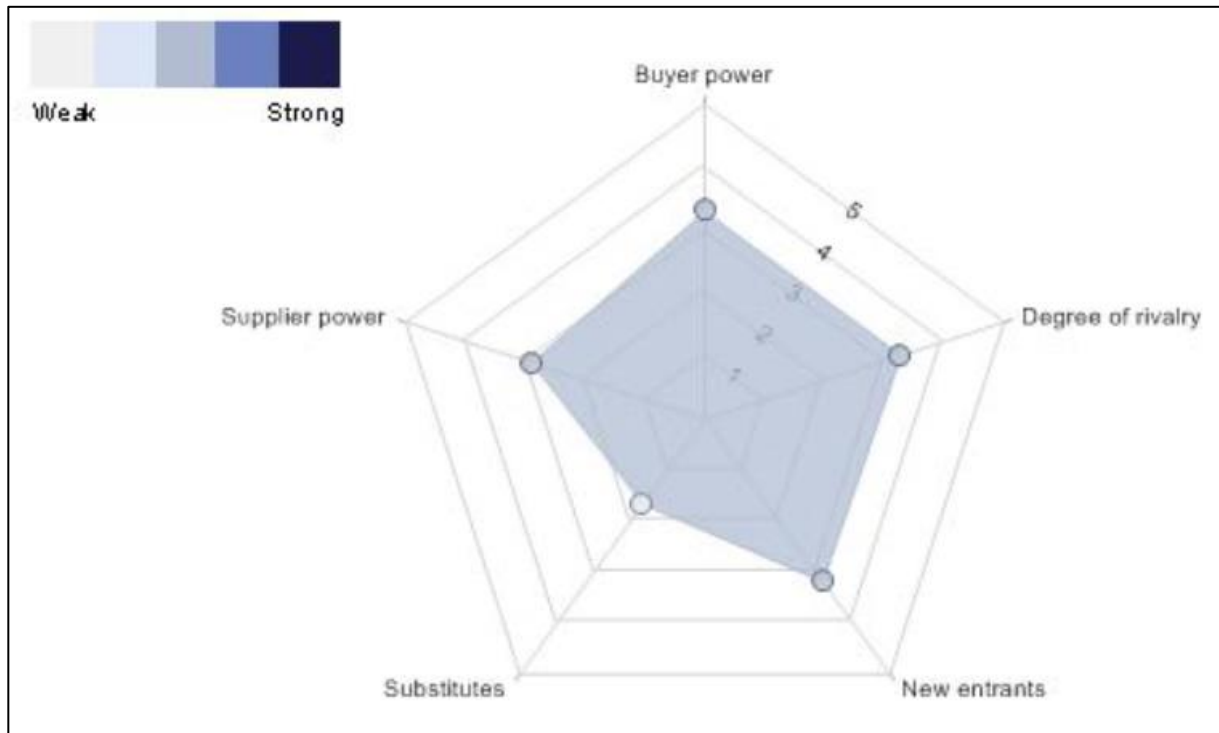
Figure 9: Five forces analysis in the Wire&Cable industry. Source: MarketLine Industry Report, 2012.

1) Buyer Power

Overall their power is rated as moderate (MarketLine Industry Profile, 2012) (see Figure 10), in fact the buyers in this industry are companies which operate in the transmission and distribution of electricity and telecommunication. For these reasons, they cannot act without the presence of these cables, which need to be installed, extended and upgraded along time, and this is a key element in the reduction of buyers' power.

Anyway, brand loyalty is very low, leaded by choices made on the basis of price and this is the main driver of an increase in buyers' bargaining power. In fact, there are also reinforced by the fact that vertical integration is really difficult because the players at each stage of the industry play very different roles in different businesses.

In addition, in the industry it is possible to observe a certain degree of product differentiation based on product measurable performance. The use of different material in the creation of cables, or the possibility to offer a "total solution" product (where products are accompanied by high technology knowledge content) differentiate the overall offer by the actors in the industry, thus, reducing buyers' bargaining power.
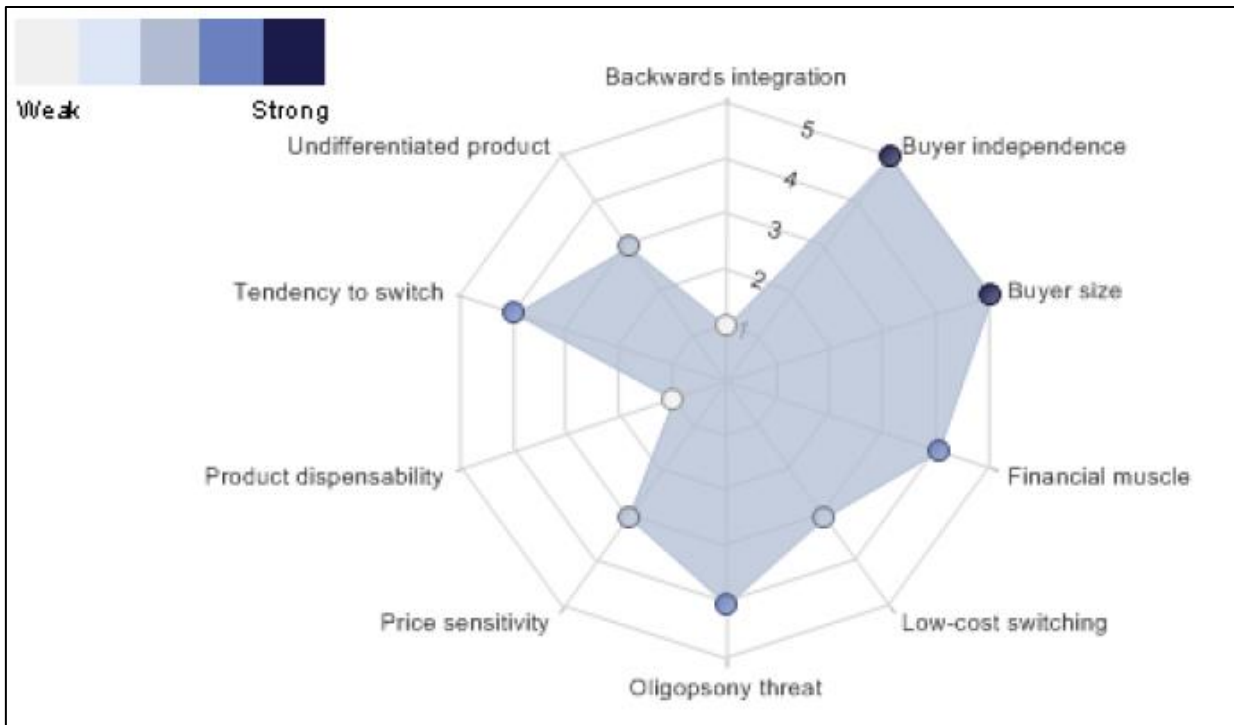
Figure 10: Drivers of Buyer power in the Wire&Cable industry. Source: MarketLine Industry Report, 2012.

2) Supplier Power

Supplier power has been assessed as moderate by MarketLine Industry Report (2012) (see Figure 11). First of all, the supplier in this industry are mainly who provide raw materials needed for the production of wires and cables, such as aluminium, copper, glass and plastic. Of course, the providers are very numerous and different, reducing in this way their bargaining power. In addition to this, raw materials are very subject to their price's fluctuations, increasing the possibility to shift to one supplier to another on the base of the best price.

On the other hand, these materials are the only ones that can be used properly in the construction of cables: copper is the main input, just substitutable by aluminium, to produce power cables, whilst fiber optic wires for communications are generally made with glass or plastic. Therefore, given that other material cannot offer the same technical and transmission characteristics, this increase very heavily supplier market power.

Even in this case, the impossibility to have upward vertical integration is another factor which increases supplier strength, which cannot be threatened by cables producers.

Figure 11: Drivers of Supplier Power in the Wire&Cable industry. Source: MarketLine Industry Report, 2012.

3) Threat of New Entrants

MarketLine Industry report (2012) assessed the threat of new entrants as moderate due to the combined effect of several factors (see Figure 12).

Firstly, the continuous growth of the industry will for sure attract new entrants, even because in the latest and following years more and more investments have been, and will be, required to bring fiber optic access to families (FTTH networks).

On the other hand, new entrants will face powerful incumbents in the industry, capital and knowledge intensive, well established in the network with supplier and customers, with strong and consolidated expertise in the production of wires and cables. In addition, the high fixed costs associated to the start of a new company in this market are all strong reasons to the reduction of new entrants' possibilities.

Figure 12: Drivers of Threat of New Entrants in the Wire&Cable industry. Source: MarketLine Industry Report, 2012.

4) Threat of Substitutes

Threat of substitutes is weak (MarketLine Industry Profile, 2012) (see Figure 13), in fact there are very few alternative ways and materials that can be used to build and make wire and cables. As
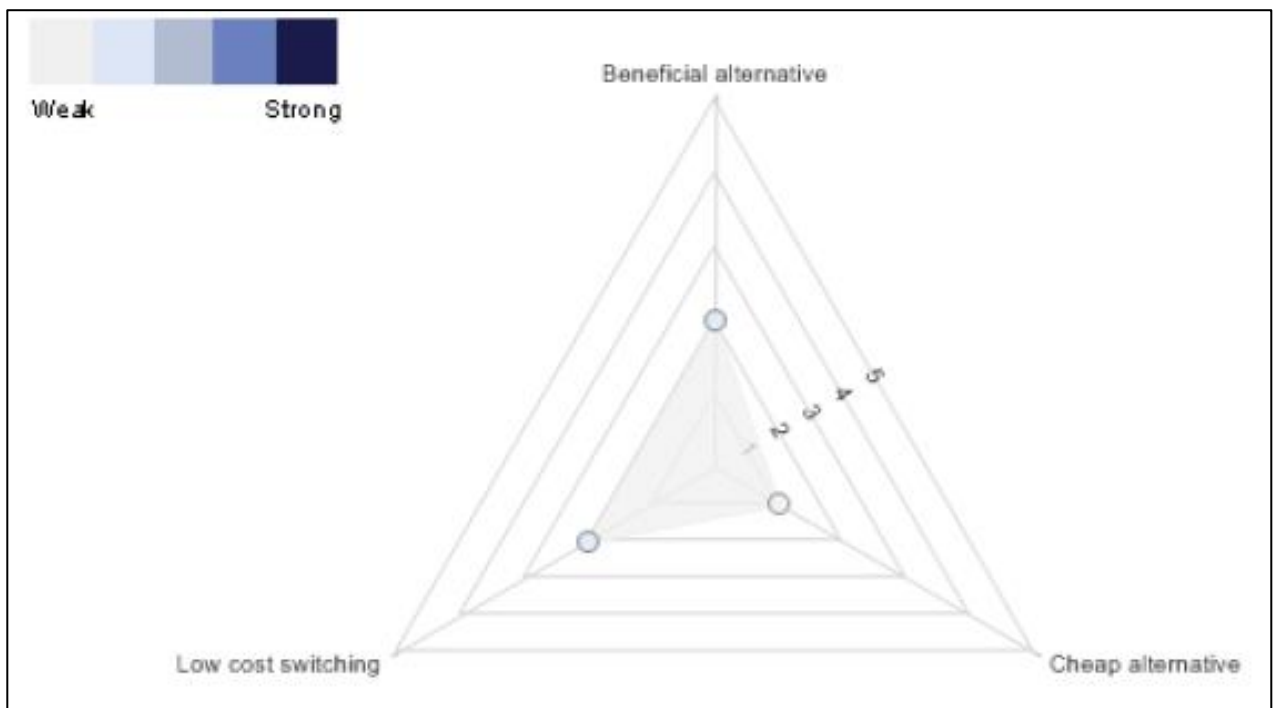
Figure 13: Drivers of Threat of Substitutes in the Wire&Cable industry. Source: MarketLine Industry Report, 2012.

an example, regarding telecommunications, the only possibility available is the utilization of infrastructures with wireless links, however the switching costs are very large.

Instead, considering high and extra high voltage cables for power transportation and distribution there are not valid substitutes to what is currently used in the industry, the only exception is the installation of solar panel in each household for autonomous production of energy, but anyway this option is still very restricted to some few cases.

5) Degree of Rivalry

The degree of Rivalry has been estimated as moderate (MarketLine Industry Profile, 2012) (see Figure 14) because in the market the active players are big and well-established companies. The investments required to enter in the market are very high, creating entry barriers and also exit barriers because the investments borne will be hardly convertible. Furthermore, the huge dimensions of these players allow them to reach economies of scale and be able to compete on prices, something very hard for possible new entrants.

However, the players are usually very specialists in some areas, for example some are specific producers of cables for energy and industrial markets, while other for infrastructure and communication markets. Therefore, it should be the possibility for a new entrant to specialize in some markets not completely served or occupied by incumbents.

Figure 14: Drivers of Degree of Rivalry in the Wire&Cable industry. Source: MarketLine Industry Report, 2012.

Defined the main characteristics of the wire and cable industry, it is important to specify that, in line with the industry characteristics, there are few big and relevant players active mainly in different parts of the world. Moreover, vertical integration, both upward and downward, it is very hard and therefore internal competition is characterized mainly by mergers and acquisition between competitors in the same level of the value chain.

The most important companies in this market are showed in the Figure 15 which underlines also the most important M&A occurred in the period 2007-2014: Prysmian acquired Draka Holding, becoming the first player per revenues all over the world. In this master thesis, I am going to analyse another, and maybe more important than previous, M&A involving again Prysmian which, last year (2018), acquired General Cable, strengthening its absolute domain in this market.

It is now time to describe the protagonist companies in this valuable M&A.
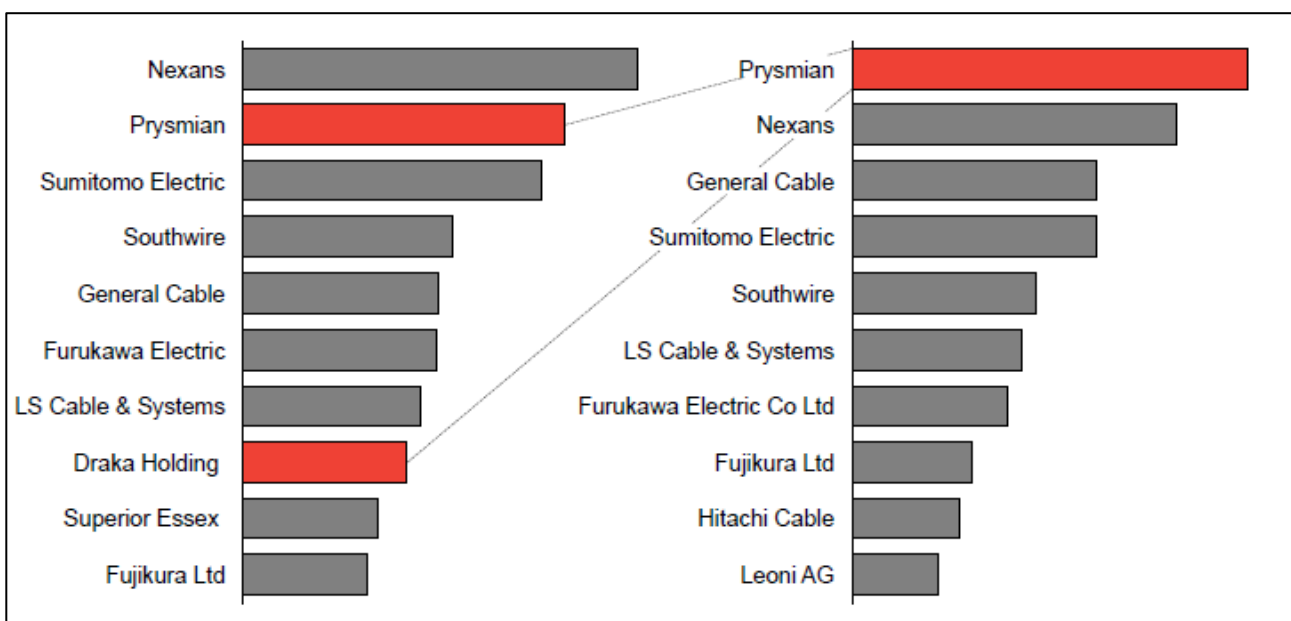

Figure 15: Global top ten cable.makers in 2007 (left) and 2014 (right), with highlight of Prysmian-Draka M&A. Source: Integer Wire & Cable Data Service

3.2 Prysmian Group: the acquirer company's history, business and SWOT analysis

Prysmian was created in 2005, but anyway its history begins in 19th century. Giovan Battista Pirelli started the first factory of G.B Pirelli and C. in 1872 where, thanks to machines arrived from France, worked the gum to produce technical products used for civil and military scope. This versatile raw material allowed him to widen horizontally its product family from tyres to cables.

In fact, in this way the founder created in 1879 "Pirelli Cavi e Sistemi", Prysmian ancestor, for the production of submarine cables for telegraphs and energy wires used also in cars' engines, representing a complementary product for the tyres business, contemporary developed always by the same company.

At the end of 19th century, wire and cable industry was dominated by huge investments by national governments to develop own telecommunication and power grids, that's why Pirelli was able to obtain more and more importance in the Italian market. Moreover, the development of the first multinationals companies and the founder's vision allowed to Pirelli to obtain market shares also in the international landscape, in the Mediterranean countries and then South America and rest of Europe. In 1950s Pirelli Cavi e Sistemi was the first company to produce cables for the transmission of high voltage energy higher than 270kW and in 1982 the first Italian fiber optic producer.

In 2001, during a re-organization process Pirelli decided to separate the activities related to wire and cables in two arms: "Cavi e Sistemi Energia" and "Cavi e Sistemi Telecom", which in 2005 will be acquired by the private equity fund named Prysmian (Lux) II, owned by Goldman Sachs Group. Under their guide, the company was transformed in a public company named Prysmian and listed in the Italian stock exchange market, Borsa Italiana S.p.A., in 2007 with a price of 15€ per share, obtaining a market capitalization of 2,7 billion. The role played by Goldman Sachs between 2005 and 2010 was really important to give the company a cultural footprint typically American, fundamental for the definition of the ownership model and for its multinational strategy, different from the usual Italian familiar business ideology.

Prysmian Group corporate organization is divisional with six different divisions each of them directly reporting to the Board of Directors: "Research and Development", "Administration, Finance, Accountancy and IT", "Corporate Development", "HR and Organization", "General Affairs" and "Communication", to which are added two more operative business functions. "Operative Management", who defines the supply chain strategy, the decision-making process and the time to market, while the "Commercial Management" is more oriented to the satisfaction of clients.

During the long history of the company continuous investments were, and are, made to improve the market power and presence all over the world, in addition to acquisition and joint ventures, in order to reach economies of scale in each plant and gain the nearest location possible to the final costumer (Prysmian Group, 2017).

Nowadays, Prysmian Group gives to clients a wide range of solutions and products based on cutting-edge technologies: submarines cables for high and extra high tension to connect continents; solutions for the oil and gas from exploration to production and warehousing; wires and cables for telecommunications and transmission of voice and video data; products useful for constructions and infrastructures in phases of installation and maintenance; cable solutions for naval, aerospace, rail-wail and street transportations and travel; specialized solutions to support the main global industries, such as defence, commerce and renewable energy, underlining the company willingness to be always up to date with new market opportunities (Prysmian Group, 2017).

3.2.1 Prysmian Group SWOT Analysis

- **Strengths**: Prysmian is a strategic champion due to its wide spread of operations and plants all over the world, indeed the company has its manufacturing activities managed in a very decentralized way, counting 82 plants in 50 different countries. This organization is pivotal to the company, allowing the quick reaction that the high-tech markets require to face continuously new challenges. All the plants in which the production is concentrated have become centres of excellence, guaranteeing to the company costs reduction through economies of scale, better efficiency and reduction of capital employed. Furthermore, the wide geographical presence is really important to reduce the distance from the numerous clients and minimize distribution costs, therefore mitigating the business risks with strong, quick production and delivery capabilities.

  The global presence of the company enables itself to avoid being over-dependent on a single market, diversifying the risks associated with countries, raw materials, legislations and so and so forth, while exploiting geographical opportunities. In addition, the different countries are also important to diversify the source of revenues, generated by four main regions: EMEA (Europe, Middle East and Africa), North America, Latin America and Asia Pacific, which in FY2017 accounted for 67.3%, 14.9%, 5.5% and 12.1% of total revenues respectively.

  Another important pillar of Prysmian's strategy is its effort in Research and Development (R&D) that allows the company to maintain high-tech edge over its competitors staying ahead of industry trends. Every year new products, processes and patents are studied and created in order to provide costumers the most advanced and innovative technologies, at competitive

costs. The group has 17 Centres of Excellence with over 500 skilled professionals, being able to add in the latest years 4850 patents. This was also possible thanks to the partnerships established with universities and research centres from all over the world, gathering knowledge and forefront capabilities from each of the different countries in which it operates. (MarketLine, 2018)

- **Weaknesses**: in the latest years, there was a reduction of the historical focus in the management and control of costs, which resulted in an operating margin declining from 5.9% (FY2016) to 5.3% (FY2017), with a confidence reduction and restrictions of further investments. Prysmian's operating costs as percentage of sales increased from 94.1% (FY2016) to 94.7% (FY2017) due to higher G&A expenses, consequently reducing the net profit margin from 3.3% (FY2016) to 2.9% (FY2017). The overall effect was reflected by the return on equity stood at 15.3% (FY2017) against the 17% (FY2016) (MarketLine, 2018).

- **Opportunity:** Prysmian has received in the recent years several new contracts that are expected to drive relevant revenues for the company increasing its dimensions and, thus, generating additional growth. As an example, it received a contract for the deployment of cable systems connecting a floating offshore wind farm to mainland UK. Moreover, in 2018 the firm was contacted for the creation and furniture of fire resistant cables in Dubai and it signed also an agreement with another company to test and improve technologies in power distribution and transmission and in telecom networks.

  In addition to these firm related opportunities, the outlook for the global wire and cable industry, as previously described, is positive and strong. Prysmian is well positioned in the market, owning a large portion of the total market shares, thus able to largely benefit from the industry growth. In fact, the expanding market is expected to drive higher demand for the group's products, enhancing the top-line performance in the medium/long term.

  In conclusion, it is important to anticipate that numerous synergies are expected by the merger with General Cable, source of additional opportunities for the company, but that will be later presented and analysed (MarketLine, 2018).

- **Threats**: Prysmian global operations have also a downside that every year represents a threat for the company results, the exchange rates. In fact, acting all over the world, the company must be able to manage huge amount of money in different currencies, which are subject to fluctuations. The US Dollar, British Pound, Brazilian Real, Turkish Lira and Chinese

Renminbi are the main threats due to their frequent changes in value, determining a risk for the company when it has future transactions, assets or liabilities recognized in the financial statement in a currency other than the functional one (the Euro in the case of Prysmian). To manage this risk the company operates in the financial markets using forward contracts that, anyway, cannot preserve the company from sudden changes in financial reports due to currency depreciations.

Another risk is related to the particular type of projects in which the company operates. These projects are defined by specific contracts with deadlines and quality standards, guaranteed by huge penalties calculated as a percentage of the contract value, even determining sometimes the contract termination. Therefore, non-compliance with contractual terms could result in heavy losses in terms of money and reputation.

In addition, wire & cable industry is moderately competitive and many of the products offered by the companies must be in line with legislative requirements, thus diminishing the possibility of differentiation and shifting the competition on prices. Furthermore, even if there are high entry barriers, it is not possible to rule out potential new entrants or limit the escalation of an incumbent aiming at increasing its market shares, both reducing source of profits for the company.

3.3 General Cable: the acquired company's history, business and SWOT analysis

General Cable Corporation is a developer, designer, manufacturer, marketer and distributor of copper, aluminium and fibre optic wire and cable products. These are used in several industries such as energy, industry, construction and communications, firstly in the US, Canadian, French, Brazilian and Spanish markets. In the latest year of independent operations, FY2017 before the acquisition by Prysmian, General Cable operated in 33 manufacturing facilities in 16 different countries with regional centres around the world.

The company has a long history started in 1927 when it was incorporated in New Jersey. Its first important contract was in 1929 when it produces the first 75,000-volt submarine cable in the US for the Delaware River Crossing, which started a strong relationship with the US Government that continued over years, guaranteeing several projects. In fact, later, during the Second World War the company deployed the 80% of the battlefield telephone wire used by the Allies and the 50% of the Navy's power and communications cable. During the years following the global conflict, the company was acquired by Penn Central Corp. and itself started to acquire other minor competitors, when in 1992 it gained one of its most important contracts, indeed it supplied the wire and cable to build infrastructure used for the Barcelona Olympic Games in 1992, giving the company experience in the construction of technologies for sports events. As a consequence, General Cable was also involved by the US Government in the supply of portable power cable for the Winter Olympic Games in Salt Lake City (Utah) in 2002. Before this date (in 2000), the firm had its first approach with Prysmian when it was still Pirelli Cavi e Sistemi, in fact the two enterprises entered in an agreement for the sale/purchase of underperforming businesses. In the following years, General Cable continues its growth acquiring other firms and establishing joint ventures aiming at widening its global scope and realizing optimal products and internal production processes. The results were evident in 2014 and 2015 when the company was awarded with four Stevie Awards for Sales and Customer Service and then one of its manufacturing facilities, in Marion (Indiana, US) was named winner in Industry Week's North America Best Plants Competition. These successes continued until the 2017 when it decided to merge with Prysmian in the business transaction that will be analysed in the following paragraphs. Before this event, General Cable operated through four geographical business segments: North America consisting in 17 manufacturing facilities and whose revenues accounted for 53% of the total; Europe and Latin America, both consisting in 6 manufacturing facilities with revenues representing the 23% and the 17%, respectively, of the total; Africa/Asia Pacific, consisting in 4

manufacturing plants reporting revenues which represented the 7% of the group's total revenues (General Cable, 2014).

3.3.1 General Cable SWOT analysis

- **Strengths:** General Cable owns a strong brand portfolio, with numerous patents, trademarks and secret protected confidential and proprietary information. The particularity of the company is that it sells its products globally with several brands such as Phelps Dodge International Corporation, PDIC global symbols, General Cable, Anaconda, BICC, Carol, GenSpeed, Helix/HiTemp, NextGen, Silec, Polyrad, Prestolite Wire, STABILOY, and NUAL which have significant recognition within the industry gaining an intense customer reach. The company, in line with Prysmian, has a wide global presence in terms of manufacturing plants and distribution areas, allowing the reduction of over-dependence on a single market. Moreover, the firm is characterized by a broad product portfolio composed by five main product lines: electric utility, electrical infrastructure, construction, communication and rod mill. This wide range of product allows also the establishment of a well-balanced revenue stream formed by different sources of products, reaching different customers and tapping opportunities in new and existing markets (MarketLine, 2017).

- **Weaknesses**: the worst weakness for General Cable are the many lawsuits and government investigations related to cleanup of certain waste sites and natural resource damages. As an example, at the end of the FY2016 and 2015 the company reported accrued liabilities approximately equal to $5.6 million and $3.6 million due to environmental-related damages. In future years again, if General Cable of any of its subsidiaries are found guilty, they can be charged with heavy fines and claims for damages, having a huge negative impact on the consolidated financial results. In addition to this, the firm has showed over years an over-dependence on few suppliers for part of its main raw materials such as copper and aluminum. It does not sign long term contracts with some suppliers, which resulted in a low level of bargaining power and low possibility of instant changes in the selection of suppliers. Further, any sudden problem with one of these counterparties could strongly damage the whole company's supply chain (MarketLine, 2017).

- **Opportunities:** General Cable has the major part of its activities in the US market where for the following years it is expected an increase in the demand of electricity by the end costumers, therefore augmenting also the request for cables for energy transmission. Hence,

the company could benefit from this external positive situation, increasing their bottom line. This positive outlook is also reinforced by the positive trend of the overall wire & cable industry, which, as already seen for Prysmian, will level up the number of products requested and the total revenues of General Cable (MarketLine, 2017).

- **Threats:** As said before, the company is heavily dependent on its raw material suppliers and therefore one of its threats is the fluctuation of raw material prices, which determines negative variations in the company's cost of goods sold, negatively affecting company's profits. As an example, at the end of FY2016 General Cable raw material costs were approximately 85% of total product costs, where copper and aluminum accounted for the 45% of the total. From these data it is possible to understand the possible huge impact that raw material price increase could have on company financial results. In addition, in the wire & cable industry there is a moderate competition as previously described but General Cable is not as big as Prysmian, thus not able to face with the same strength the other players.
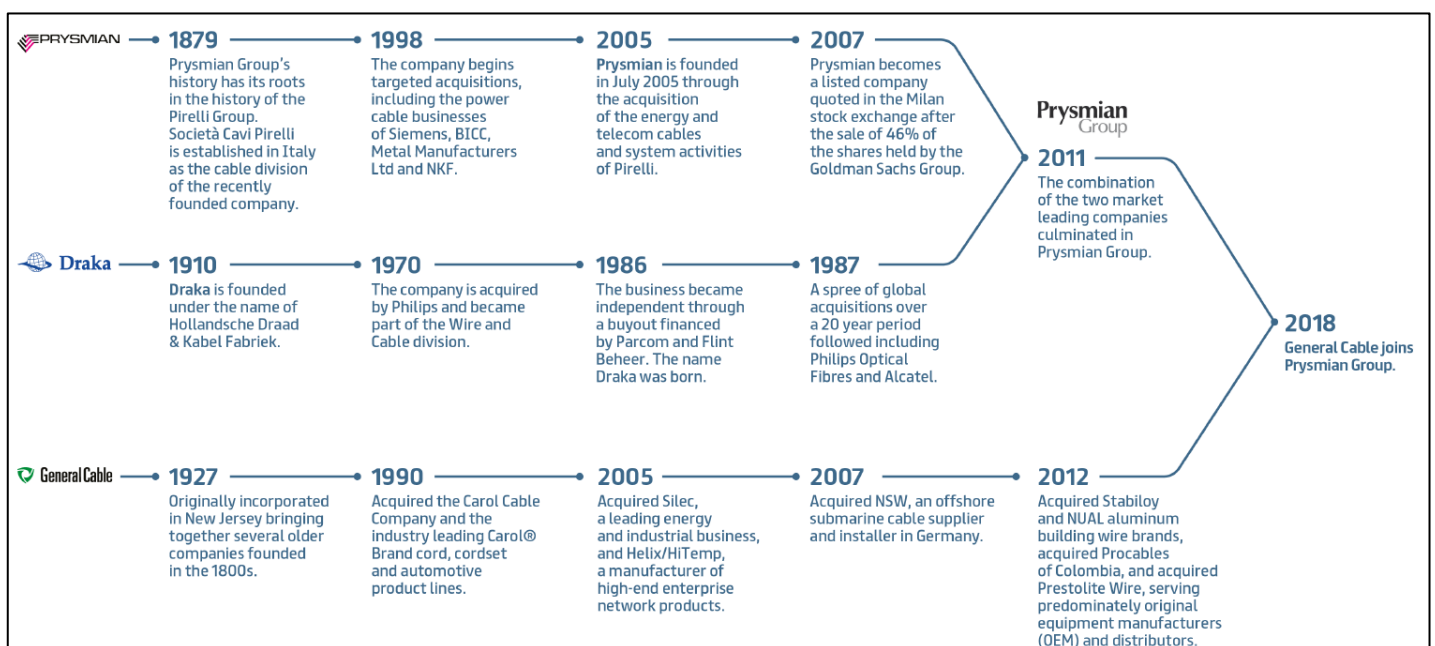

Figure 16: History of the Prysmian Group in a nutshell. Source: Prysmian Group Web site, https://it.prysmiangroup.com/

3.4 The Acquisition: timeline, events and rationale of a milestone in the Wire&Cable industry

"It is an exciting time to be part of Prysmian Group. The union with General Cable is a unique strategic opportunity to create value for all; for our people, our shareholders, our customers, and every community we have an impact on" (Prysmian Group, 2018)

With this phrase Prysmian Group CEO, Valerio Battista, talked about the acquisition of General Cable, an event defined as a milestone for the history of the group and for the entire Wire&Cable industry. For these reasons, this paragraph aims at explaining the rationale behind the operation, trying to explain and analyze the synergies between the two companies and the positive effect that it is expected to create for both firms, now joined in one big giant of the market.

Before the sign of this meaningful deal, General Cable tried in several ways to continue managing the business on their own. In fact, notwithstanding the numerous difficulties that were faced, in October 2014 the company initiated a transformation process to improve its performance: divestment of all non-core assets in Asia Pacific and Africa (United States Securities and Exchange Commission, 2018). The result of this strategy weren't so positive, therefore in the fourth quarter of 2015 General Cable committed to a new strategy plan aiming at the optimization of assets portfolio, developing leading cost and efficiency positions, innovating and creating an high-performance culture. The plan required significant capital expenditures in new projects, restructuring of facilities in main regions, hiring of new relevant executive management and the engagement of external consultant resources while internally developing a renewed employee culture. Even if this strategy provided with the expected results in terms of cost reduction, as of June 2017, the results have been substantially offset by business and market trends such as: overall weak economic growth in the products and markets in which the firm operated, added to price erosion due to increased competitiveness.

As a consequence, on June 21 2017, General Cable's Board held a meeting to analyze the recent negative results: the firm obtained flat to declining outcomes in 2016/2017 despite the effort in the new plans. Consequently, they decided to start considering new initiatives and investments that could lead to performance improvement, with a detail of each associated cost, risk, time and payback. Every possibility of continued operations would have led to significant investments with no certain future results in the near term. Therefore, on July 12 2017, J.P. Morgan, acting as financial advisor for General Cable, suggested that the best way to generate the highest value for shareholders would have been to initiate new external strategic alternatives such as a recapitalization with borrowed capital, a sale for cash or for stock or a combination of both. Each possibility was then presented in terms of

costs and benefits and finally the Board of Directors opted for the sale of the Company, convinced that, in presence of numerous possible synergies with other parts, the cash obtained would have represented the best way to deliver value to shareholders (United States Securities and Exchange Commission, 2018).

In fact, the following days, the entire process was articulated in 5 main steps (Prysmian Group, 2018):

1. *The intention to sell*: on 16 July 2017, General Cable decided to open itself to the possibility of selling the company, reviewing the strategic alternatives to maximize the shareholder value.

2. *The announcement*: on 3 December 2017, Prysmian and General Cable defined their agreement for the purchase of the latter by the former for a price of $30 per share in cash.

3. *The stakeholders' approval*: on 16 February 2018, General Cable stockholders approved the acquisition of the company, 38,140,754 shares at a price of $30 per share, representing the 75.34% of the total number of shares of common stock outstanding and around the 99% of the total votes cast.

4. *The Regulator approval*: on 8 March 2018, the transaction has been cleared for US antitrust purposes.

5. *The last obstacle and the closing*: firstly, on 2 June 2018, the two companies obtained clearance from the CFIUS (Committee on the Foreign Investment in the United States) that eliminates the last hurdle for the acquisition. In fact, on 6 June 2018 Prysmian and General Cable announced the closing of the operation, launching publicly their new organization 5 days later.

From the beginning, the two companies organized themselves to operate as a single company, aligning their goals and the delivering strategy. The new structure created is simple in order to increase accountability all over the world, managing the differences in cultures and nationalities to achieve mutual successes.

"We will now be able to leverage our combined strengths, increase our presence in existing markets, and reach out new ones, while strengthening our leadership position and continuing to exceed the expectations of our customers" (Prysmian Group, 2018).
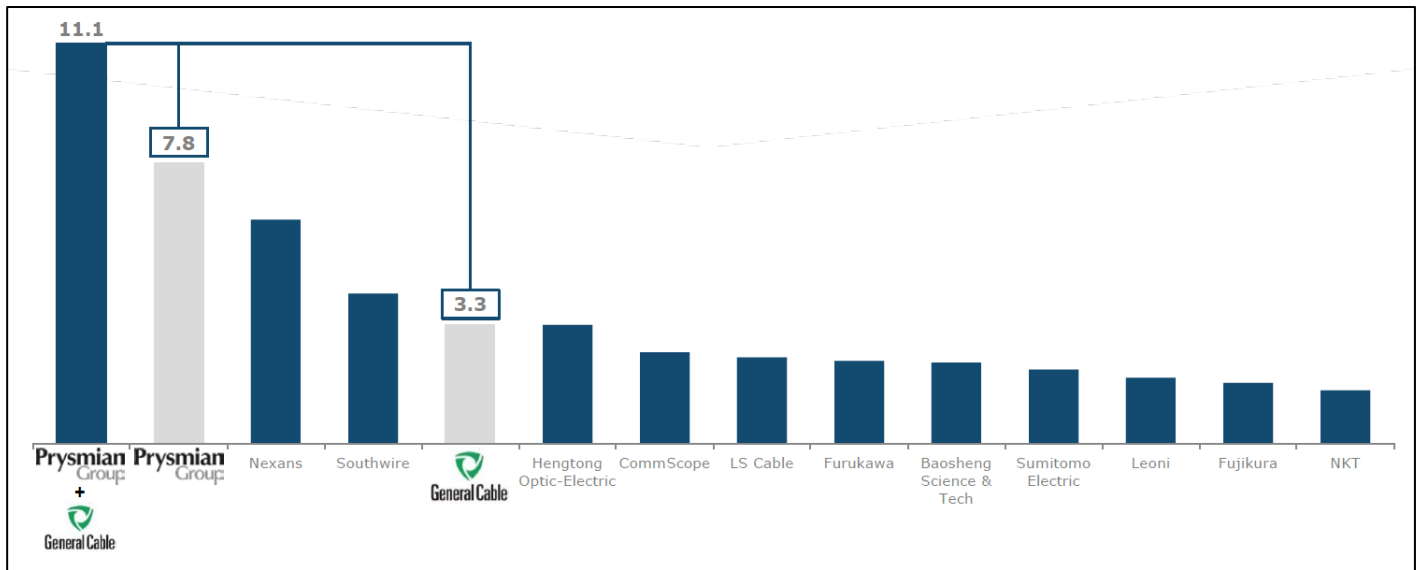
Figure 17: The increasing market position of the Prysmian Group (per revenues) after the acquisition. Source: Prysmian Group Insight, 2018

The CEO words, commenting the acquisition, are useful to understand the reasons that leaded to the closing of the transaction. Prysmian is able to strengthen its, already strong, competitive position, reducing the number of competitors and being able to enter and expand in new markets.

As it is possible to see from the Figure 17, the transaction involved the first and the fourth players in the Wire&Cable industry, allowing the joined group to reach the first position detaching its competitors per total revenues. In fact, this astonishing increase is the result of several synergies arising from the combining forces of the two companies.

1. **Complementary geographical footprint**: The two companies, even if both operating globally, had a major focus on different countries. Prysmian had higher presence in EMEA and APAC regions, while General Cable was really strong in the American continent, both in North America and LATAM. With the merger of the two firms, the entire group have now the possibility to be actively present all over the world, being the first operator in each market reached. Indeed, the total €11.1 billion revenues (showed in the Figure 18) are the result of €6 billion from EMEA, €1 billion from APAC (both generated by Prysmian), €3.1 billion from North America and €1 billion from LATAM (both generated by General Cable).
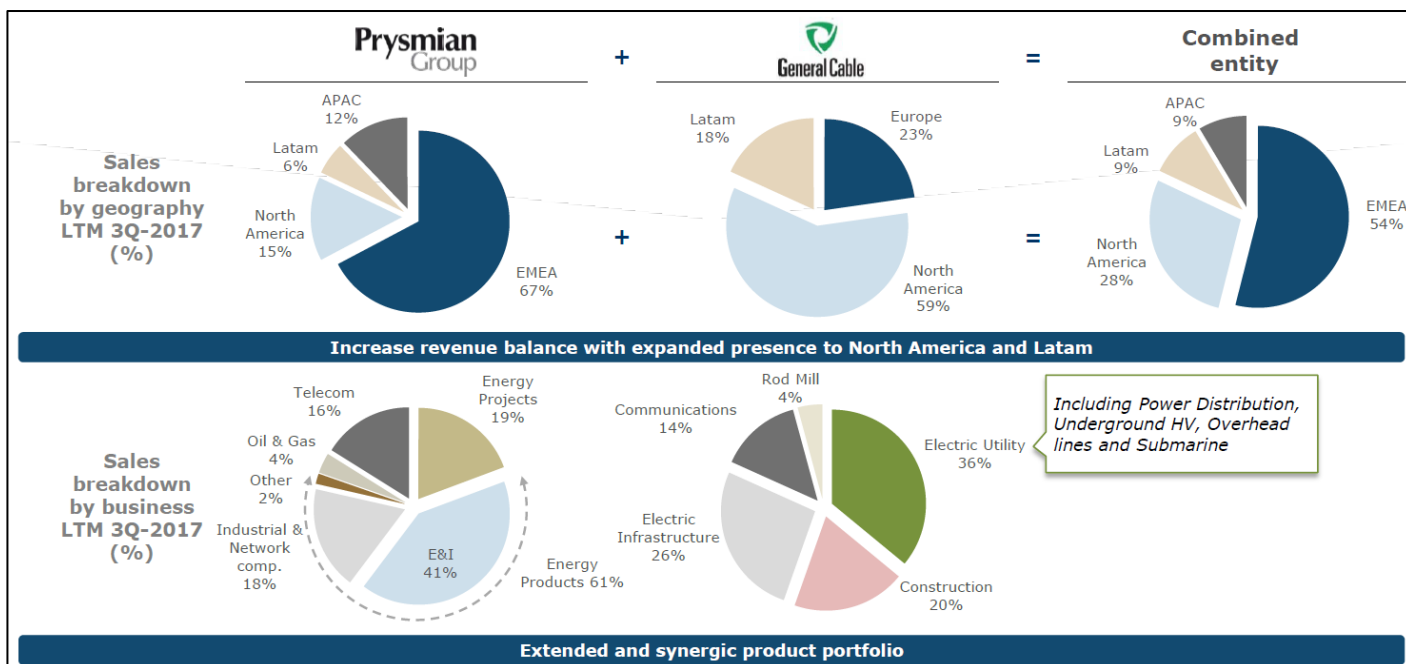
Figure 18: Revenues breakdown per region and business, for the two companies and the whole group. Source: Prysmian Group Insight, 2018

2. **Complete understanding of the market**: Acting together the two firms have a complete understanding of the industry, gathering information and innovation possibilities from each corner of the world. As an example for Prysmian, the entry in the American market represents a real opportunity due to the market's innovative footprint and high level of demand, leading to new ideas and higher need for further developments in technology. This will be additionally enhanced by the 25 R&D centers, which can now rely on both companies' knowledge and unique patents.

3. **A strong cultural fit**: This is a core element in a merger process, because cultural similarities can facilitate inclusion, team working and accelerate the unification of the two companies. The two entities embrace in the same way values such as efficiency, economic, social and environmental commitment and sense of responsibility, having at the center of both strategies customers and sustainability. Indeed, the goal of the new entity is to leverage the combined capabilities to serve the customers with the cutting-edge technologies, not only satisfying them but also anticipating their needs.

4. **The widest and complete product/contract portfolio in the market**: Combining the firms services, products and present/future contracts with customers located in different parts of the world, the group can now benefit from the biggest portfolio of opportunities to increase revenues and gain more experience. Prysmian and General Cable are now the world leader in project, such as: deployment of power grids, power transmission and offshore wind farms;

exploration and production of oil and gas, refineries and petrochemical solutions; construction of the safest power transmission cables for buildings and giant infrastructures, cars, trains, airplanes and ships; optical fiber and telecom networks connecting communities and industries globally; construction of high temperature conductors for overhead powerlines; provision of advanced systems and solutions to help customers even after the construction of infrastructures, for their management and control.

5. **Procurement, overhead and manufacturing costs reduction**: Taking into consideration the increasing number of contracts possibilities and synergies deriving from combined technologies and production facilities, the two companies estimated a reduction also in costs, related to procurement overhead expenses and manufacturing, expecting to reach economies of scales. This effect was estimated using the "pre-tax run-rate cost synergies", that is an estimation of the cost savings generated by the synergies with the assumption that all the other conditions will continue as they are in the present year. Therefore, the joined companies are expected to generate a pre-tax run rate cost synergies of around €150 million in five years from the merger.
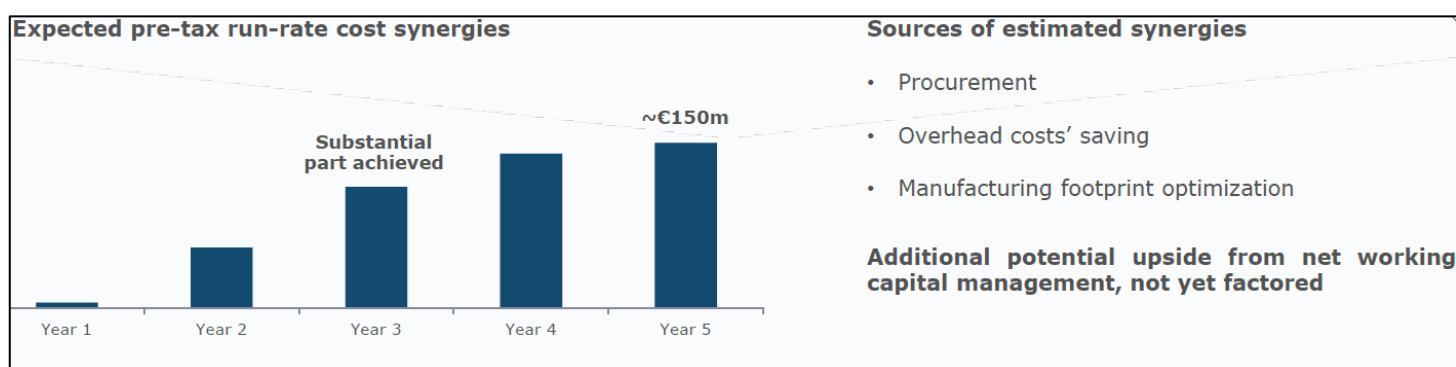
Figure 19: Prysmian-General Cable pre-tax run rate cost synergies over the first five years after the merger. Source: Prysmian Group Insight, 2018

3.4.1. Economic and Financial Characteristics and effects

In conclusion of this paragraph, it is important to explain the financial characteristics of the acquisition because the actual price payed by Prysmian to take over General Cable will be the benchmark for this master thesis in the evaluation of reliability and accuracy of the different business valuation techniques.

The transaction was financed with a mix of new debt, cash and credit lines, which, concluded the deal, ensures to the two companies a pro forma net financial position equal to 2.9x over the adjusted EBITDA. Moreover, the overall sources of capital have been all employed to reach the amount of $3 billion needed to acquire the total amount of General Cable stocks: 50,623,497 outstanding shares of

common equity. This price represent the evaluation of the company, including debt and other liabilities, and guaranteeing a premium of around 81% to the acquired firm's closing stock price, $16.55 and $21.80 per share, dated 14 July 2017 and 1 December 2017 respectively, the last day before the announcement regarding the possibility of selling the company and the last day of trading before the announcement of the agreement between the parts.

As a consequence of this transaction, the day after the disclosure of the deal, General Cable stocks had a rise, opening at 29$, while Prysmian shares suffered due to the communication. Anyway, its shareholders believed that the merger would have ensured an increase in terms of earnings per share, equal to +10-12% in the first year after the closing. In fact, the huge number of synergies and the perfect geographical completeness achieved by the whole group gave strong positive feelings for the future. In addition to that, Prysmian was already studying new acquisition possibilities due to its huge cash flow generation, which allows to be the first and most convincing bidder.

Taking into account these financial information, the aim of the next chapter is to evaluate General Cable through three different valuation methods, with reasonable assumption to forecast its future results and the termination value, in order to understand which of the selected valuation techniques allows to business analysts to gain the most accurate estimation of a company's enterprise value.
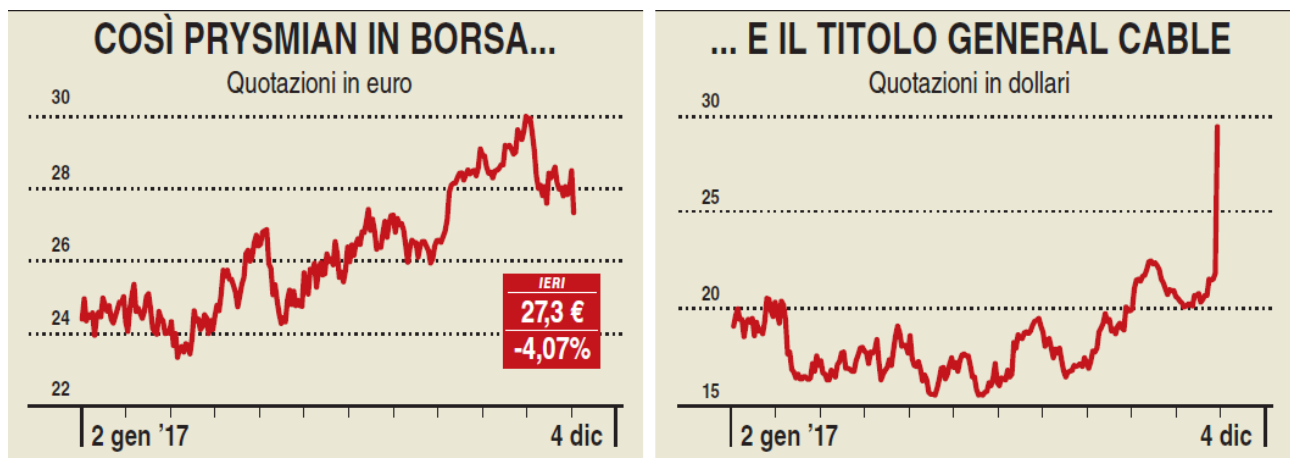
Figure 20: Prysmian and General Cable share price after the deal disclosure, 4 December 2017. Source: Milano Finanza, 5 dicembre 2017.

Chapter 4: Business case, General Cable company valuation

The previous chapters were useful to understand the basic knowledge needed to perform a business valuation exercise, the goal of this section. Indeed, after having deeply analyzed the main valuation methods, among which I selected the three more suitable for this specific case, the flow moved to the understanding of the two companies involved in the M&A and the industry in which they operate. Finally, this chapter will be more practical as it will present the result of the valuation exercise performed using Excel worksheets. In order, the writing will present firstly the historical result of General Cable, the acquired company, exhibiting its reclassified financial documents and all the needed information to explain the changes from year to year. Following, there will be the representation of the valuation exercise through the DCF, the Comparable companies multiples and the Comparable transactions multiples methods. The chapter will be then followed by conclusions in which I will critically analyzed the results obtained from the three different methods, performing measures of errors and understanding which one has been nearer to the actual share price payed in the transaction (30$ per share, as previously stated).

4.1 General Cable historical results

The aim of this paragraph is to present the historical results of the acquired company, in order to understand its recent operative history and build on past data the projections for future evaluations. Firstly, it is important to precise that the historical data considered are from financial years 2014 – 2015 – 2016 – 2017. Unfortunately, it was not possible to go more in the past because the results would not be any more comparable due to two main reasons: a restructuring and transformation program aiming at the simplification of the entire group, which began in 2014, and the adoption of the new ASU 2015-17, regarding the management of "Income Taxes (Topic 740): Balance Sheet Classification of Deferred Taxes" (General Cable Corporation, 2018). In fact, the years before 2014 cannot be compared due to very different results in terms of quantity and of geographical presence of the company. Moreover, the new taxation law changed the registration of deferred taxes, allowing just the analysis between 2015 and 2017, but fortunately looking at 2015 annual report it was possible also to obtain the 2014 adjusted results, performed by the management in order to have continuity of comparison between 2014 and 2015 (General Cable Corporation, 2016).

Before presenting the results, the following part will be used to summarize the annual main events on the base of respective annual reports. In fact, the numbers in each financial documents have been

generated by the operating events occurred year by year; this is why it is crucial to present what happened in the past:

a) *Financial year 2014*: In this year, the company announced that it was starting to implement a restructuring program aiming at asset optimization all over the world. Indeed, the program determined the closure of certain underperforming assets as well as the consolidation and realignment of other facilities. As a consequence, the company completed the sale of Phelps Dodge International Philippines Inc. and Phelps Dodge Philippines Energy Products Corporation in exchange of cash ($ 67.1 million). Moreover, the plan brought to the divestiture of two manufacturing facilities in North America, as well as the cessation of operations in Brazilian aluminum rod mill manufacturing. All these interventions lead to numerous savings, especially in SG&A expenses, even if there were both monetary and reputational costs in front of all stakeholders. Anyway, the majority of the positive effects were offset by goodwill and impairment losses due to problematics with the Venezuelan entity. Indeed, the changes occurred in the currency exchange system and the prices' control regime, under which the Venezuelan facilities were subject to, restricted the company's ability to increase the prices more than 30% higher than product costs. This led General Cable to negative estimation of operating results, obtaining heavy losses in terms of assets impairment and goodwill charges (General Cable Corporation, 2015).

b) *Financial year 2015*: During this period, the company was able to generate restructuring savings of $ 36 million and reduced the net debt by $ 220 million. In North America another underperforming plant closure was performed, as well as relocation of assets across multiple plants to increase scale and efficiencies. Moreover, the company acted to consolidate several plants in Brazil and Colombia. Regarding the rest of the World, General Cable managed to sale its interests in numerous joint ventures in Asia-Pacific regions (51% of Fiji and 20% of Keystone in exchange of cash, as well as definitive sale of operations in Thailand, China, New Zealand and Australia). Furthermore, 2015 was also crucial in terms of new future expectation due to a new strategic roadmap following the restructuring program of the previous year. In line with new goals, the company aimed at the enhancement of organizational capabilities and cultivation of an high-performance culture. Notwithstanding these efforts, even 2015 positive results were offset by asset impairment charges. Indeed, in this financial year the valuation of Algerian facilities led to expected future cash flows lower than the carrying value of the same assets due to significant decline of oil and gas markets, resulting in impairment losses of more than $ 30 million (General Cable Corporation, 2016).

c) *Financial year 2016*: In line with past years, General Cable continued with its plans closing and selling facilities in Asia and Africa, accounting for a total amount of 370 positions closed globally. Indeed, the divestiture plan continued in both North and South America where the company completed the disposal of its Automotive Ignition Wire business and Venezuelan facilities for total cash amount of $ 7.1 million and $ 6 million respectively, also obtaining gains, due to SG&A expenses reduction, for a total amount of $ 36 million. Nevertheless, even this year gains and savings were partially offset by several losses: legal fines payed due to the resolution of SEC and DOJ investigations, related to the financial restatements performed for 2012 and prior years, for a total amount of $ 82.3 million. Moreover, Procables minority shareholders elected to exercise their put option to sell their 40% stake in the company, therefore General Cable was obliged to sustain costs for $ 18 million. In conclusion, other unexpected losses were registered due to unfavorable foreign currency exchanges, which affected the consolidated results due to necessarily expenses to hedge from far too much negative impacts (General Cable Corporation, 2017).

d) *Financial Year 2017*: In this year the restructuring and transformation plans, started in the prior periods, were near to an end, in fact the company performed the last divestiture in Asia-Pacific and Africa regions obtaining considerable amount of gains. At the same time, it tried to restart with new investments and capital expenditures to strengthen and accelerate its plan targeting operational effectiveness and efficiency. However, the overall results were not satisfying and the value generated for shareholders has not been enough. That's why the main event occurred during this year was the management's decision to consider external ways to create higher value, leading General Cable to enter into the Merger Agreement with Prysmian S.p.A (General Cable Corporation, 2018).

Having said that, it is now possible to present and look at financial results more critically, understanding the reason of such declining results over the period considered. Indeed, as it is possible to see from the following Balance Sheet, Cash Flow and Income Statement (Table 1, 2 and 3), management decision have been perfectly reflected by the annual final results: since 2014, the totality of accounting items resulted declining, in line with the overall business downsizing and simplification. Revenues as well as costs were reduced, tangible and intangible assets has been declining together with debt and equity. This general path was slightly changed in some cases during 2017 when the company tried the last attempt to turn positive again with new debt and investments. However, as previously said, it was not enough to obtain the desired results.

The most evident and significant items in the time period considered are the depreciation & amortization as well as unusual expenses in the Income Statement, along with deferred taxes, non-

cash items and foreign exchange effects in the Cash Flow Statement. In particular, it is possible to notice that in 2016 the company obtained nil effect in relation to foreign currency conversion, due to its prompt hedging plan in response to the prior years' losses. Moreover, the increase in capital expenditures, in 2016 and 2017, are representative, if compared to the previous year, of General Cable willingness to turn newly positive.

Balance Sheet				
Data in $ millions	2017	2016	2015	2014
Intangibles assets	110,0	113,1	151,0	299,9
Tangible Assets	530,3	529,3	563,2	670,7
Fixed Assets	**640,3**	**642,4**	**714,2**	**970,6**
Inventory	736,1	768,2	846,4	926,6
Current Assets	793,4	750,1	804,6	1.353,1
Current Liabilities	(793,2)	(901,1)	(949,3)	(1.482,8)
Operating Working Capital	**736,3**	**617,2**	**701,7**	**796,9**
Provisions	(19,2)	(20,2)	(23,0)	(20,3)
Other Long term liabilities	(271,5)	(300,5)	(332,6)	(423,0)
Net Invested Capital	**1.085,9**	**938,9**	**1.060,3**	**1.324,2**
Cash and short term investments	(84,7)	(101,1)	(112,4)	(136,7)
Total Long term Debt	1.038,8	871,1	911,6	933,9
Net Financial Position	**954,1**	**770,0**	**799,2**	**797,2**
Shareholders Equity	**131,8**	**168,9**	**261,1**	**527,0**
Source of Financing	**1.085,9**	**938,9**	**1.060,3**	**1.324,2**

Table 1: Reclassified Balance Sheet, own elaboration on the base of General Cable Balance Sheet (see Appendix 1)

Cash Flow Statement				
Data in $ millions	2017	2016	2015	2014
Cash Flow-Operating Activities				
Net Income/Starting Line	**(54,7)**	**(94,4)**	**(136,3)**	**(644,4)**
Depreciation/Depletion	**73,9**	**86,0**	**96,4**	**126,4**
Deferred Taxes	**(12,1)**	**(22,7)**	**(24,4)**	**(14,4)**
Non-Cash Items	**80,2**	**41,6**	**141,7**	**609,8**
Changes in Working Capital	**(126,3)**	**143,2**	**121,0**	**54,1**
Accounts Receivable	(25,3)	11,2	133,5	(0,4)
Inventories	18,1	52,6	34,0	110,8
Other Assets	6,4	7,3	23,0	24,5
Accounts Payable	7,8	2,8	(37,6)	(69,0)
Payable/Accrued	(133,3)	69,3	(31,9)	(10,5)
Other Assets & Liabilities, Net	-	-	-	-
Other Operating Cash Flow	-	-	-	(1,3)
Cash from Operating Activities	**(39,0)**	**153,7**	**198,4**	**131,5**
Cash Flow-Investing Activities				
Capital Expenditures	(85,4)	(84,1)	(61,5)	(89,6)
Other Investing Cash Flow Items, Total	4,0	83,5	72,0	73,6
Cash from Investing Activities	**(81,4)**	**(0,6)**	**10,5**	**(16,0)**
Cash Flow-Financing Activities				
Financing Cash Flow Items	-	(11,9)	(2,5)	(6,9)
Total Cash Dividends Paid	(37,4)	(35,6)	(35,3)	(35,4)
Issuance (Retirement) of Stock, Net	2,1	1,2	0,2	(30,4)
Issuance (Retirement) of Debt, Net	133,8	(119,0)	(221,7)	(50,4)
Cash from Financing Activities	**98,5**	**(165,3)**	**(259,3)**	**(123,1)**
Foreign Exchange Effects	5,5	-	(43,5)	(205,8)
Net Change in Cash	**(16,4)**	**(12,2)**	**(93,9)**	**(213,4)**
Net Cash - Beginning Balance	101,1	112,4	205,8	418,8
Net Cash - Ending Balance	84,7	100,2	111,9	205,4
Free Cash Flow	**(124,4)**	**69,6**	**136,9**	**41,9**

Table 2: Reclassified Cash Flow Statement, own elaboration on the base of General Cable Cash Flow Statement (see Appendix 2)

Income Statement				
Data in $ millions	2017	2016	2015	2014
Revenues	**3.837,2**	**3.858,4**	**4.514,5**	**5.979,8**
Operating Expenses	**(3.754,0)**	**(3.774,2)**	**(4.398,0)**	**(5.910,9)**
Cost of Revenue	(3.411,1)	(3.365,3)	(3.985,7)	(5.460,2)
SG&A	(416,8)	(408,9)	(412,3)	(450,7)
EBITDA	**83,2**	**84,2**	**116,5**	**68,9**
EBITDA Margin %	*2,17%*	*2,18%*	*2,58%*	*1,15%*
Depreciation and Amortization	(73,9)	(86,0)	(96,4)	(126,4)
Unusual Income (Expenses)	-	(16,5)	(5,6)	(253,9)
Impairment-Assets Held for Use	*-*	*(16,5)*	*(5,6)*	*(253,9)*
EBIT	**9,3**	**(18,3)**	**14,5**	**(311,4)**
EBIT Margin %	*0,24%*	*-0,05%*	*0,45%*	*-0,96%*
Net Interest Income (Expenses)	(76,7)	(87,0)	(94,3)	(111,8)
Other Non Operating Income (Expenses)	28,5	7,2	(71,3)	(212,9)
EBT	**(38,9)**	**(98,1)**	**(151,1)**	**(636,1)**
Income Tax (provision) benefit	(15,8)	3,7	14,8	(8,3)
Net Income (Loss)	**(54,7)**	**(94,4)**	**(136,3)**	**(644,4)**

Table 3: Reclassified Income Statement, own elaboration on the base of General Cable Income Statement (see Appendix 3)

4.1.1 FY2017 Adjustment for comparison purposes

Having in mind the particular transformation process undertaken by General Cable in the considered period, it was mandatory, for the purposes of this thesis, to perform some crucial adjustments to the last financial year (2017). Indeed, as previously announced, the firm valuation exercise will be performed through the DCF, Comparable companies and Transactions multiples methods, therefore comparability between companies will be pivotal.

In order to guarantee comparability, it has been necessary to adjust the last year's results trying to purify them from all extraordinary expenses occurred to conclude the transformation processes, as well as income taxes and unusual non-controlling interests' expenses/income. The goal of this activity was to obtain financial values linked to the sole operating activity, allowing the valuation results to be analyzed in comparison with other firms' annual performance.

In the following two tables, there will be the adjustment of EBITDA, EBIT and Net Income (Table 4 and 5), while in the third one the adjustment has been also performed to the FY2017 Free Cash Flow (Table 6), pivotal data to the DCF valuation exercise.

Adjustment of Financial Year 2017 Results	
Data in $ million	2017
Net Income (Loss)	(54,7)
Income tax provision (benefit)	15,8
Income tax provision (benefit) adjustment [1]	*6,0*
Adjusted EBT	(32,9)
Net Interest Income (Expenses)	76,7
Other Non Operating Income (Expenses)	(28,5)
Net Income (loss) attributable to noncontrolling interest [2]	*2,0*
One-time adjustment [3]	*72,0*
Adjusted EBIT	89,3
Depreciation and Amortization	73,9
Adjusted EBITDA	163,2

Table 4: Adjustment of Financial Year 2017 Results, own elaboration on the base of Schedule 14A Proxy Statement filed with US Securities and Exchange Commission by General Cable

Adjustment of Financial Year 2017 Results	
Data in $ million	2017
Adjusted EBITDA	163,2
Depreciation and Amortization	(73,9)
Adjusted EBIT	89,3
Net Interest Income (Expenses)	(76,7)
Other Non Operating Income (Expenses)	28,5
Adjusted EBT	41,1
Income Tax (provision) benefit	(15,8)
Adjusted Net Income	25,3

Table 5: Adjustment of Financial Year 2017 Results, own elaboration on the base of Schedule 14A Proxy Statement filed with US Securities and Exchange Commission by General Cable

The Adjustments observable in Table 4 are the result of own elaboration on the base of FY2017 Annual report and of the "Proxy Statement pursuant to section 14(a) of the Securities Exchange Act of 1934 (Rule 14a-101)", submitted to the United States Securities and Exchange Commission by General Cable, at conclusion of the agreement with Prysmian. The adjustment needed and performed are marked with notes and will be now explained:

a) *Note 1, Income Tax provision (benefit) adjustment*: This is the result of the adoption, as previously stated in this chapter, of the new ASU 2015-17, regarding the management of "Income Taxes (Topic 740): Balance Sheet Classification of Deferred Taxes". Indeed, this

new rule affected annual reports due to a different reporting technique of Deferred taxes between last and prior years, creating the necessity to consider adjustment for comparison purposes with other US and, especially, with foreign companies (General Cable Corporation, 2018).

b) *Note 2 and 3, "Net Income (Loss) attributable to non-controlling interests" and "One-time adjustment"*: The two items' adjustment is related to the restructuring and divestiture costs sustained by the company ($ 3 million in Asia Pacific and Africa, added to $ 29 million in the rest of the world), as well as losses on the sale of assets and minority interest for the total amount of $ 41 million. Moreover, the total amount comprehends further legal and investigative expenditures ($ 1 million) (General Cable Corporation, 2018). As it is possible to understand, the whole amount considered represents expenditures not related to sole operating activities and that are thus added back in this adjustment process.

The so determined Adjusted EBITDA was used to compute the Adjusted EBIT and finally the Adjusted Net Income. Every item resulted higher than the reported values in the actual Income statement (Table 3) because the extraordinary events affected very negatively company's results, thus making difficult a fair comparison with other firms. Furthermore, the adjustment was concluded determining an Adjusted Operating Free Cash Flow (Table 6) using as starting point the Adjusted EBITDA and introducing figurative taxes calculated with a figurative tax rate equal to 33%, as specified by General Cable in its documentation (General Cable Corporation, 2018).

Adjustment of Financial Year 2017 Results	
Data in $ million	**2017**
Adjusted EBITDA	**163,2**
Depreciation and Amortization	(73,9)
Adjusted EBIT	**89,3**
Figurative Taxes (figurative tax rate 33%)	(29,5)
NOPAT	**59,8**
Depreciation and Amortization	73,9
Delta Net Working Capital	(126,3)
Delta Provision	1,0
Capex	(85,4)
Adjusted Free Cash Flow	**(77,0)**

Table 4: Adjustment of Financial Year 2017 Results, own elaboration on the base of Schedule 14A Proxy Statement filed with US Securities and Exchange Commission by General Cable

4.2 General Cable valuation using Discounted Cash Flow

The first valuation exercise that will be presented will be performed through the Discounted Cash Flow method. Therefore, before showing the results it is important to understand the hypothesis made for the projections of future cash flows and the reasoning behind the determination of the most appropriate discounting rate (WACC).

- **Future projections' assumptions**

Discounted Cash Flow valuation							
Data in $ million	2017	2018	2019	2020	2021	2022	TV
Revenues	3.837,2	3.994,5	4.158,3	4.328,8	4.506,3	4.691,0	4.691,0
Adjusted EBITDA	163,2	169,9	176,9	184,1	191,7	199,5	199,5
Depreciation and Amortization	(73,9)	(73,9)	(73,9)	(73,9)	(73,9)	(73,9)	(55,0)
Adjusted EBIT	89,3	96,0	103,0	110,2	117,8	125,6	144,5
Figurative Taxes (33%)	(29,5)	(31,7)	(34,0)	(36,4)	(38,9)	(41,5)	(47,7)
NOPAT	59,8	64,3	69,0	73,8	78,9	84,2	96,8
Depreciation and Amortization	73,9	73,9	73,9	73,9	73,9	73,9	55,0
Delta Net Working Capital	(126,3)	(15,0)	(14,0)	(14,0)	(13,0)	(13,0)	-
Delta provision	1,0	0,4	0,4	0,4	0,4	0,4	-
Capex	(85,4)	(70,0)	(55,0)	(55,0)	(55,0)	(55,0)	(55,0)
Operating Free Cash Flow	(77,0)	53,6	74,2	79,1	85,2	90,4	96,8

Table 5: Discounted Cash Flow data projections, own elaboration.

As a starting point, it is important to precise that I assumed 2017 as last data available year and as time zero, given that the M&A agreement between General Cable and Prysmian was signed at the end of it. Therefore, the data showed in Table 7 are actual, and based on the adjustment process abovementioned, for FY2017, while projected, and thus based on assumptions, for the following 5 years (considered as explicit period). In addition to the explicit period, I also computed the data for all future periods, considered implicit, and summarized in the last column TV (or Terminal Value). The purpose of the implicit years is to consider the company's ability to continue to operate even further the five years explicitly showed, considering also long-term cash flows for the aim of the valuation exercise.

a) *Revenues*: In the future, the revenues are always increasing. Indeed, I assumed that the company, concluded its transformation process in 2017, would have been able to start growing in following years. Therefore, I used a **Revenues Growth Rate** equal to **4,1%**, in line with the CAGR 2018-2026 estimated by Transparency Market Research in its Wire&Cable Industry report (Transparency Market Research, 2018).

b) *Terminal Value*: Regarding the implicit period, beyond 2022, I assumed the company in a **steady state**. This means that the revenues will be flat, depreciation and amortization equal to the total amount of Capex and changes in Provision and Net Working Capital equal to zero.

c) *Adjusted EBITDA*: The adjusted EBITDA has been calculated considering the adjusted EBITDA Margin (*EBITDA/Revenues*), from the last actual year (2017), representative of the following periods. Unfortunately, I wasn't able to use the average of a longer past period due to the extraordinary years in which the company has been passing through. Therefore, the most reasonable assumption was to employ the EBITDA Margin 2017 computed after the adjustment previously described. In particular, in 2017 the **adjusted EBITDA Margin** was equal to **4,3%**.

d) *Depreciation and Amortization*: This item has been considered flat during the period presented and reflecting only the North America, Europe and Latin America segments (General Cable Corporation, 2018). Furthermore, regarding the Terminal Value I assumed, in line with the steady state, depreciation and amortization equal to the capital expenditures sustained.

e) *Income figurative taxes*: These has been computed on the base of EBIT and of a figurative **interest tax rate** equal to **33%** (General Cable Corporation, 2018).

f) *Changes in Net Working Capital – Provision and Capex*: The evolution of these items would have been difficult to estimate without knowing the company's future projects. Fortunately, I found out a **business plan performed by the management** and included in the document submitted to the United States Securities and Exchange Commission (General Cable Corporation, 2018). Hence, I adopted these data even because, as previously stated, it would have been impossible to consider the past years average as a reliable measure of the future, given that they resulted from extraordinary periods.

- **Discounting Interest Rate: WACC computation and assumptions**

Before presenting the result of the Discounted Cash Flow method, it is pivotal to explain the estimation of the discounting interest rate, the Weighted Average Cost of Capital (WACC), through which the above-showed Operating Free Cash Flows will be discounted back in time zero (2017 for the purpose of this valuation).

WACC formula is the following:

$$WACC = Ke * E/(D+E) + Kd * D/(D+E) * (1\text{-}Tax\ rate)$$

Its computation is exposed in the following table, after which the several variables will be deeper analyzed presenting their specific determination process.

WACC	
Risk free rate 10Y (avg 12m)	2,3%
Market risk premium	5,5%
Beta unlevered	1,12
Beta levered	7,01
Cost of equity (Ke)	**24,6%**
Gross cost of debt	7,4%
Tax shield	2,4%
Tax rate	33,0%
Net cost of debt (Kd)	**4,9%**
D/D+E	88,7%
E/D+E	11,3%
D/E	7,88
WACC	**7,16%**

Table 6: WACC determination, own elaboration.

a) *Risk free rate*: The risk free rate has been defined using Bloomberg platform, looking for the twelve months average of the 10 years U.S. Treasury bond yields, obviously considering 2017 data.

b) *Market risk premium*: This variable has been determined using Damodaran web site (Damodaran, 2019).

c) *Beta unlevered*: the beta representative of comparable companies has been determined using Bloomberg Platform. In particular, the results are shown in the following table, highlighting that the median value will be employed in the computation of WACC rate (further information regarding the selected comparable companies will be given later, in the section focused on the Comparable Companies Multiple method).

Comparable pricing analysis						
Data in $ million # Company	Country	Total market cap	NFP	EV	Sales 2016	Beta unlevered
1 BELDEN INC	US	2.725	705	3.430	2.082	1,380
2 ENCORE WIRE CORP	US	739	(87)	651	917	1,457
3 PRYSMIAN SPA	IT	4.860	808	5.668	7.361	0,846
4 NEXANS SA	FR	2.107	268	2.375	6.239	1,115
Average						**1,143**
Median						**1,115**
Min						**0,846**
Max						**1,457**

Table 7: Comprable companies' unlevered beta estimation, data obtained using Bloomberg platform.

d) *Beta levered*: This data is based on the process of "re-levering" the beta on the base of General Cable capital structure. In particular:

$$Beta\ Levered = \beta_{unlevered}*[1+(1\text{-}tax\ rate)*Debt/Equity]$$

e) *Cost of Equity (Ke)*: This interest rate is representative of the yield expected by the shareholders in return of the capital employed in the company. Its computation is based on the formula defined by the Capital Asset Pricing Model (CAPM), previously shown in this thesis. As a matter of clarity, here it is presented the numerical computation:

$$Ke = 2,3\% + 7,01*(5,5\% \text{ - } 2,3\%) = 24,6\%$$

f) *Gross cost of debt (Gross Kd)*: Representative of the average cost of debt sustained by the company in FY2017, this has been defined as follows, without considering the positive effect of tax shield:

$$Gross\ Kd = Interest\ Expenses/Total\ financial\ debt$$

g) *Tax shield*: It was computed as the Gross Kd multiplied by the figurative tax rate (33%) and it is representative of the shield fiscally obtained due to interests payed on debt outstanding.

h) *Net cost of debt (Kd)*: Obtained as the difference between the Gross Kd and the Tax Shield, resulting in this case in a net value of 4,9%.

i) *Capital structure*: It represents the amount of debt and equity used by the company to finance its expenditures. In particular General Cable D/(D+E) is equal to 88,7%, while E/(D+E) to 11,3%.

j) *WACC*: in conclusion of the entire process, it is now possible to obtain our initial goal, the Weighted Average Cost of Capital.

$$WACC = (4,9\%*88,7\%) + (24,6\%*11,3\%) = 7,16\%$$

- **Discounted Cash Flow result**

Discounted Cash Flow valuation							
Data in $ million	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**TV**
Revenues	3.837,2	3.994,5	4.158,3	4.328,8	4.506,3	4.691,0	4.691,0
Adjusted EBITDA	**163,2**	**169,9**	**176,9**	**184,1**	**191,7**	**199,5**	**199,5**
Depreciation and Amortization	(73,9)	(73,9)	(73,9)	(73,9)	(73,9)	(73,9)	(55,0)
Adjusted EBIT	**89,3**	**96,0**	**103,0**	**110,2**	**117,8**	**125,6**	**144,5**
Figurative Taxes (33%)	(29,5)	(31,7)	(34,0)	(36,4)	(38,9)	(41,5)	(47,7)
NOPAT	**59,8**	**64,3**	**69,0**	**73,8**	**78,9**	**84,2**	**96,8**
Depreciation and Amortization	73,9	73,9	73,9	73,9	73,9	73,9	55,0
Delta Net Working Capital	(126,3)	(15,0)	(14,0)	(14,0)	(13,0)	(13,0)	-
Delta provision	1,0	0,4	0,4	0,4	0,4	0,4	-
Capex	(85,4)	(70,0)	(55,0)	(55,0)	(55,0)	(55,0)	(55,0)
Operating Free Cash Flow	**(77,0)**	**53,6**	**74,2**	**79,1**	**85,2**	**90,4**	**96,8**

Tax rate	33,0%						
WACC (%)	7,2%						
g-rate	1,0%						
Revenues Growth rate	4,1%						
EBITDA Margin	4,3%						
Discount factor		0,9	0,9	0,8	0,8	0,7	0,7
Discounted OFCF		50,0	64,7	64,3	64,6	64,0	1.588,8
Σ OFCF	307,6						
Discounted TV	1.124,6						
Enterprise Value	**1.432,2**						
NFP	954,1						
Equity Value	478,1						
Shares Outstanding	50,6						
Share Price	**$9,4**						

Table 8: Share price estimation through the DCF method, own elaboration.

After having explained in detail all the assumptions needed in such a complex valuation method, here it is the result. The share price computed is equal to $ 9,4 therefore significantly far from the actual payed price of $ 30 per share. Anyway, further comments on the result, also compared to the other valuation methods, will be presented later in conclusion of this thesis.

For the purpose of this chapter, just few other clarifications need to be made. In particular:

1) The Terminal Value discount factor has been considered equal to the last year and then adjusted as stated in paragraph 1.2.2 of this writing:

$$TV\ Discount\ Factor = 1/(1+WACC)^5$$

Subsequently adjusted in the following way,

$$Discounted\ TV = TV*[(1+g)/(WACC-g)]/(1+WACC)^5$$

Where the g rate is the long term growth rate considered for the years beyond the explicit period, that has been defined prudentially at 1,0% (as it possible to see from Table 10).

2) The Discounted Cash Flow method consists in the discounting of all future operating cash flows, thus representative of the company asset side. Therefore, the first result obtained is the Enterprise Value, also definable as the sum of Equity and Net financial position (which is the total amount of debt minus cash and cash equivalents). Indeed, as it is possible to see from table 10, the Share Price was determined as the Equity Value divided by the number of Shares outstanding. In particular:

$$Equity\ Value = Enterprise\ Value - Net\ financial\ Position$$

$$Share\ Price = Equity\ Value/Shares\ Outstanding = \$\ 9,4\ per\ share$$

Moreover, as stated always in paragraph 1.2.2 of this thesis, when the result of a valuation technique is based on numerous assumptions, it is always good practice to perform a scenario analysis. The purpose is to understand how the share price can change with different growth rates and WACC. Indeed, in the following table, there are all the possible share price outcomes in correspondence of several combination of g rate and WACC. Specifically, I performed the sensitivity analysis adding and subtracting 100 basis points to both long-term growth rate and WACC.

Share price measure					
Data in $			WACC		
	6,2%	6,7%	7,2%	7,7%	8,2%
0,0%	10,46	8,14	6,15	4,42	2,90
0,5%	12,62	9,95	7,67	5,72	4,02
g-rate **1,0%**	15,21	12,07	**9,44**	7,22	5,30
1,5%	18,34	14,60	11,53	8,95	6,77
2,0%	22,24	17,68	14,02	11,00	8,47

Table 9: Share price sensitivity, own elaboration.

4.3 General Cable Valuation using Comparable companies' multiples

The flow of the writing now shifts to the second valuation method selected: Comparable companies' multiples. As described in previous chapters, the main two steps in this technique are the selection of the most representative comparable companies and comparison multiples.

Regarding the first choice, the identification of similar companies was driven by the specific industry in which firms operates, without regard of their countries. Therefore, as stated in chapter two, the choice was made at an "International infra-sector" level. Indeed, the Wire&Cable market is, in its nature, global given that large part of companies' business is devoted to submarine cable for electricity and communication transmission purposes. Consequently, considering just US companies would have been reductive aiming at a fair comparison of such a global company. Without considering the last years of transformation and divestitures, General Cable had activities in several part of the world, from US to Latin America, from Europe to Africa and Asia-Pacific. That is why I decided to consider comparable companies from the home, as well as foreign, countries. A brief description of the selected comparable is now exposed:

a) **Belden Inc.**

It was incorporated in 1988 in USA and it operates as a signal transmission solutions provider company. Its products are used in a large variety of segments, such as broadcast, enterprise, industrial, and sold to distributors, end users and installers. Nowadays the company has manufacturing facilities in the United Sates, Brazil, Canada, China, Japan, Mexico and in various countries of Europe (Thomson Reuters, 2019).

b) **Encore Wire Corp.**

Born in 1989 it is a manufacturer of electrical building wire and cable, used for interior electrical wiring in both the commercial and housing sectors. Its principal customers are wholesale electrical distributors, selling to electrical contractors and building companies. The company is smaller than its comparables as it operates just in the US, anyway its competitive position is really strong and as of 2017 it was one of the most competitive companies in home country (Thomson Reuters, 2019).

c) **Prysmian S.p.A.**

Prysmian will be not more presented in this section as it was well analyzed in chapter 3. Anyway, it is worth specifying that considering the huge amount of synergies previously exposed and the consideration made on geographies and production similarities, Prysmian can be considered one of the most representative companies, with Italian origin and global operations.

d) Nexans SA

It is a France based company incorporated in 2000 as a business unit of Alcatel. It provides copper and fiber-optic cables and cabling systems to the energy, as well as telecom, data and building industries. It is the second largest manufacturer of cables after Prysmian and it has a worldwide presence in 34 countries (Thomson Reuters, 2019).

Having selected the comparable companies, their most representative financial information have been researched to obtain significant multiples, which in this specific valuation exercise are:

- **EV/EBITDA** and **EV/Sales**: this choice was driven by two main reasons. Firstly, the global scope of operations of these companies represents a problem in terms of tax regulations and tax reporting policies, leading the choice to EV/EBITDA without considering different taxes. Otherwise, a fair comparison would have been possible just with other American companies. Furthermore, the EBITDA does not take into consideration financial expenses, so avoiding differences in terms of financing structures.

  On the other hand, the EV/Sales is needed due to the several adjustment performed for FY2017 General Cable results. In fact, as previously stated, the years of transformation lead General Cable to have extra-ordinary financial outcomes, making the comparison with other companies difficult to be performed. To avoid these adjustment problems, I decided to consider the multiple based on Sales, which is the item less affected by accounting and adjustment policies, able to represent objectively the ability of each company to generate income.

 As a result of these considerations, the table below shows financial information for each comparable company, the calculation of the two multiples in three different years (2016-2017-2018) and the final calculation of a range of different multiple values: the minimum, the average, the median and the maximum.

Comparable pricing analysis											
Data in $ million		Total	NFP	EV	Sales	EV/Sales			EV/EBITDA		
# Company	Country	market cap			2016	2016	2017	2018	2016	2017	2018
1 BELDEN INC	US	2.725	705	3.430	2.082	1,6x	1,6x	1,5x	10,2x	9,8x	8,3x
2 ENCORE WIRE CORP	US	739	(87)	651	917	0,8x	0,6x	0,6x	10,6x	7,5x	6,2x
3 PRYSMIAN SPA	IT	4.860	808	5.668	7.361	0,7x	0,7x	0,6x	9,2x	9,8x	11,7x
4 NEXANS SA	FR	2.107	268	2.375	6.239	0,4x	0,4x	0,4x	7,4x	5,6x	8,1x
Average						0,9x	0,8x	0,7x	9,3x	8,2x	8,6x
Median						0,8x	0,7x	0,6x	9,7x	8,6x	8,2x
Min						0,4x	0,4x	0,4x	7,4x	5,6x	6,2x
Max						1,6x	1,6x	1,5x	10,6x	9,8x	11,7x

Table 10: Comparable companies' multiple determination, own elaboration on the base of Bloomberg platform data

The financial information above represented were obtained through the use of Bloomberg Platform and transformed in Dollars, in order to have complete comparability with General Cable results. Indeed, having obtained the multiple from other companies, it is now time to apply these data to General Cable and estimate the share price range.

General Cable Corp financial data							
Data in $							
Target Company	Stock Price	Shrs. Out.	Market Cap.	NFP	EV	EBITDA	Sales
GENERAL CABLE CORP	21,8	50,6	1.103,6	954,1	2.057,7	163,2	3.837,2
		in millions	in $ millions	in $ millions	in $ millions	in $ millions	in $ millions

Table 11: General Cable financial data as of 31/12/2017, own elaboration on the base of Bloomberg Platform data

Implied share price through multiple analysis				
Data in $	Min	Average	Median	Max
EV/Sales Implied Share Price	9,4	43,3	31,6	100,5
EV/EBITDA Implied Share Price	(0,9)	7,4	9,0	12,6

Table 12: Calculation of General Cable share price on the base of selected multiples, own elaboration

As it is possible to see from Table 14 several price estimations have been performed on the base of the two multiples considered. Specifically, for each multiple, there is a range of possible prices: the minimum and the maximum, considering the minimum and maximum comparable multiples respectively; the average or the median, using the mean or the median value of the comparables considered.

In detail, starting from the multiples estimation and applying them to General Cable's data, we obtain different estimations of Enterprise Value from which it is necessary to subtract the Net Financial Position (in Table 13), arriving to the estimations of Equity Value or Market Capitalization (that can be compared to the actual Market Cap in 2017, expressed in Table 13). The Share Price is then determined as Market Cap divided by the number of share outstanding (see Table 13).

Obviously, starting the analysis with a range of different multiples leads to a range of different possible prices, as showed in Table 14. Anyway, looking at it, and considering the actual share price payed in the analyzed M&A (30$ per share), it is evident that the best results are obtained with the EV/Sales. In fact, the average is pretty a good estimation, anyway the nearest value is the Median estimation. That's significant because the median is considered "stronger" and more representative than the average due to its ability to be less sensitive to outliers (Leys, Ley, Klein, Bernard, & Licata, 2013). Moreover, this result is reasonable because, as previously stated, the multiple EV/Sales is not sensitive to reporting and adjustment policies performed by companies and in this analysis for the purposes of the thesis.

4.4 General Cable Valuation using Comparable transactions multiples

As for the other two methods, the comparable transactions multiples method will be now performed in order to estimate General Cable share price in the most accurate way possible.

In this process, the most important choice is the selection of similar transactions and of the most representative multiples. As regard of multiples, also in this occasion the selected ones are the EV/Sales and EV/EBITDA, on the base of the abovementioned reasoning. In fact, also in this case it is important to maintain comparability between results and these two multiples are the best choice possible.

On the other hand, comparable transactions selection has been a different process. Firstly, it was necessary to look for M&A deals equally made through the use of cash in exchange of shares, one of the purchasing method described in the second chapter. Indeed, Prysmian acquired General Cable's shares in exchange of sole cash, without considering share options or conversion, therefore better comparability is reached with transactions occurred in the same way.

Secondly, another important factor is that each transaction identified occurred through companies operating in the Wire&Cable industry, providing with a better consideration of synergies and control premium when estimating the share price.

As a result of these reasoning, the list of comparable transactions selected and its financial characteristics is showed in the following table.

Comparable transactions' financials							
Accouncement Date	Aquirer Name	Target Name	Purchase Price	Sales	EBITDA	EV/Sales	EV/EBITDA
September-16	NKT	ABB HV Cables	836,0	472,0	70,8	1,77x	11,80x
December-13	Southwire	Coleman Cable	492,0	914,6	88,7	0,54x	5,55x
November-10	Prysmian	Draka	1.250,0	2.048,0	125,0	0,61x	10,00x
June-07	LS Cable	Superior Essex	900,0	2.993,1	284,5	0,30x	3,16x
September-07	General Cable	Phelps Dodge	735,0	1.300,0	77,0	0,57x	9,55x
March-07	Coleman Cable	Copperfield	213,0	520,0	35,3	0,41x	6,03x
			(in $ million)	(in $ million)	(in $ million)		
Average						0,70x	7,68x
Median						0,59x	7,79x
Min						0,30x	3,16x
Max						1,77x	11,80x

Table 13: Financial data and multiples for comparable transaction, own elaboration on the base of Bloomberg Platform data

Looking at Table 15, it is evident that it was selected a M&A deal each three years, and specifically in 2010 and 2007, I decided to include transactions executed by Prysmian and General Cable, respectively, acquiring two other companies, providing with relevant data in terms of comparability. As a matter of clarity, it is important to specify that each data in Table 15 is related to each target company and that the multiples EV/Sales and EV/EBITDA have at numerator the actual Purchase

price payed by the acquirer. Moreover, now each transaction will be briefly described to present the most important data in terms of rationale and financial conditions:

a) **NKT acquiring ABB HV Cables**

In the second half of 2016 NKT Cables entered into a purchase agreement to acquire ABB HV Cables. The acquirer specified that it would divide the two businesses in two separated companies working together to be strongly positioned in both offshore wind and interconnector grid industries (Russel, 2016). Specifically, the enterprise value was determined at $ 712 million, but considering also ABB's investments in new cable-laying ship the total amount ends up to be equal to $ 836 million (NKT, 2017).

b) **Southwire acquiring Coleman Cable**

Southwire Co was one of the biggest US companies in this market and at the end of 2013 it entered in an agreement to buy its smaller rival Coleman Cable Inc. in order to strengthen even further its market position in the automotive wire industry (Thomson Reuters, 2013). The total amount payed to conclude the deal has been equal to $ 492 million (Coleman Cable Inc., 2013).

c) **Prysmian acquiring Draka**

The acquisition process of Prysmian, aiming at becoming the biggest player worldwide, began several years ago and, apart from the M&A with General Cable, the Italian company acquired in 2010 another competitor, reaching for the first time the first position among wire and cable producers (Thomson Reuters, 2011). In this occasion, the offer price reached $ 1.250 million beating the bid made by Chinese and French competitors (Market Insider, 2011).

d) **LS Cable acquiring Superior Essex**

In the latest years before 2010, LS Cables was seeking for revenues, given that its local market was saturated and no more growth was expected (Thomson Reuters, 2008). Therefore, it decided to enter into an acquisition agreement with Superior-Essex for a total value of $ 900 million, paying a 50% premium over the year to date shares' closing price (Superior Essex, 2008).

e) **General Cable acquiring Phelps Dodge**

Before the radical transformation process started in 2014, as previously analyzed, General Cable was one of the biggest strength in US Wire&Cable industry, able to outperform and even acquire its competitors (Business Courier, 2007). That was the case when in 2007 the company entered in the M&A agreement with Phelps Dodge, boosting its annual revenue base by a third (compared to 2006 results). The total amount needed to conclude the acquisition

has been equal to $ 735 million in cash, to acquire the totality of shares outstanding (Phelps Dodge Corporation, 2007).

f) Coleman Cable acquiring Copperfield

Always in 2007, significant year in terms of M&A in Wire and Cable industry, Coleman Cable concluded its purchase of all of the equity interests in Copperfield, expecting to result in one of the biggest wire manufacturers in US, combining their respective capabilities and manufacturing facilities. The purchase price has been equal to $ 213 million in cash (US Tech, 2007).

After this analysis, it is important to apply the financial outcome of every deal previously analyzed to the business case studied in this writing. Specifically, as occurred in the Comparable Companies Multiple method, the ratios obtained from previous comparable transactions will be now applied to Prysmian and General Cable estimating a new range of share prices.

General Cable Corp financial data							
Data in $							
Target Company	**Stock Price**	**Shrs. Out.**	**Market Cap.**	**NFP**	**EV**	**EBITDA**	**Sales**
GENERAL CABLE CORP	21,8	50,6	1.103,6	954,1	2.057,7	163,2	3.837,2
		in millions	in $ millions	in $ millions	in $ millions	in $ millions	in $ millions

Table 14: General Cable financial data as of 31/12/2017, own elaboration on the base of Bloomberg Platform data

Implied share price thorugh Comparable transactions				
Data in $	**Min**	**Average**	**Median**	**Max**
EV/Sales Implied Share Price	3,9	34,2	25,7	115,4
EV/EBITDA Implied Share Price	(8,6)	5,9	6,3	19,2

Table 15: Calculation of General Cable share price on the base of selected multiples, own elaboration

As previously performed for comparable companies, even in this case the multiples present a range of values, from Minimum to the Maximum, and from the Average to the Median too. Moreover, also in this case the implied share price was determined applying the multiples to General Cable data (showed in Table 16) and obtaining an estimation of the Enterprise Value. Following, from the EV the amount of Net Financial Position is subtracted arriving to the Equity Value, which, divided by the number of shares outstanding, results in an estimation of share prices' ranges (as showed in Table 17).

In particular, it is worth saying that, as for comparable companies' method, the most representative results are represented by the average and the median values of the EV/Sales multiple, at the same distance from the actual payed price of $ 30 per share. This is significant because this valuation method is able to take into account the control premium or the possible value of synergies that have

been recognized in each transaction considered. As a consequence, also the estimated share price is able to represent the Enterprise Value plus an implicit premium related to control and synergies. Furthermore, as previously stated, the best proxy is estimated through the use of the EV/Sales because it is the multiple less affected by accounting policies, fundamental characteristic in this comparison, due to the different geographical origin of the companies involved in each deal.

Chapter 5: Conclusions, valuation methods comparison and limitations

During the whole writing, everything was analyzed in order to create the theoretical basis and the deepest knowledge possible regarding the business case previously presented. Starting from the understanding of the valuation methods used by the analysts and from the study of M&A deals from an academic point of view, the writing shifted to the study of a specific transaction. Therefore, the protagonists, Prysmian and General Cable, have been presented, as well as their agreement and the industry landscape in which it occurred. In the latest part, the valuation exercise was performed using three different valuation methods selected among the others due to their characteristics aligned with the specific M&A deal. Different results have been computed and every value obtained is more or less far from the actual share price payed by Prysmian. To conclude the master thesis, it is now time to analyze the results trying to answer to the research question presented in the introduction:

"In the specific context of M&A deals, which are the most representative and effective valuation methods in the estimation of share prices?"

The previous chapter was devoted to the estimation of General Cable share price at the assumed time zero, 31/12/2017. Once obtained the results, these have been compared to the actual share price that Prysmian payed to conclude the M&A. As previously observed, the best results have been registered using the comparable transactions' multiples and specifically using the EV/Sales. Anyway, a better analysis is needed to evaluate the methods as a whole, thus considering the accuracy of DCF and its sensitivities, as well as comparable companies and transactions results with both EV/Sales and EV/EBITDA multiples. This process is fundamental in the determination of the empirical representativeness of methods, aiming at answering to the research question.

As a consequence, I decided to compute an estimation of the absolute error of each valuation method and to determine the corresponding Median Absolute Deviation (MAD). Indeed, the valuation method with the lowest Median Absolute Deviation can be considered as the most efficient.

Specifically, the first step of this error estimation consists in the calculation of the absolute value of the error (i.e. the deviation, that is the difference, between the estimated value and the target price, $30 per share):

$$\text{Absolute deviation} = \left| \text{Estimated value} (x_i) - \text{Target share price} (P) \right|$$

After this calculation it was necessary to identify a unique summarizing parameter in each valuation exercise performed. The possibilities were different:

a) The average of all the absolute deviations:

$$\sum (|\textit{Estimated value}\,(x_i) - \textit{Target share price}\,(P)|)/I$$

where "I" represents the total number of observations. In this manner, the results is defined Mean Absolute Deviation.

b) The variance of all the absolute deviation:

$$\sum [(\textit{Estimated value}\,(x_i) - \textit{Target share price}\,(P))^2]/I$$

where "I" is the total numbers of observations and the error estimation is squared in order to consider also the negative deviation from the target price, alike the variance. In this case the final error estimation is defined Mean Squared Error or Variance.

c) The median of all the absolute deviations, where the summarizing parameter is represented by the central value of all the observations (in case of odd number of observation), or by the average of the two numbers occupying the central positions (in case of even number of observations). As an example, in the following list of numbers the median is:

Observations: 1, 2, 2, 4, 5, 7, 7, 8, 9 (odd number of observations) → *Median = 5*
Observations: 1, 2, 2, 4, 5, 7, 7, 8 (even number of observations) → *Median = (4+5)/2 = 4,5*

In this situation, the estimated summarizing parameter is defined Median Absolute Deviation.

The estimation method selected has been the Median Absolute Deviation. The decision was determined on the base of the better mathematical characteristics of Median, if compared to the average and to the standard deviation ones. Indeed, the average and the standard deviation (or its squared value, the Variance) assume that the distribution of observation is normal and, more importantly, they are highly impacted by outliers (Leys, Ley, Klein, Bernard, & Licata, 2013). In contrast, the Median is not at all affected by these problems and Huber (1981) described the Median Absolute Deviation as the "single most useful ancillary estimate of scale".

Furthermore, the use of the median it has been mandatory due to the presence of several extreme values in some of the estimation (such as the maximum share price estimation equal to 100,5 or 115,4 and a minimum equal to -0,9 or -8,6, considering respectively the comparable companies and comparable transaction multiples, see Table 14 and 17).

In order to show the whole analysis performed, the following tables aim at presenting the computed share prices, the estimated deviation from the target value and finally the summarizing parameter through the Median Absolute Deviation, for each of the three valuation methods performed.

1. Discounted Cash Flow analysis

a) Share price estimation through WACC and g rate sensitivities

Share price measure						
Data in $				**WACC**		
		6,2%	6,7%	**7,2%**	7,7%	8,2%
	0,0%	10,46	8,14	6,15	4,42	2,90
	0,5%	12,62	9,95	7,67	5,72	4,02
g-rate	**1,0%**	15,21	12,07	**9,44**	7,22	5,30
	1,5%	18,34	14,60	11,53	8,95	6,77
	2,0%	22,24	17,68	14,02	11,00	8,47

b) Deviation from the target price estimation and Median Absolute Deviation.

Each value in table has been computed as the absolute value of the difference between the estimated share price, showed in the previous table, and the target $30 share price payed by Prysmian. In conclusion, the **Median Absolute Deviation**, determined as the median of all the deviation showed in above table, is equal to **20,56**.

DCF measure of error vs actual share price						
				WACC		
		6,2%	6,7%	7,2%	7,7%	8,2%
	0,0%	19,54	21,86	23,85	25,58	27,10
	0,5%	17,38	20,05	22,33	24,28	25,98
g-rate	1,0%	14,79	17,93	**20,56**	22,78	24,70
	1,5%	11,66	15,40	18,47	21,05	23,23
	2,0%	7,76	12,32	15,98	19,00	21,53
	Actual payed price	30,00				
	Median Absolute Deviation	**20,56**				

2. Comparable companies' multiple method

a) Share price estimation considering the different possible scenarios, minimum, maximum, average and median values.

Implied share price through multiple analysis				
Data in $	Min	Average	Median	Max
EV/Sales Implied Share Price	9,4	43,3	31,6	100,5
EV/EBITDA Implied Share Price	(0,9)	7,4	9,0	12,6

b) Deviation from the target price computation and Median Absolute Deviation. Again, the deviation, or the estimation error, has been computed as the absolute value of the difference between the calculated share price and the actual payed price ($30 per share). As a consequence, the **Median Absolute Deviation**, median of each row of estimated errors (both for EV/Sales and EV/EBITDA), is equal to **16,92** (considering the EV/Sales multiple) and **21,80** (considering the EV/EBITDA multiple).

Measure of error vs Actual payed price					
	Min	Average	Median	Max	Median Absolute Deviation
EV/Sales Implied error	20,59	13,26	1,58	70,47	16,92
EV/EBITDA Implied error	30,88	22,57	21,02	17,37	21,80
Actual payed price	30				

3. Comparable transactions multiple method

a) Share price estimation in four different possible scenarios, the minimum, maximum, average and median, on the base of the multiple obtained from the past comparable transactions.

Implied share price thorugh Comparable transactions				
Data in $	Min	Average	Median	Max
EV/Sales Implied Share Price	3,9	34,2	25,7	115,4
EV/EBITDA Implied Share Price	(8,6)	5,9	6,3	19,2

b) Deviation of each result from the target price and Median Absolute Deviation. Even in this last case, the results in the following table have been computed as the absolute value of the difference between the above shown share prices and the actual one ($30 per share). In

Measure of error vs Actual payed price					
	Min	Average	Median	Max	Median Absolute Deviation
EV/Sales Implied error	26,05	4,15	4,29	85,41	15,17
EV/EBITDA Implied error	38,65	24,08	23,73	10,81	23,91
Actual payed price	30				

conclusion, the **Median Absolute Deviation**, median of each row estimated errors, is equal to **15,17** (in case of the EV/Sales multiple) and **23,91** (in case of the EV/EBITDA multiple).

Summarizing the results obtained through the effectiveness analysis, it is possible to observe that:

- **Discounted Cash Flow:** MAD = 20,56.
- **Comparable Companies Multiples:**
  EV/Sales MAD = 16,92
  EV/EBITDA = 21,80
- **Comparable Transactions Multiples:**
  EV/Sales MAD = 15,17
  EV/EBITDA MAD = 23,91

Therefore, it is possible to state that the Comparable Transactions using the EV/Sales multiple is the most representative given that its MAD is the lowest. In fact, looking at its results both the median and the average share prices are really near to the actual price.

Directly behind, the second-best result is represented by the Comparable Companies EV/Sales multiple with a computed MAD equal to 16,92 given that the median share price is really near to the target value ($31,6 against the target $30).

In the third position of this hypothetic ranking there is the Discounted Cash Flow, which registered a MAD equal to 20,56 considering all the possible outcomes performing the sensitivities related to WACC and g rate values.

Finally, the worst results have been registered through Comparable Companies/Transactions EV/EBITDA multiples equal to 21,80 and 23,91 respectively.

These results can be explained if analyzed from a theoretical point of view, in fact it is reasonable to have the best estimation results when using the EV/Sales multiple, and in particular with Comparable Transactions. Indeed, as explained before in this writing, the previous transactions multiples are able to consider the effect of control premium or synergies values, which are impossible to consider with other valuation techniques but that are important variables considered by acquirer and acquired companies when concluding a M&A deal. The performed exercise in this master thesis represents a practical example of this statement.

Furthermore, the best result has been reached using the EV/Sales multiple, which is not affected by accounting policies and representing the actual ability of companies to sell products to the costumers and so generating income. In addition, sales were not affected by the extra-ordinary situation in which

General Cable operated in the last five years considered, which have led to several essential adjustment affecting the reliability of EBITDA as a comparable multiple.

Dealing with the Discounted Cash Flow method, its effectiveness is neither the worst nor the best, thus a good estimation considering that it does not consider the value of future control or possible synergies. Furthermore, other distorting effects were caused by the several adjustments performed to obtain a more comparable value of Operating Free cash flow and by the natural presence of subjective assumptions. Indeed, one of the limitations of this method is the presence of subjective assumptions which can be different from analyst to analyst. Moreover, the sensitivities performed have been a good test to understand which hypothesis in terms of growth rate and WACC rate would have led to the best result.

In conclusion, the worst estimation was obtained through the EV/EBITDA multiples, which, in my opinion, were too much affected by accounting policies and adjustment processes that, even if performed in this master thesis, have not been satisfying to allow perfect comparability among companies and with the actual share price payed by Prysmian.

5.1 Limitations, further possible studies and implications

Even if the whole exercise lead to reasonable results in line with the theoretical guidelines explained in the first part of this master thesis, it is reasonable to include an analysis of the limitations of this valuation exercise.

1. **Context of analysis**

   The first limitation is related to the specific context in which the abovementioned results have been obtained. Indeed, this valuation exercise was related to an M&A transaction and it is possible that, in other business landscapes, the valuation method here analyzed will show better or worse outcomes in terms of valuation effectiveness. Further studies will be necessary to understand if the results here obtained are replicable in other context of enterprise valuation.

2. **Analyzed companies' uniqueness**

   Even if in other M&A situations, each deal considers different companies and different financial results. Therefore, it is worth reminding that the acquired company, General Cable, presented an extra-ordinary situation in the last five years before the deal, making the projections of future data on the base of past results impossible. This consideration is, for example, fundamental when judging the Discounted Cash Flow reliability as a valuation technique. To overcome this limitation, future researches could be devoted to the repetition of this empirical study on different and numerous M&A deals, checking results' consistency in each case.

3. **Assumptions and adjustments**

   The difference between my results and the actual price payed by Prysmian is also related to different assumptions when projecting future results and adjusting past outcomes. In fact, Prysmian had had for sure better and deeper information when making its valuation to determine the right bid price. In addition, different results from this thesis will be also possible considering different time-periods, diverse multiples as well as diverse comparable companies or transactions. Future possible research can be performed trying to obtain financial information directly from Prysmian or General Cable, understanding their assumptions and calculation when estimating the best purchase price possible. Once obtained the needed insights, the valuation exercise can be newly performed to verify valuation methods' effectiveness.

4. **Different error estimation**

   Even if previous limitations were avoided, different results would have been obtained estimating the deviation from the target price in ways other than the Median Absolute Deviation. Indeed, future studies can demonstrate business valuation efficiency estimating the deviation from the target price with other statistical measures.

Implications for practitioners

Concluded the analysis and presented the limitations, it is worth thinking to the usefulness of this study for practitioners such as researchers, analysts, managers and other students. Firstly, this master thesis can be used as theoretical background in M&A and Business Valuation's fields, in order to deepen knowledges and add new skills. Secondly, managers and analysts can understand better which valuation method to use when valuing their own firms or other possible targets in future take over. Indeed, the understanding of each method and their corresponding pros and cons can help when deciding the best way to valuate a company. Moreover, this master thesis can be used as a guideline and support when performing business valuation as the three valuations performed have been described step by step, showing formulas and processes replicable in different valuation contexts. Finally, as previously described, the outcomes of this analysis can be used as source for further studies in this field, widening the understanding of valuation methods' effectiveness compared to real firm valuation cases.

Appendix

Appendix 1 – General Cable original Balance Sheet, downloaded from Thomson Reuters platform

General Cable Balance Sheet				
Data in $ million	**2017**	**2016**	**2015**	**2014**
Cash and Short Term Investments	84,7	101,1	112,4	136,7
Cash & Equivalents	84,7	101,1	112,4	136,7
Accounts Receivable - Trade, Net	714,2	664,5	715,4	895,1
Accounts Receivable - Trade, Gross	733,4	684,7	738,4	915,4
Provision for Doubtful Accounts	(19,2)	(20,2)	(23,0)	(20,3)
Total Receivables, Net	714,2	664,5	715,4	895,1
Total Inventory	736,1	768,2	846,4	926,6
Prepaid Expenses	60,0	65,4	66,2	99,9
Other Current Assets, Total	-	-	-	337,8
Total Current Assets	**1.595,0**	**1.599,2**	**1.740,4**	**2.396,1**
Property/Plant/Equipment, Total - Gross	1.062,2	1.019,1	1.068,6	1.144,1
Buildings - Gross	223,4	206,5	206,3	228,6
Land/Improvements - Gross	44,0	44,7	50,0	60,3
Machinery/Equipment - Gross	755,8	714,4	786,0	819,9
Construction in Progress - Gross	39,0	53,5	26,3	35,3
Property/Plant/Equipment, Total - Net	530,3	529,3	563,2	670,7
Accumulated Depreciation, Total	(531,9)	(489,8)	(505,4)	(473,4)
Goodwill, Net	11,0	12,0	22,2	22,8
Intangibles, Net	23,3	28,3	36,6	50,5
Intangibles - Gross	118,2	118,5	130,1	131,7
Accumulated Intangible Amortization	(94,9)	(90,2)	(93,5)	(81,2)
Long Term Investments	0,2	9,0	8,4	17,5
LT Investment - Affiliate Companies	0,2	9,0	8,4	17,5
Other Long Term Assets, Total	75,5	63,8	83,8	209,1
Defered Income Tax - Long Term Asset	7,9	20,4	30,9	18,4
Discontinued Operations - LT Asset	--	--	--	119,9
Other Long Term Assets	67,6	43,4	52,9	70,8
Total Assets	**2.235,3**	**2.241,6**	**2.454,6**	**3.366,7**
Accounts Payable	437,5	414,0	428,7	552,7
Accrued Expenses	172,6	264,7	182,8	379,9
Notes Payable/Short Term Debt	-	-	-	-
Current Port. of LT Debt/Capital Leases	46,9	67,5	168,1	391,6
Other Current liabilities, Total	136,2	154,9	169,7	158,6
Total Current Liabilities	**793,2**	**901,1**	**949,3**	**1.482,8**
Total Long Term Debt	1.038,8	871,1	911,6	933,9
Long Term Debt	1.038,8	871,1	911,6	933,9
Total Debt	1.085,7	938,6	1.079,7	1.325,5
Deferred Income Tax	108,6	126,7	145,5	178,3
Deferred Income Tax - LT Liability	108,6	126,7	145,5	178,3
Minority Interest	2,6	15,8	33,1	74,9
Other Liabilities, Total	162,9	173,8	187,1	244,7
Other Long Term Liabilities	162,9	173,8	187,1	228,7
Discontinued Operations - Liabilities	--	--	--	16,0
Total Liabilities	**2.106,1**	**2.088,5**	**2.226,6**	**2.914,6**
Redeemable Preferred Stock, Total	--	--	--	--
Redeemable Convertible Preferred Stock	--	--	--	--
Common Stock, Total	0,6	0,6	0,6	0,6
Common Stock	0,6	0,6	0,6	0,6
Additional Paid-In Capital	706,6	711,0	720,5	714,8
Retained Earnings (Accumulated Deficit)	(195,3)	(102,2)	27,2	184,4
Treasury Stock - Common	(151,9)	(169,9)	(180,1)	(184,3)
Other Equity, Total	(230,8)	(286,4)	(340,2)	(263,4)
Translation Adjustment	(165,3)	(228,2)	(275,6)	(185,1)
Minimum Pension Liability Adjustment	(65,5)	(58,2)	(64,6)	(78,3)
Other Comprehensive Income	--	--	--	--
Total Equity	**129,2**	**153,1**	**228,0**	**452,1**
Total Liabilities & Shareholders' Equity	**2.235,3**	**2.241,6**	**2.454,6**	**3.366,7**

Appendix 2 – General Cable original Cash flow statement, downloaded from Thomson Reuters platform

General Cable Cash Flow Statement				
Data in $ million	2017	2016	2015	2014
Net Income/Starting Line	**-54,7**	**-94,4**	**-136,3**	**-644,4**
Depreciation/Depletion	73,9	86	96,4	126,4
Deferred Taxes	-12,1	-22,7	-24,4	-14,4
Non-Cash Items	**80,2**	**41,6**	**141,7**	**609,8**
Unusual Items	76,2	36,6	138,1	607,1
Foreign Currency exchange (gain) loss	3,4	0,6	61,4	202,5
Non-cash asset impairment charge	2,3	59,5	67,3	421,7
(Gain) Loss on disposal of subsidiaries	71,9	-25,6	-5,1	-17,6
(Gain) Loss on disposal of property	-1,4	2,1	2,5	0,5
Venezuela Consolidation charge	0	0	12	0
Other Non-Cash Items (non Cash interest charge)	4	5	3,6	2,7
Changes in Working Capital	**-126,3**	**143,2**	**121**	**54,1**
Accounts Receivable	-25,3	11,2	133,5	-0,4
Inventories	18,1	52,6	34	110,8
Other Assets	6,4	7,3	23	24,5
Accounts Payable	7,8	2,8	-37,6	-69
Payable/Accrued	-133,3	69,3	-31,9	-10,5
Other Operating Cash Flow	--	0	0	-1,3
Cash from Operating Activities	**-39**	**153,7**	**198,4**	**130,5**
Capital Expenditures	-85,4	-84,1	-61,5	-89,6
Purchase of Fixed Assets	-85,4	-84,1	-61,5	-89,6
Other Investing Cash Flow Items, Total	4	83,5	72	73,6
Acquisition of Business	--	--	--	--
Sale of Business	2,2	81,8	78,4	52,4
Sale of Fixed Assets	11,9	1,5	1,8	21,4
Other Investing Cash Flow	-10,1	0,2	-8,2	-0,2
Cash from Investing Activities	**-81,4**	**-0,6**	**10,5**	**-16**
Financing Cash Flow Items	0	-11,9	-2,5	-6,9
Total Cash Dividends Paid	-37,4	-35,6	-35,3	-35,4
Issuance (Retirement) of Stock, Net	2,1	1,2	0,2	-30,4
Repurchase/Retirement of Common	--	0	0	-30,7
Options Exercised	2,1	1,2	0,2	0,3
Issuance (Retirement) of Debt, Net	133,8	-119	-221,7	-50,4
Total Debt Issued	2101,1	1516,2	2945,5	2689,9
Total Debt Reduction	-1967,3	-1635,2	-3167,2	-2740,3
Cash from Financing Activities	**98,5**	**-165,3**	**-259,3**	**-123,1**
Foreign Exchange Effects	5,5	0	-43,5	-205,8
Net Change in Cash	**-16,4**	**-12,2**	**-93,9**	**-214,4**
Net Cash - Beginning Balance	101,1	112,4	205,8	418,8
Net Cash - Ending Balance	84,7	100,2	111,9	204,4
Free Cash Flow	**-124,4**	**69,6**	**136,9**	**41,9**

Appendix 3 – General Cable original Income Statement, downloaded from Thomson Reuters platform

General Cable Income Statement				
Data in $ million	**2017**	**2016**	**2015**	**2014**
Revenue	3.837,2	3.858,4	4.514,5	5.979,8
Net Sales	3.837,2	3.858,4	4.514,5	5.979,8
Total Revenue	**3.837,2**	**3.858,4**	**4.514,5**	**5.979,8**
Cost of Revenue, Total	3.411,1	3.451,3	4.082,1	5.586,6
Cost of Revenue	3.411,1	3.451,3	4.082,1	5.586,6
Gross Profit	**426,1**	**407,1**	**432,4**	**393,2**
Selling/General/Admin. Expenses, Total	416,8	408,9	412,3	450,7
Unusual Expense (Income)	-	16,5	5,6	253,9
Impairment-Assets Held for Use	-	16,5	5,6	253,9
Other Unusual Expense (Income)	-	-	-	-
Total Operating Expense	**3.827,9**	**3.876,7**	**4.500,0**	**6.291,2**
Operating Income	**9,3**	**(18,3)**	**14,5**	**(311,4)**
Interest Expense, Non-Operating	(78,7)	(89,5)	(97,0)	(116,3)
Interest/Invest Income - Non-Operating	2,0	2,5	2,7	4,5
Interest Inc.(Exp.),Net-Non-Op., Total	(76,7)	(87,0)	(94,3)	(111,8)
Other Non-Operating Income (Expense)	28,5	7,2	(71,3)	(212,9)
Net Income Before Taxes	**(38,9)**	**(98,1)**	**(151,1)**	**(636,1)**
Income tax (provision) benefit	(15,8)	3,7	14,8	(8,3)
Net Income	**(54,7)**	**(94,4)**	**(136,3)**	**(644,4)**

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TITLE

Company valuation process and techniques in an M&A deal: Prysmian acquiring General Cable
The Summary

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Introduction

Understanding the value of something that we are planning to buy is usual in our everyday life. Deciding which computer, smartphone, car or house is better in terms of value is pivotal in purchasing habits, indeed preference for one item over others is due to the imaginary rank value that everyone builds in his mind (Lebreton, Jorge, Michel, Thirion, & Pessiglione, 2009). Therefore, the valuation process begun by humans, when they are in front of choices, is natural and governed by the brain, which encodes the values underlying revealed preferences: choosing option A over option B means that the value addressed to A is higher than the value of B (Lebreton, Jorge, Michel, Thirion, & Pessiglione, 2009).

The described natural valuation process is what leads also analysts trying to address a value to a company: is it better to acquire shares of company A or B? Is it better to acquire, or being acquired, by company C or D? Which firm has the greatest value? Even in these more complex decisions, the final choice is made on the base of an estimation of value.

Firm valuation is something more challenging than the daily life purchase choices, anyway the background needed information are the same: measurable characteristics, a method for value estimation and comparability with other options. These elements were part of what I learned in my Master's Degree during the Financial Reporting and Performance Measurement course: enterprise valuation has its bedrock in financial documents which provide the analyst with the measurable and comparable accounting data. In addition, the analyst needs to use a valuation technique which is able to summarise financial information in one single value. This is where the interesting part come from, each company has one single version of performance data in its annual reports, but anyway, the corresponding enterprise value can be different on the base of the valuation method used.

I decided to understand better these differences and therefore to base my master thesis on the analysis of valuation methods. Anyway, this would have been a very broad analysis and further point of interests were needed to formulate an appropriate research question: Merger and Acquisition has been the answer. Enterprise valuation is always performed when a company decides to acquire another one, because, as previously stated, even this acquisition choice is made on the base of value estimation.

Companies willing to expand and grow can decide to act internally or externally, exploiting internal resources or draw them from outside. One of the external growth strategies is the M&A in which a company decides to take over another firm on the base of an acquisition price, determined through a value estimation process.

With this in mind, I decided to combine the two elements in one single argument: the estimation of company value in M&A transactions through different valuation methods. Precisely, this master thesis is going to analyse these arguments aiming at answering to the following research question:

"In the specific context of M&A deals, which are the most representative and effective valuation methods in the estimation of share prices?"

To this purpose I selected one M&A transaction already concluded and I used the actual share price payed in the acquisition as a reference point. I performed the enterprise valuation exercise with different valuation techniques, comparing the results with the reference point, in order to understand which result would have been nearer to the actual price.

More precisely, the selected M&A is the acquisition of General Cable by Prysmian, which represents one of the biggest transactions in the history of Wire and Cable industry. It has been awarded as the best deal "Italy-to-Foreign countries" by KPMG Advisory S.p.A. (KPMG Advisory S.p.A., 2019) in the M&A Award, as it resulted in a overall price of approximately $ 3 billion ($ 30 per share), building a group made of 31.000 employees spread out in 50 different countries.

Chapter 1: M&A and business valuation, literature review

When a CEO wants to increase corporate performance and to give birth to a long-term growth path, the most effective and rapid way is to take-over other smaller or weaker companies. That's why on average every year companies spend more than 2$ trillion on Mergers and Acquisitions (M&A) (Christensen, Alton, & Waldeck, 2011).

Even though these two terms are often use together and interchangeably, they mean differently:

- *The Merger*: it is the transfer of both assets and liabilities from one or more companies to another. Thus, one or more firms can merge with another existing one (through a process called "absorption"), or they can merge forming a new company (through "consolidation"). The common element is that the acquiring company takes over the ownership of the others and combines their operations all together (Aluko & Amidu, 2005).
- *The Acquisition*: this can be described as an act of acquiring complete and effective control by one company over assets or ownership and management of another company without any combination of the two firms, which remains independent. In fact, they maintain their legal entity but there may be a change in their control. The term acquisition is used interchangeably with the term "take-over", but both are differentiated from merger (Aluko & Amidu, 2005).

Having explained the difference between the two practices, it's now important to explain the different types of M&A that are commonly made by companies. In fact, there are three main forms of business combination (Brealey, Myers, Allen, & Sandri, 2015):

a. *Vertical integration*: the two businesses are in the same industry but at different levels of the value chain, therefore one is, for example, producer and the other a distributor. In order to gain more control on the entire process, the producer can merge or acquire firms that are after or before itself.

b. *Horizontal integration*: two or more companies in the same level of production, distribution or area of business and that decide to join their forces to gain more power.

c. *Conglomerate integration*: these are the strangest combinations because the business combination is done between two or more firms which operate in completely different business that are unrelated or indirectly related.

Whatever is the type of M&A, they are all made in order to have a better use of resources, increasing profitability in wealthy companies or saving operations in problematic firms. Moreover, companies are using more and more M&A deals for faster growth and aggressive expansion as an alternative to internal and organic growth (Nachescu, 2010).

Companies must select their best partner and start to negotiate the condition for an optimal agreement for both parties. Now the question is, why these firms should combine their forces through an M&A? Different are the motives why companies should start an M&A, but it is all based on the general idea that *the two firms worth more together than alone* (Brealey, Myers, Allen, & Sandri, 2015). In fact, as Brealey et al. explain in their book (2015), there are several motivations bringing added value and that can justify an M&A: *Economies of scale*, *Economies of vertical integration*, *Combination of complementary resources*, *Excess of funds*, *Inefficiencies elimination*, *Consolidation of sectors*.

Therefore, in order to understand the possible benefits, it is important to understand and evaluate the possible sources of added value. This leads to the strategic importance of *valuation* in business investment decisions, like merger and acquisition (Aluko & Amidu, 2005).

When trying to understand the relevance of a business combination Brealey et al. (2015) explain that the first thing to understand is if there is an *economic benefit* arising from the M&A: *Economic benefit* $= PV_{AB} - (PV_A + PV_B)$.

If the result is positive there is a justification to the integration process, even if, at this point, it is important to take into consideration the cost of combination too. In fact, in a M&A the acquiring company has to pay the price of acquisition in two ways: payment in cash (the simplest and most used way) or exchange of stocks. In the case of cash payments, the acquisition cost is equal to the

price payed minus the present value of the acquired company (Brealey, Myers, Allen, & Sandri, 2015): *Acquisition cost = Cash payment - PV_B*.

As a consequence, the final net present value for the acquiring company, related to the M&A, is: *NPV = economic benefit – acquisition cost = PV_{AB} – (PV_A + PV_B) – (Cash payment - PV_B)*.

If the final NPV is positive, as for every investment decision, the M&A will be convenient, and the acquiring company should take-over the other firm (Berk & DeMarzo, 2017).

As it is possible to see from the several formulas, the recurring element is the PV that is the present value of future cash flows that are generated by the different companies: PV_{AB} is, for example, the present value of all future cash flows arising from the combined operations of firm A and B, while PV_A and PV_B are the actualized values of cash flows granted by the two companies divided and alone. Considering these factors, it's easy to understand, again, how much it is important the estimation of firms' value through the use of the numerous techniques of business valuation.

These valuation methods highly rely on accounting documents such as the balance sheet and the income statement. In fact, all the values needed to compute the business value are the result of operations and management of several data taken from accounting papers. That's why Marquardt and Zur (2015) highlighted the importance of accounting quality in M&A processes. In particular, they found that accounting quality is related to the choice of sales method, the length of the process and the decision to complete or terminate the proposed deal.

1.4 What is Business Valuation

"Business valuation is the task of forecasting the present value of the stream of expected payoffs" (Lee, 1999). In his article Lee (1999) outlines the main concepts related to the business valuation, highlighting the use of accounting information to estimate shareholder value. In his view the main characteristics of the valuation process are (Lee, 1999): *Valuation is prospective*, *Valuation is interdisciplinary*, *Accounting systems are crucial to valuation*, *Valuation models are the direction to be followed*.

Lee (1999) also defines the business valuation as the *Fundamental Analysis*, that is the art of using present and past information, like historical financial statements, to make the most correct forecasts. Another point of view on this theme is given by Steiger (2008) which defines the goal of business valuation as "*give owners, potential buyers and other interested stakeholders an approximate value of what a company is worth*" (Steiger, 2008). Furthermore, given that companies are normally financed by equity and debt, valuation methods can focus on one or on the other source of capital. Techniques that rely on valuing the equity will give as a result the equity value, while on the other hand, techniques that rely on liabilities or assets will result in enterprise or firm value. Anyway, it will always possible to go from one value to the other using the following formula:

Enterprise value – Net Debt – Corporate Adjustments = Equity value

Considering again another idea from another author, "*business valuation requires a working knowledge of a variety of factors, and professional judgment and experience. This includes recognizing the purpose of the valuation, the value drivers impacting the subject company, and an understanding of industry, competitive and economic factors, as well as the selection and application of the appropriate valuation approach(es) and method(s)*" (Barnes, 2017).

Moreover, Barnes (2017) analyses deeper the concepts related to business valuation, in fact, in his article he underlines the purpose of firm valuation which can be for an M&A, litigation, taxation or financial reporting, just to say some. Purpose's selection it's very important to know which method best fits the situation. In fact, while all valuation techniques share some common attributes, there are of course differences that must reflect the single valuation case taken into consideration, because these differences can have significant impact on the final outcome of the valuation.

Chapter 2: Business Valuation and Valuation techniques

It is a common idea, that a company has to be evaluated on the base of its future cash flows, but anyway, in Italy, there are historical debates regarding this consideration. Given the specific M&A process that will be analyzed in this thesis, involving an Italian and an American company, the aim of this chapter is to present the most important methods used in the international context.

Dealing with merger and acquisition, the valuation process is fundamental in the first phases of negotiation between seller and acquirer to define a basis price for the transaction closing.

The analyst that wants to valuate a company uses its financial statements and some valuation techniques to make a business valuation (Barth, Beaver, & Landsman, 2001). These methods can be simple or more complex involving forecasting, and they have pros and cons, which must be considered by the analyst when choosing the best one to use (Penman S. H., Financial Statement Analysis and Security Valuation, 2013).

2.1 Italian Valuation methods

Historically, and differently from other countries, in Italy there has always been an higher usage and preference for methods based on the analytical determination of firms' asset value ("Metodo Patrimoniale"), on the determination of a normalized economical result ("Metodo Reddituale") and on the use of a mix of these two methods ("Metodi Misti/Patrimoniali-Reddituali") (Borsa Italiana S.p.A., 2014).

1. **Metodo Patrimoniale**: this method is based on the idea that the economical capital of a company is equal to its equity rectified, given by the sum of assets' current value minus the value of

borrowed capital (Borsa Italiana S.p.A., 2014). This method and its estimation process can be defined as: *analytical*, because referred to every single element of company capital, both material and immaterial (through the complex Metodo Patrimoniale) (Guatri, 1997); *at current values* or *of substitution*. Moreover, the Metodo Patrimoniale is highly objective, given the few assumptions and hypothesis needed. Anyway, this method has its downturn: it sums up assets and liabilities' historical values, without considering the firm ability to generate future cash flows.

2. **Metodo Reddituale**: this technique aims at the determination of a normalized income, discounted using the perpetual annuity model, using an interest rate in line with the specific risk of the company (Zanda, Lacchini, & Onesti, 2013). In fact, this method evaluates the ability of the company to generate future income that is then discounted in three different possible ways: Perpetual annuity, Limited life, Limited life plus a terminal value. As already said, before the discounting process the income has to be "normalized", that is purified by all the extraordinary items, net of financial expenses and taxes. The goal of this practice is to determine the real and stable firm's ability to produce income, not considering occasional, non-repeatable and non-relevant events.

3. **Metodi Misti**: All the techniques that use a mix between the Metodo Patrimoniale and Reddituale are considered mixed methods, which estimate the firm value summing up its rectified equity (as the Metodo Patrimoniale) to the goodwill, obtained as the discounted future cash flows produced by the company itself (as the Metodo Reddituale). These mixed forms try to join the benefit of the objectivity with the possibility to consider firm's ability to generate future cash flows. They are born to solve problematics of both the previous methods. In this category of methods, one of the most important and used is the so called "**Stima Autonoma Dell'Avviamento**". This method, also known as UEC method because firstly recommended in 1961 in the historical valuation book of "Union Europeenne des Experts Comptables Economiques et Financiers", is relevant because it takes into account both material and immaterial assets guaranteeing a complete evaluation of the company combining pros from both Metodo Reddituale and Patrimoniale (Guatri, 1997).

2.2 International Valuation methods

In foreign countries, there are numerous and different methods normally used to evaluate firms and generally divided in simple and complex approaches. The simple ones request a limited amount of information such as assets values or pricing multiples. Anyway, using these methods, analysts run the risk of ignoring more important elements contained in financial statements, from which are then extracted all the implications needed to evaluate the company. This paragraph will firstly present

simple methods and then deepen the analysis with more complex techniques, all related to what is called "fundamental analysis" (Penman S. , 2001).

1. **Market approach:** the market approach is based on the comparison of a company asset with identical or comparable assets for which price information are available. This technique is highly relevant when the analyzed asset or similar ones have been recently sold in other transactions, or they are actively traded on financial markets allowing the analyst to gain precious information on current values. In this framework, the most common methods are based on elements of comparison called "multiples", that are a ratio between two elements, some of them include EBITDA multiples, earnings multiples or book value multiples, but the list is of course longer (International Valuation Standards Council, 2017). The advantages of these methods are their simplicity of application, the possibility to use them frequently, even in the short term, and their use of highly representative information, obtained by actual public negotiations, without any kind of assumptions or forecasting.

The mostly used methods are *comparable companies multiple* and the *comparable transactions multiple.* Therefore, as it is possible to understand by the example, the most important phases in market approach methods are: the selection of comparable firms or comparable transactions and the selection of the most relevant multiples (Penman S. , 2001).

2. **The Cost approach or Asset Based Valuation:** the techniques in this cluster valuate the firm's value through the identification and sum of its assets, successively obtaining the equity value by deducting the amount of debt issued by the company: Value of Equity = Value of the Firm – Value of Debt (Penman S. , 2001). The process underlining the cost approach is to recreate the balance sheet by gathering and using current market values for assets and liabilities, identifying similar items traded on the market. Even if this idea may be considered simple, analysts pointed out several problems: having market value not always available or perfectly reliable; market prices collected may not be perfectly representing of real intrinsic value of assets if markets are imperfect; market values may not represent the importance and the value that an asset represents for the company in a going-concern point of view; the sum of the value of each single asset may not be representative of the real combined value of all the assets together. In fact, the idea is that a company uses its assets in a strategical way, combined them in a unique way in order to create "synergies" and increase their overall value (Damodaran, The Value of Synergy, 2005).

3. **Fundamental Analysis: a**ll the methods abovementioned have a common characteristic, they do not involve any forecasting activity. In this regard, it is pivotal to talk about the *Fundamental Analysis* that is "the method of analyzing information, forecasting payoffs from that information, and arriving at a valuation based on those forecasts" (Penman S. , 2001). Behind the final value

there are several steps and actions that are pivotal: *identify and analyze information*, because the forecast cannot be done without knowing perfectly the business, the industry and the strategy of the company for future years; *forecast*, because the final value is the sum of the discounted value of all future cash flows that the company is expected to generate. Fundamental analysis can be divided in 5 different steps: know the business, analyze the information, develop forecasts, convert the forecast to a valuation and make the investment decision.

The fundamental analysis, as described until now, is the general category of the numerous possible methods involving forecasting that can be used. In fact, on the base of the method selected the information needed and the analysis to be performed can change: the most important difference in the techniques involving forecasting is that they can be "Equity side or Asset Side". The result of valuation will be representative of Equity value/Market Capitalization (in case of Equity side) or of Firm Value/Enterprise Value (in case of Asset side), underling also that the discounting factor used will be the Return on equity in the first case and the WACC (weighted average cost of capital) in the second one. In general, the most important methods used in this category are:

a) **Equity Side**

- **Dividend Discount Model**: This method uses as base of calculation the dividends, considered as the future cash flows available for shareholders (Zanda, Lacchini, & Onesti, 2013). Therefore, the dividends are forecasted with the Gordon Growth Model taking into account a constant growth rate and then they are discounted using as discounting rate the equity cost of capital.

<div align="center">

Equity value/Market Cap valuation

$\sum D_t/(1+K_e)^t + TV/(1+K_e)^t$

</div>

- **Earnings Capitalization equity side**: this method is used both as equity side and as asset side measure. In this case, the method discounts the future net profits. In fact, the Net Income generated by a company is forecasted in the future increasing at a constant rate or on the base of a variable growth rate. Even in this equity side method, the discount rate used is the equity cost of capital, obtaining directly the equity value of the firm.

<div align="center">

Equity value/Market Cap valuation

$\sum NI_t/(1+K_e)^t + TV/(1+K_e)^t$

</div>

- **Residual Earnings Method**: This method is particular, because it discounts Net Income adjusted for an amount representative of common shareholders opportunity cost in generating net income. In fact, firms can increase their value by increasing their Net Income or by decreasing alternatively the Book Value of Equity and cost of equity.

<div align="center">

Residual Income computation

</div>

$$\text{Net Income} - (Ke*BVt\text{-}1)$$

Equity value/Market Cap valuation

$$BVt_0 + \sum RIt/(1+Ke)\text{^}t + TV/(1+Ke)\text{^}t$$

b) Asset Side

- **Discounted Cash Flow**: With this technique, the analyst discounts the free cash flows generated by the company through its operations forecasted for future years. Given that these cash flows are created through the use of assets owned by the company, the method gives a valuation of the Enterprise Value, discounting with the WACC rate.

Enterprise Value computation

$$\sum OFCFt/(1+WACC)\text{^}t + TV/(1+WACC)\text{^}t$$

- **Earnings Capitalization asset side**: the method here described is equal to the equity side one, but in this case the discounting process takes into account the EBIT (Earns before interests and taxes) instead of Net Income. Therefore, even the discounting factor used is now the WACC and not any more the cost of equity.

Equity value/Market Cap valuation

$$\sum EBITt/(1+WACC)\text{^}t + TV/(1+WACC)\text{^}t$$

2.3 The selection of the valuation methods for the study case

The goal of this section is to explain the choice of the valuation methods that will be used in next chapters to perform the valuation exercise related to the M&A analyzed as business case, following the suggestions given by Guatri, Fusa and Guatri in their book "La valutazione del capitale economico d'Impresa" (1999). Indeed, after having presented valuation methods used both in Italian and in international contexts, it is now important to define which are the most suitable for the study case.

The two companies involved in the analyzed M&A are one from Italy (Prysmian, the acquiring company) and one from United States (General Cable, the acquired company), but notwithstanding their origins these are two international companies, both operating all over the world. Therefore, I decided to use international methods in order to reflect their scope of work and the two different stock exchange market where their shares were traded before the M&A process. In particular, I started a research process among relevant sources to understand which could be the more significant methods to use in business valuation and I found out that, as stated by Borsa Italiana S.p.A. in its document "Listing Guides" (2014), the principal methods used for M&A valuations are the Discounted Cash Flow, the Comparable Companies Multiple ad the Comparable Transactions Multiple.

The use of the first two methods allows me to make a comparison between the valuation results obtained from a more difficult, but more complete, method based on forecasting, and a simpler method, using less information but avoiding the subjectivity errors intrinsic in the forecasting process.

Anyway, these two methods are not able to catch what is called "*Control Premium*". In fact, when a M&A process is concluded there is the transfer of control of a company to another, the buyer, which will have more flexibility and more options on how to create value in the future. In order to take into account the possible effect of this control premium, the Comparable Transaction Multiple method is the right way to ascertain the difference between the value of comparable companies acquired in the past before and after the transaction closure. In other words, this method is able to give a valuation of the difference between the market value of the acquired company before the transaction and the amount paid by the acquirer. This difference explains the premium paid to obtain the control over the acquiree.

Chapter 3: Prysmian acquisition of General Cable

Before the sign of this meaningful deal, General Cable tried in several ways to continue managing the business on their own. In fact, notwithstanding the numerous difficulties that were faced, in October 2014 the company initiated a transformation process to improve its performance: divestment of all non-core assets in Asia Pacific and Africa (United States Securities and Exchange Commission, 2018). The results of this strategy weren't so positive, therefore in the fourth quarter of 2015 General Cable committed to a new strategy plan aiming at the optimization of assets portfolio, developing leading cost and efficiency positions, innovating and creating an high-performance culture. The plan required significant capital expenditures in new projects, restructuring of facilities in main regions, hiring of new relevant executive management and the engagement of external consultant resources while internally developing a renewed employee culture. Even if this strategy provided with the expected results in terms of cost reduction, as of June 2017, the results have been substantially offset by business and market trends such as: overall weak economic growth in the products and markets in which the firm operated, added to price erosion due to increased competitiveness.

As a consequence, on June 21 2017, General Cable's Board held a meeting to analyze the recent negative results: the firm obtained flat to declining outcomes in 2016/2017 despite the effort in the new plans. Consequently, they decided to start considering new initiatives and investments that could lead to performance improvement, with a detail of each associated cost, risk, time and payback. Every possibility of continued operations would have led to significant investments with no certain future results in the near term. Therefore, on July 12 2017, J.P. Morgan, acting as financial advisor for General Cable, suggested that the best way to generate the highest value for shareholders would have been to initiate new external strategic alternatives such as a recapitalization with borrowed capital, a sale for cash or for stock or a combination of both. In the following days, the entire process was articulated in 5 main steps (Prysmian Group, 2018):

1. *The intention to sell*: on 16 July 2017, General Cable decided to open itself to the possibility of selling the company, reviewing the strategic alternatives to maximize the shareholder value.
2. *The announcement*: on 3 December 2017, Prysmian and General Cable defined their agreement for the purchase of the latter by the former for a price of $30 per share in cash.
3. *The stakeholders' approval*: on 16 February 2018, General Cable stockholders approved the acquisition of the company, 38,140,754 shares at a price of $30 per share, representing the 75.34% of the total number of shares of common stock outstanding and around the 99% of the total votes cast.
4. *The Regulator approval*: on 8 March 2018, the transaction has been cleared for US antitrust purposes.
5. *The last obstacle and the closing*: firstly, on 2 June 2018, the two companies obtained clearance from the CFIUS (Committee on the Foreign Investment in the United States) that eliminates the last hurdle for the acquisition. In fact, on 6 June 2018 Prysmian and General Cable announced the closing of the operation, launching publicly their new organization 5 days later.

This astonishing deal results in several synergies arising from the combining forces of the two companies, such as: complementary geographical footprint, complete understanding of the market, a strong cultural fit, the widest and complete product/contract portfolio in the market, procurement, overhead and manufacturing costs reduction.

3.1 Economic and Financial Characteristics and effects

The transaction was financed with a mix of new debt, cash and credit lines, which, concluded the deal, ensures to the two companies a pro forma net financial position equal to 2.9x over the adjusted EBITDA. Moreover, the overall sources of capital have been all employed to reach the amount of $3 billion needed to acquire the total amount of General Cable stocks: 50,623,497 outstanding shares of common equity. This price represent the evaluation of the company, including debt and other liabilities, and guaranteeing a premium of around 81% to the acquired firm's closing stock price, $16.55 and $21.80 per share, dated 14 July 2017 and 1 December 2017 respectively, the last day before the announcement regarding the possibility of selling the company and the last day of trading before the announcement of the agreement between the parts. As a consequence of this transaction, the day after the disclosure of the deal, General Cable stocks had a rise, opening at 29$, while Prysmian shares suffered due to the communication. Anyway, its shareholders believed that the merger would have ensured an increase in terms of earnings per share, equal to +10-12% in the first year after the closing.

Taking into account these financial information, the aim of the next chapter is to evaluate General Cable through three different valuation methods, with reasonable assumption to forecast its future results and the termination value, in order to understand which of the selected valuation techniques allows to business analysts to gain the most accurate estimation of a company's enterprise value.

Chapter 4: Business case, General Cable company valuation

This chapter will be more practical as it will present the result of the valuation exercise performed using Excel worksheets.

General Cable valuation using Discounted Cash Flow: The share price computed is equal to $ 9,4 therefore significantly far from the actual payed price of $ 30 per share. Moreover, it is always good practice to perform a scenario analysis (Table 9). The purpose is to understand how the share price can change with different growth rates and WACC. Indeed, in the following table, there are all the possible share price outcomes in correspondence of several combination of g rate and WACC. Specifically, I performed the sensitivity analysis adding and subtracting 100 basis points to both long-

Discounted Cash Flow valuation							
Data in $ million	2017	2018	2019	2020	2021	2022	TV
Revenues	3.837,2	3.994,5	4.158,3	4.328,8	4.506,3	4.691,0	4.691,0
Adjusted EBITDA	163,2	169,9	176,9	184,1	191,7	199,5	199,5
Depreciation and Amortization	(73,9)	(73,9)	(73,9)	(73,9)	(73,9)	(73,9)	(55,0)
Adjusted EBIT	89,3	96,0	103,0	110,2	117,8	125,6	144,5
Figurative Taxes (33%)	(29,5)	(31,7)	(34,0)	(36,4)	(38,9)	(41,5)	(47,7)
NOPAT	59,8	64,3	69,0	73,8	78,9	84,2	96,8
Depreciation and Amortization	73,9	73,9	73,9	73,9	73,9	73,9	55,0
Delta Net Working Capital	(126,3)	(15,0)	(14,0)	(14,0)	(13,0)	(13,0)	-
Delta provision	1,0	0,4	0,4	0,4	0,4	0,4	-
Capex	(85,4)	(70,0)	(55,0)	(55,0)	(55,0)	(55,0)	(55,0)
Operating Free Cash Flow	(77,0)	53,6	74,2	79,1	85,2	90,4	96,8

Tax rate	33,0%						
WACC (%)	7,2%						
g-rate	1,0%						
Revenues Growth rate	4,1%						
EBITDA Margin	4,3%						

Discount factor			0,9	0,9	0,8	0,8	0,7	0,7

Discounted OFCF			50,0	64,7	64,3	64,6	64,0	1.588,8
Σ OFCF	307,6						
Discounted TV	1.124,6						
Enterprise Value	1.432,2						
NFP	954,1						
Equity Value	478,1						
Shares Outstanding	50,6						
Share Price	$9,4						

Table 16: Share price estimation through the DCF method, own elaboration.

term growth rate and WACC. Anyway, further comments on the result, also compared to the other valuation methods, will be presented later in conclusion of this thesis.

Share price measure						
Data in $				**WACC**		
		6,2%	6,7%	**7,2%**	7,7%	8,2%
	0,0%	10,46	8,14	6,15	4,42	2,90
	0,5%	12,62	9,95	7,67	5,72	4,02
g-rate	**1,0%**	15,21	12,07	**9,44**	7,22	5,30
	1,5%	18,34	14,60	11,53	8,95	6,77
	2,0%	22,24	17,68	14,02	11,00	8,47

Table 17: Share price sensitivity, own elaboration.

General Cable Valuation using Comparable companies' multiples: The flow of the writing now shifts to the second valuation method selected, Comparable companies' multiples. The identification of similar companies was driven by the specific industry in which firms operates, without regard of their countries. Therefore, as stated in chapter two, the choice was made at an "International infra-sector" level: **Belden Inc.**, **Encore Wire Corp.**, **Prysmian S.p.A.**, **Nexans SA**. Having selected the comparable companies, their most representative financial information have been researched to obtain significant multiples, which in this specific valuation exercise are: **EV/EBITDA** and **EV/Sales**. As a result of these considerations, the table below shows financial information for each comparable company, the calculation of the two multiples in three different years (2016-2017-2018) and the final calculation of a range of different multiple values: the minimum, the average, the median and the maximum.

Comparable pricing analysis											
Data in $ million		Total	NFP	EV	Sales	EV/Sales			EV/EBITDA		
# Company	Country	market cap			2016	2016	2017	2018	2016	2017	2018
1 BELDEN INC	US	2.725	705	3.430	2.082	1,6x	1,6x	1,5x	10,2x	9,8x	8,3x
2 ENCORE WIRE CORP	US	739	(87)	651	917	0,8x	0,6x	0,6x	10,6x	7,5x	6,2x
3 PRYSMIAN SPA	IT	4.860	808	5.668	7.361	0,7x	0,7x	0,6x	9,2x	9,8x	11,7x
4 NEXANS SA	FR	2.107	268	2.375	6.239	0,4x	0,4x	0,4x	7,4x	5,6x	8,1x
Average						0,9x	0,8x	0,7x	9,3x	8,2x	8,6x
Median						0,8x	0,7x	0,6x	9,7x	8,6x	8,2x
Min						0,4x	0,4x	0,4x	7,4x	5,6x	6,2x
Max						1,6x	1,6x	1,5x	10,6x	9,8x	11,7x

Table 20: Comparable companies' multiple determination, own elaboration on the base of Bloomberg platform data

General Cable Corp financial data							
Data in $							
Target Company	Stock Price	Shrs. Out.	Market Cap.	NFP	EV	EBITDA	Sales
GENERAL CABLE CORP	21,8	50,6	1.103,6	954,1	2.057,7	163,2	3.837,2
		in millions	in $ millions	in $ millions	in $ millions	in $ millions	in $ millions

Table 18: General Cable financial data as of 31/12/2017, own elaboration on the base of Bloomberg Platform data

Implied share price through multiple analysis				
Data in $	**Min**	**Average**	**Median**	**Max**
EV/Sales Implied Share Price	9,4	43,3	31,6	100,5
EV/EBITDA Implied Share Price	(0,9)	7,4	9,0	12,6

Table 19: Calculation of General Cable share price on the base of selected multiples, own elaboration

Considering the actual share price payed in the analyzed M&A (30$ per share), it is evident that the best results are obtained with the EV/Sales. In fact, the average is pretty a good estimation, anyway the nearest value is the Median estimation. That's significant because the median is considered "stronger" and more representative than the average due to its ability to be less sensitive to outliers (Leys, Ley, Klein, Bernard, & Licata, 2013). Moreover, this result is reasonable because the multiple EV/Sales is not sensitive to reporting and adjustment policies performed by companies and in this analysis for the purposes of the thesis.

General Cable Valuation using Comparable transactions multiples: in this process, it was necessary to look for M&A deals equally made through the use of cash in exchange of shares, one of the purchasing method described in the second chapter. Indeed, Prysmian acquired General Cable's shares in exchange of sole cash, without considering share options or conversion, therefore better comparability is reached with transactions occurred in the same way. Secondly, another important factor is that each transaction identified occurred through companies operating in the Wire&Cable industry, providing with a better consideration of synergies and control premium when estimating the share price. As a result of these reasoning, the list of comparable transactions selected and its financial characteristics is showed in the following table.

Comparable transactions' financials							
Accouncement Date	Aquirer Name	Target Name	Purchase Price	Sales	EBITDA	EV/Sales	EV/EBITDA
September-16	NKT	ABB HV Cables	836,0	472,0	70,8	1,77x	11,80x
December-13	Southwire	Coleman Cable	492,0	914,6	88,7	0,54x	5,55x
November-10	Prysmian	Draka	1.250,0	2.048,0	125,0	0,61x	10,00x
June-07	LS Cable	Superior Essex	900,0	2.993,1	284,5	0,30x	3,16x
September-07	General Cable	Phelps Dodge	735,0	1.300,0	77,0	0,57x	9,55x
March-07	Coleman Cable	Copperfield	213,0	520,0	35,3	0,41x	6,03x
			(in $ million)	(in $ million)	(in $ million)		
Average						0,70x	7,68x
Median						0,59x	7,79x
Min						0,30x	3,16x
Max						1,77x	11,80x

Table 23: Financial data and multiples for comparable transaction, own elaboration on the base of Bloomberg Platform data

General Cable Corp financial data							
Data in $							
Target Company	Stock Price	Shrs. Out.	Market Cap.	NFP	EV	EBITDA	Sales
GENERAL CABLE CORP	21,8	50,6	1.103,6	954,1	2.057,7	163,2	3.837,2
	in millions	in $ millions	in $ millions	in $ millions	in $ millions	in $ millions	

Table 22: General Cable financial data as of 31/12/2017, own elaboration on the base of Bloomberg Platform data

Implied share price thorugh Comparable transactions				
Data in $	Min	Average	Median	Max
EV/Sales Implied Share Price	3,9	34,2	25,7	115,4
EV/EBITDA Implied Share Price	(8,6)	5,9	6,3	19,2

Table 21: Calculation of General Cable share price on the base of selected multiples, own elaboration

In particular, it is worth saying that, as for comparable companies' method, the most representative results are represented by the average and the median values of the EV/Sales multiple, at similar distance from the actual payed price of $ 30 per share. This is significant because this valuation

method is able to take into account the control premium or the possible value of synergies that have been recognized in each transaction considered. As a consequence, also the estimated share price is able to represent the Enterprise Value plus an implicit premium related to control and synergies. Furthermore, as previously stated, the best proxy is estimated through the use of the EV/Sales because it is the multiple less affected by accounting policies, fundamental characteristic in this comparison, due to the different geographical origin of the companies involved in each deal.

Chapter 5: Conclusions, valuation methods comparison and limitations

Different results have been computed and every value obtained is more or less far from the actual share price payed by Prysmian. To conclude the master thesis, it is now time to analyze the results trying to answer to the research question presented in the introduction:

"In the specific context of M&A deals, which are the most representative and effective valuation methods in the estimation of share prices?"

The previous chapter was devoted to the estimation of General Cable share price at the assumed time zero, 31/12/2017. Once obtained the results, these have been compared to the actual share price that Prysmian payed to conclude the M&A. As previously observed, the best results have been registered using the comparable transactions' multiples and specifically using the EV/Sales. Anyway, a better analysis is needed to evaluate the methods as a whole, thus considering the accuracy of DCF and its sensitivities, as well as comparable companies and transactions results with both EV/Sales and EV/EBITDA multiples. This process is fundamental in the determination of the empirical representativeness of methods, aiming at answering to the research question. As a consequence, I decided to compute an estimation of the absolute error of each valuation method and to determine the corresponding Median Absolute Deviation (MAD). Indeed, the valuation method with the lowest Median Absolute Deviation can be considered as the most efficient.

Specifically, the first step of this error estimation consists in the calculation of the absolute value of the error (i.e. the deviation, that is the difference, between the estimated value and the target price, $30 per share): *Absolute deviation = │Estimated value (x_i) – Target share price (P)│*.

The decision regarding the use of Median Absolute Deviation was determined on the base of the better mathematical characteristics of Median, if compared to the average and to the standard deviation ones. Indeed, the average and the standard deviation (or its squared value, the Variance) assume that the distribution of observation is normal and, more importantly, they are highly impacted by outliers (Leys, Ley, Klein, Bernard, & Licata, 2013). In contrast, the Median is not at all affected by these problems and Huber (1981) described the Median Absolute Deviation as the "single most useful ancillary estimate of scale". Furthermore, the use of the median it has been mandatory due to

the presence of several extreme values in some of the estimation (such as the maximum share price estimation equal to 100,5 or 115,4 and a minimum equal to -0,9 or -8,6, considering respectively the comparable companies and comparable transaction multiples, see Table 14 and 17).

In order to show the whole analysis performed, the following tables aim at presenting the computed share prices, the estimated deviation from the target value and finally the summarizing parameter through the Median Absolute Deviation, for each of the three valuation methods performed.

1. **Discounted Cash Flow analysis**: deviation from the target price estimation and Median Absolute Deviation. Each value in table has been computed as the absolute value of the difference between the estimated share price, showed in the previous table, and the target $30 share price payed by Prysmian. In conclusion, the **Median Absolute Deviation**, determined as the median of all the deviation showed in above table, is equal to **20,56**.

DCF measure of error vs actual share price						
		WACC				
		6,2%	6,7%	7,2%	7,7%	8,2%
g-rate	0,0%	19,54	21,86	23,85	25,58	27,10
	0,5%	17,38	20,05	22,33	24,28	25,98
	1,0%	14,79	17,93	**20,56**	22,78	24,70
	1,5%	11,66	15,40	18,47	21,05	23,23
	2,0%	7,76	12,32	15,98	19,00	21,53
	Actual payed price	30,00				
	Median Absolute Deviation	**20,56**				

2. **Comparable companies' multiple method analysis:** deviation from the target price computation and Median Absolute Deviation. Again, the deviation, or the estimation error, has been computed as the absolute value of the difference between the calculated share price and the actual payed price ($30 per share). As a consequence, the **Median Absolute Deviation**, median of each row of estimated errors (both for EV/Sales and EV/EBITDA), is equal to **16,92** (considering the EV/Sales multiple) and **21,80** (considering the EV/EBITDA multiple).

Measure of error vs Actual payed price	Min	Average	Median	Max	Median Absolute Deviation
EV/Sales Implied error	20,59	13,26	1,58	70,47	16,92
EV/EBITDA Implied error	30,88	22,57	21,02	17,37	21,80
Actual payed price	30				

3. **Comparable transactions multiple method:** deviation of each result from the target price and Median Absolute Deviation. Even in this last case, the results in the following table have been computed as the absolute value of the difference between the above shown share prices and the

Measure of error vs Actual payed price	Min	Average	Median	Max	Median Absolute Deviation
EV/Sales Implied error	26,05	4,15	4,29	85,41	**15,17**
EV/EBITDA Implied error	38,65	24,08	23,73	10,81	**23,91**
Actual payed price	30				

actual one ($30 per share). In conclusion, the **Median Absolute Deviation**, median of each row estimated errors, is equal to **15,17** (in case of the EV/Sales multiple) and **23,91** (in case of the EV/EBITDA multiple).

Summarizing the results obtained through the effectiveness analysis, it is possible to observe that:

- **Discounted Cash Flow:** MAD = 20,56.
- **Comparable Companies Multiples:**
     EV/Sales MAD = 16,92
     EV/EBITDA = 21,80
- **Comparable Transactions Multiples:**
     EV/Sales MAD = 15,17
     EV/EBITDA MAD = 23,91

Therefore, it is possible to state that the Comparable Transactions using the EV/Sales multiple is the most representative given that its MAD is the lowest. In fact, looking at its results both the median and the average share prices are really near to the actual price.

Directly behind, the second-best result is represented by the Comparable Companies EV/Sales multiple with a computed MAD equal to 16,92 given that the median share price is really near to the target value ($31,6 against the target $30).

In the third position of this hypothetic ranking there is the Discounted Cash Flow, which registered a MAD equal to 20,56 considering all the possible outcomes performing the sensitivities related to WACC and g rate values.

Finally, the worst results have been registered through Comparable Companies/Transactions EV/EBITDA multiples equal to 21,80 and 23,91 respectively.

These results can be explained if analyzed from a theoretical point of view, in fact it is reasonable to have the best estimation results when using the EV/Sales multiple, and in particular with Comparable Transactions. Indeed, as explained before in this writing, the previous transactions multiples are able to consider the effect of control premium or synergies values, which are impossible to consider with other valuation techniques but that are important variables considered by acquirer and acquired companies when concluding a M&A deal. The performed exercise in this master thesis represents a practical example of this statement. Furthermore, the best result has been reached using the EV/Sales multiple, which is not affected by accounting policies and representing the actual ability of companies to sell products to the costumers and so generating income. In addition, sales were not affected by the extra-ordinary situation in which General Cable operated in the last five years considered, which have led to several essential adjustment affecting the reliability of EBITDA as a comparable multiple.

Dealing with the Discounted Cash Flow method, its effectiveness is neither the worst nor the best, thus a good estimation considering that it does not consider the value of future control or possible synergies. Furthermore, other distorting effects were caused by the several adjustments performed to obtain a more comparable value of Operating Free cash flow and by the natural presence of subjective assumptions. Indeed, one of the limitations of this method is the presence of subjective assumptions which can be different from analyst to analyst. Moreover, the sensitivities performed have been a good test to understand which hypothesis in terms of growth rate and WACC rate would have led to the best result.

In conclusion, the worst estimation was obtained through the EV/EBITDA multiples, which, in my opinion, were too much affected by accounting policies and adjustment processes that, even if performed in this master thesis, have not been satisfying to allow perfect comparability among companies and with the actual share price payed by Prysmian.

5.1 Limitations, further possible studies and implications

Even if the whole exercise lead to reasonable results in line with the theoretical guidelines explained in the first part of this master thesis, it is reasonable to include an analysis of the limitations of this valuation exercise.

1. **Context of analysis**

   The first limitation is related to the specific context in which the abovementioned results have been obtained. Indeed, this valuation exercise was related to an M&A transaction and it is possible that, in other business landscapes, the valuation method here analyzed will show better or worse outcomes in terms of valuation effectiveness. Further studies will be necessary to understand if the results here obtained are replicable in other context of enterprise valuation.

2. **Analyzed companies' uniqueness**

   Even if in other M&A situations, each deal considers different companies and different financial results. Therefore, it is worth reminding that the acquired company, General Cable, presented an extra-ordinary situation in the last five years before the deal, making the projections of future data on the base of past results impossible. This consideration is, for example, fundamental when judging the Discounted Cash Flow reliability as a valuation technique. To overcome this limitation, future researches could be devoted to the repetition of this empirical study on different and numerous M&A deals, checking results' consistency in each case.

3. **Assumptions and adjustments**

   The difference between my results and the actual price payed by Prysmian is also related to different assumptions when projecting future results and adjusting past outcomes. In fact,

Prysmian had had for sure better and deeper information when making its valuation to determine the right bid price. In addition, different results from this thesis will be also possible considering different time-periods, diverse multiples as well as diverse comparable companies or transactions. Future possible research can be performed trying to obtain financial information directly from Prysmian or General Cable, understanding their assumptions and calculation when estimating the best purchase price possible. Once obtained the needed insights, the valuation exercise can be newly performed to verify valuation methods' effectiveness.

4. **Different error estimation**

Even if previous limitations were avoided, different results would have been obtained estimating the deviation from the target price in ways other than the Median Absolute Deviation. Indeed, future studies can demonstrate business valuation efficiency estimating the deviation from the target price with other statistical measures.

Implications for practitioners

Concluded the analysis and presented the limitations, it is worth thinking to the usefulness of this study for practitioners such as researchers, analysts, managers and other students. Firstly, this master thesis can be used as theoretical background in M&A and Business Valuation's fields, in order to deepen knowledges and add new skills. Secondly, managers and analysts can understand better which valuation method to use when valuing their own firms or other possible targets in future take over. Indeed, the understanding of each method and their corresponding pros and cons can help when deciding the best way to valuate a company. Moreover, this master thesis can be used as a guideline and support when performing business valuation as the three valuations performed have been described step by step, showing formulas and processes replicable in different valuation contexts. Finally, as previously described, the outcomes of this analysis can be used as source for further studies in this field, widening the understanding of valuation methods' effectiveness compared to real firm valuation cases.