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## Investment policy and economic performance of Italian listed companies: a multivariate analysis

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**INVESTMENT POLICY AND ECONOMIC  
PERFORMANCE OF ITALIAN LISTED COMPANIES: A  
MULTIVARIATE ANALYSIS**

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## **Abstract**

This study focuses on the investment policy of companies listed on the Italian Stock Exchange in the period between 2007 and 2014.

In particular this research concentrates on the industrial and technological sectors, which have deep differences in terms of internal structure and business strategy. As a consequence, there emerged the curiosity to investigate whether the specific type of investments have an impact on the economic performance, in terms of operating margin (EBIT).

This study starts with the analysis of trends and relationships between tangibles, intangibles and operating income. Using the Pearson correlation ratio, the authors aimed at finding evidence of a hypothetical correlation in 2014 between tangible and intangible investments and EBIT. In addition, in order to verify if the trend of the economic performance is affected, a MANOVA multivariate analysis is used, by starting from the production function and its development.

***Key-words: investments, tangible, intangible, assets, EBIT, listed companies, multivariate regression, MANOVA.***

*Title*

## **Introduction**

Intangible and tangible investments do not have the same importance from one industry to another.

The choice of the business in which a company operates is the key that determines its organization and capital structure (Pisoni, Brusa et. al., 1996).

In particular, it means having a clear idea of the product or service to realize, of the market in which a firm wants to compete, of techniques and instruments to be used and of the way strategies are put into practice.

This is the reason why we have decided to focus on Italian listed companies belonging to the industrial and technological sectors, in fact we want to compare and contrast two different situations and understand their investment policy and the related impact on the economic performance, in terms of operating margin (EBIT, Earnings Before Interests and Taxes).

Our empirical study bases its theoretical rationale on the necessity to strengthen with further demonstrations that different investment policies could have several implications on the overall performance of a company.

By analysing several works of many researchers, we started our research with a very complex theoretical framework.

Consequently, by starting with the first hypothesis that industrial companies invest more in tangible assets and technological ones in intangibles, our first aim is to study the trend of the two types of investments in the period between 2007 and 2014.

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*Intangible assets* are identifiable non-monetary assets without physical substance. They are initially measured at cost, subsequently measured at cost or using the revaluation model, and amortised on a systematic basis over their useful lives, unless the asset has an indefinite useful life. In this case it is not amortised and it is subjected to impairment test.

The three critical attributes of an intangible asset, to be reported in the balance sheet of a company, are: identifiability; control; future economic benefits, in terms of more revenues or lower future costs; determinable costs. The accounting treatment of intangibles is concentrated on whether expenditures should be reported in the income statement or in the balance sheet. Moreover, not all intangible elements could be reported in the financial statements.

The main difference in the accounting policy between tangibles and intangibles lies in this last element: tangible investments should be all reported in the balance sheet of a company if they produce future economic benefits and the costs can be determined.

Consequently it is more likely that the balance-sheet information will represent the reality and the correct amount of all tangible investments, while in the other case it will not.

In the following Paragraph 3, there are further details and definitions of these concepts.

Our research concentrates on the economic margin, related to the core activities of the companies considered.

*Title*

The third step is to combine these two elements, investments and operating income (EBIT, Earnings Before Interests and Taxes), in order to evaluate if there is a correlation between the two. In particular, this purpose can be demonstrated by the Pearson correlation ratio.

As a consequence the final part of this empirical research is based on the study of the impact of the specific investment policy on the operating income, by using a multivariate regression of variance (MANOVA) based on the production function and its development. The purpose is to evaluate if a generalized model of multivariate regression can explain in both samples this cause-effect relationship between the independent variables, expressed by the tangible and intangible investments and the dependent variable, represented by the operating income.

The aim of this research was two-fold. Firstly, we tried to understand the effective investment policy of the two groups of companies over ten years and finally we wanted to analyze the impact of this policy on the economic operating result in 2014.

The remainder of this study is organized as follows. In Paragraph 1, we provide the theoretical background of the topic presented. The definition of the sample of companies and the methodology are described in Paragraph 2. In this section, we also include the presentation of the research questions and of the phases of analysis. Our findings are presented in Paragraph 3 and conclusions in the last part of the research.



*Author*

## **1. Literature**

The discipline of Business Administration defines the company as a system, composed of many elements which are interrelated (Santesso, 2010; Pisoni, Brusa et al., 1995; Ferrero, 1987). It is a unique system because every single company is an independent entity, with its own internal structure (Amit and Schoemaker, 1993).

As we mentioned in the foreword, defining the specific business in which every firm operates means developing distinctive competences and creating a strategy that allows the company to be competitive on the market (Myers, 2013; Franco and Bourne, 2004).

Several authors based their research on studying the capital structure of companies in order to monitor their impact in terms of competitiveness, value and performance (Lombardi, Manfredi et.al., 2014; Mezentceva and Mezentceva, 2014; Bobillo, Rodriguez-Sanz and Tejerina-Gaite, 2006; Hall, 2001; Dierickx and Cool, 1989).

Other studies decided to concentrate on intangible assets and on the related benefit for a company investing in them (Denicolai, Zucchella and Strange, 2014; Cohen and Vlismas, 2013; Chiucchi, 2013; Heiens, Leach and McGrath, 2007; Casta, Escaffre and Ramond, 2005; Hand and Lev, 2004; Megna and Mueller, 1991; Grabowski and Mueller, 1978), because the last two decades have witnessed an explosive growth in intangible investments. Currently, it is believed that such investments frequently constitute the most valuable assets of firms.

### *Title*

Several empirical studies (Ittner, 2008; Casta, Escaffre and Ramond, 2005; Ittner and Larcker, 2005; Franco and Bourne, 2004; Ittner and Larcker, 2003) have found evidence of a positive relationship between intangibles and companies' performance. Two methodologies can be distinguished: on the one hand studies analyzing the relationships between capital market and financial performance measures, such as share returns, holding period returns, Tobin's  $q$ , and investment in intangible assets, and on the other hand research works dealing with relationships between intangible assets and performance measurements or competitive advantage. In this last approach, to assess performance, objective financial performance indicators, such as Return on Assets (ROA), Return on Equity (ROE), Return on Investments (ROI), subjective measurement of financial indicators (Likert scales) or non-financial indicators (market share, product service quality, customer satisfaction) are used. In this last category we will concentrate on financial measurements of commercial performance using indicators such as gross margin ratio and its evolution and growth in sales.

These different methods present ambiguous and divergent results regarding the impact of intangible investments on companies' performance (Casta, Escaffre and Ramond, 2005). Consistent with Franco and Bourne's review of the performance measurement literature (2004), the evidence indicates that the strength of the statistical relations between intangible asset measurement and performance declines as the

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sophistication of the analysis increases (Ittner, 2008). Stronger results are obtained using self-reported performance than actual accounting or stock market returns (Ittner, 2008). Many individual companies find it difficult to link improvement in their intangible asset measurements to financial gains (Ittner and Larcker, 2003, 2005).

Moreover, over the past few decades there has been a lot of criticism around the accounting policy of intangibles. Lev and Zarowin (1999) argue that non-recognition of intangibles in the balance sheet of companies has caused a significant decline in the relevance and usefulness of accounting reports.

Most of the debate regarding the accounting treatment of intangibles has centred on whether expenditures on intangibles should be reported in the income statement or in the balance sheet (Kanodia, 1980; Lev and Surgiannis, 1996; Kanodia and Lee, 1998; Lev and Zarowin, 1999; Healy, Myers and Howe, 2002).

For the International Financial Reporting Standards (IAS-IFRS), lots of intangible expenses are reported as a line of the income statement, instead of being capitalized on the balance sheet.

Some intangibles, such as investments creating brand value and increasing customer base, are not even identified in the financial statements of companies and they are not separated from the operating expenditures.

Several researchers (Healy, Myers and Howe, 2002; Lev and Zarowin, 1999; Kanodia and Lee, 1998; Lev and Surgiannis, 1996; Kanodia, 1980)

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have tried to decide whether expenditures on intangibles should be recognised and reported separately on the balance sheet or left unmeasured and represented in the income statement.

Amadiou and Viviani (2010) tried to measure the intangible expenses and the intangible assets, by defining all the elements that influence the stock of intangible assets and, in particular, by specifying a constant proportional depreciation rate for all the intangibles analysed, without making any difference between all the items that characterised the whole amount of these investments.

Kanodia, Sapra and Venugopalan (2004) analysed a sample of listed companies and the evaluated the way intangibles were reported in the financial statements and consequently the disclosure to the market. They found that when intangibles are not reported and explicitly measured, the market does not naively price the firm as if its intangibles were zero or some other equally arbitrary amount. In their theory, the market rationally anticipates the firm's investment in intangibles and prices the firm accordingly. A simplistic regression of price against recorded book values and recorded earnings, where the data are drawn from an expensing regime, assumes that the market prices the firm as if its intangibles are zero. This kind of regressions would provide misleading results. Moreover the researchers wanted to demonstrate that every regression that tries to add an estimation of intangibles, despite the fact that significant coefficient values and improved  $R^2$  could be obtained, the related results

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do not necessarily imply that incorporating such estimates in formal accounting reports would provide new information to the market, nor do they imply that an outside observer could use these estimates to identify mispriced stocks and earn excess returns from the market.

Kanodia, Sapatra and Venugopalan also indicate that the value relevance of intangibles does not necessarily imply that intangibles should be measured because they are fully reflected in stock prices.

Some researchers instead decided to analyze the different role of tangible and intangible assets as resources (Galbreath, 2005) and some others concentrated on one sector in particular, monitoring the impact of a specific investment policy (Makris, 2008).

Our analysis fits into this framework but the purposes are different. In fact it is aimed at comparing and contrasting two different situations: the first one represented by technological companies, oriented to an intangible investment policy, and the second one represented by industrial firms, which mostly own tangible assets.

After this first phase, our study goes deeply into the evaluation of the impact of these investments on the economic performance, in particular in 2014. In this case the economic performance is represented by the operating income (EBIT, Earning Before Interests and Taxes), which is the margin deriving from the company core business activities.

As a consequence our research represents a sort of extension of previous studies above-mentioned because firstly we concentrate on two important

*Title*

sectors in Italy and secondly this study tries to formulate and implement empirically an econometric model of linear regression between investments and economic margin.

We did not implement a sophisticated statistical model in order to pursue the effectiveness of the results and to concentrate on the real relationship between the items considered.

Moreover we also concentrated on tangibles and, by making this comparison between the two sectors and consequently between two different kinds of investment policies, we wanted to monitor the economic results of companies pursuing one policy or another.

Our approach is balance-sheet based, consequently we started from the data extracted from the financial statements of companies and that can be seen as one of the limits of this research because of what has been expressed above. Therefore we did not focus on measuring the intangibles and we based our study only on what emerged from the balance-sheet of those firms.

However, despite the limits of the research, thanks to this analysis and the results obtained, we may consider the opportunities of growth and development of these companies included in the sample. We may notice the differences emerging after deciding to make a particular investment.

*Author*

## **2. Methodology**

### *2.1 The sample*

This analysis focuses on two different groups of companies listed on the Italian Stock Exchange.

In particular, we have chosen those listed on the sectoral index called FTSE All-share Industrials, and those listed in another sectoral index called FTSE All-share Technology. The first index includes firms operating in the industrial field, while the second one refer to companies working in the technological sector. We have decided to concentrate on these two groups because they are extremely different in their structure and in their investment policies. This difference may help us analyse the trend of the related investments over the period between 2007 and 2014. Moreover these typical characteristics can help us study if the dynamic of investments can influence the economic performance of these firms.

Data were extracted from AIDA, which is a database containing comprehensive information on companies in Italy, and from the financial statements of those firms.

Therefore we focused on information about tangible and intangible assets and EBIT (Earnings Before Interest and Taxes).

We want to specify that data provided in our figures all refer to the mean of the single element analyzed for the specific sector.

*Title*

AIDA provided data of 92 companies out of 93. We had to exclude Stmicroelectronics, belonging to the technological sector.

Table 1 shows all the Italian limited companies linked to the technological field.

(Insert Table 1: Italian Companies Listed on the Technological Sectoral Index)

In the multivariate analysis applied to the technological companies we had to exclude Be company because in 2014 there were no sales related to the core business.

Table 2 shows all the firms of the sample, related to the industrial sector.

(Insert Table 2: Italian Companies Listed on the Industrial Sectoral Index )

## *2.2 Research questions and phases of analysis*

The present research is based on the following two hypothesis:

- *H1*: companies listed on the sectoral index called FTSE All-share Industrials, invested more in tangible assets, while those listed in the sectoral index called FTSE All-share Technology, focused their business on intangibles.
- *H2*: there is a positive correlation between the investments and the economic performance in the two group of companies.



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To reach the goals of this study, we need to formulate three research questions:

- *RQ1*: what are the trends of the specific type of investments in the industrial and in the technological sectors? And what about the EBIT?
- *RQ2*: Is there a correlation between the specific investment policy, followed by each sector, and the related operating income?
- *RQ3*: can a generalized model of multivariate linear regression explain the relationship between the specific investment policy of the companies of the two groups and the related economic margin?

The research methodology follows three phases:

a) Phase 1: Definition of the items monitored. As we analyse the annual financial reporting of a group of Italian listed companies, we refer to the IAS-IFRS principles (Dezzani, F., Biancone, P.P. and Busso, D., 2014), and in particular to IAS 1, *Presentation of Financial Statement*, IAS 16, *Property, Plant and Equipment*, IAS 38, *Intangible Assets*, and IAS 40, *Investment Property*;

b) Phase 2: Empirical analysis and findings. It involves an analysis of the information derived from the sample. The research methodology only uses the information provided in the financial statements because it is sufficient to answer the research questions.

With reference to *RQ1*, we firstly want to demonstrate that the first hypothesis is true. As a consequence, we have to consider the mean of the investments of the specific sector in order to understand what kind of

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policy is followed by the two groups. Secondly, we monitor the trend of the investments and the EBIT between 2007 and 2014 to underline which group suffered less from the economic crisis. Then we compare the two situations in order to introduce the second research question.

With reference to *RQ2*, for each group of companies, we firstly calculate the Pearson correlation ratio between the different kinds of investments and EBIT for both sectors and then we compare the two situations. Thanks to this ratio, we can analyse the impact of investments on the overall operating result in order to evaluate the effects of a specific investment policy. The analysis of the correlation between tangible assets and EBIT on the one hand, and intangibles and EBIT on the other aims at discovering if there is a strict link between them and, if it is confirmed, how strongly the two are connected.

As mentioned above, the Pearson correlation ratio ( $p$ ) is used to identify a positive or negative correlation between the specific investments and the EBIT. For this, it is necessary to underline the following conditions:

- if  $p > 0$  there is a direct correlation;
- if  $p = 0$  there is no correlation;
- if  $p < 0$  there is an indirect correlation;
- if  $0 < p < 0.3$  the correlation is weak;
- if  $0.3 < p < 0.7$  the correlation is moderate;
- if  $p > 0.7$  the correlation is strong.

*Author*

With reference to RQ3, we used a generalized econometric model of a multivariate linear regression, based on the production function approach. This model was applied to the two sectors and the results were compared in order to understand if the model represents correctly the entire sample and, consequently, the entire population.

c) Phase 3: Conclusions and limitations of the research.

### *2.3 Statistical techniques*

In Phase 2, after a brief analysis of the data obtained and a descriptive statistics, we conducted a multivariate analysis of variance (MANOVA) based on the production function approach and its following development. This analysis refers to 2014.

In this approach, also used by Amadiou and Viviani (2010), the output (of a country, a sector, a company) is a function of inputs. At the country level it is measured by income (GDP, gross domestic product), at the company level it can be measured by sales or by any indicator of result. Whatever the level of analysis, classical inputs are capital and labor. The general equation used for this approach was:

$$Y = f(KT, KI, L) \quad (1)$$

where Y is the output (EBIT or EBITDA in our analysis), KT is the stock of tangible capital, KI is the stock of intangible capital, and L is labor cost. In most studies, for example, Bobillo et al. (2006) on R&D efficiency, the

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standard Cobb–Douglas function is used for the function  $f$ , and Equation (1) becomes:

$$Y = A \times KI^{\alpha_1} KT^{\alpha_2} L^{\alpha_3} \quad (2)$$

$\alpha_1$  is the output elasticity with respect to intangible capital,  $\alpha_2$  is the output elasticity with respect to tangible capital,  $\alpha_3$  is the output elasticity with respect to labor. To test the previous equation, it is useful to make a logarithm of Equation (4):

$$\ln(Y) = \ln(A) + \alpha_1 \ln(KI) + \alpha_2 \ln(KT) + \alpha_3 \ln(L) + \varepsilon \quad (3)$$

$$y_n = a + \alpha_1 k_i + \alpha_2 k_t + \alpha_3 l + \varepsilon$$

The classical production function approach provides important information on the relevance of each factor, but its major drawback is that it does not indicate whether intangible investments provide more benefit to the firm than costs. To overcome this drawback, we used a modified version of the production function approach developed by Sougiannis (1994), Lev and Sougiannis (1996), and Lev and Zarowin (1999). The function reflects the fundamental relationship between the value of corporate assets (tangible and intangible) and the earnings, or operating income, generated by them.

$$OI = g(KT, KI) \quad (4)$$

*Author*

where OI is operating income (EBIT, Earnings Before Interests and Taxes). The variables are scaled by sales to mitigate the econometric problem of heteroskedasticity, due to the different size of the sample of companies. The estimated model is (Lev & Zarowin, 1999):

$$(OI/S) = b + \beta_1 (KI/S) + \beta_2 (KT/S) + \varepsilon \quad (5)$$

### **3. Findings**

#### **3.1 Results**

First of all, before analyzing the data obtained, we want to give further details and definitions about some concepts mentioned in the Introduction. IAS 38 states that an *intangible asset* is an identifiable non-monetary asset without physical substance. Intangible assets are initially measured at cost, subsequently measured at cost or using the revaluation model, and amortised on a systematic basis over their useful lives, unless the asset has an indefinite useful life. In this case it is not amortised and it is subjected to impairment test.

The three critical attributes of an intangible asset, in order to be reported in the balance sheet of a company, are:

- identifiability: the capacity to distinguish the intangible element from the others, especially from goodwill;
- control: power to obtain benefits from the asset;

*Title*

- future economic benefits, in terms of more revenues or lower future costs;
- determinable costs: costs related to the acquisition of an asset should be easily determined.

The accounting treatment of intangibles is concentrated on whether expenditures on intangibles should be reported in the income statement or in the balance sheet.

In addition, not all intangible elements could be reported in the financial statements.

The main difference in the accounting policy between tangibles and intangibles lies in this last element: tangible investments should be all reported in the balance sheet of a company if they produce future economic benefits and the costs can be determined.

Consequently it is more likely that the balance-sheet information will represent the reality and the correct amount of all tangible investments, while in the other case it will not.

As regards tangible assets, AIDA provides overall information concerning both investment property and property, plants and equipment. Unfortunately, there is no distinction between the two categories.

Phase 2 concerns the stages of our research and the related comments.

Starting with RQ 1, Figure 1 underlines what kind of investments were made by technological companies during the period between 2007 and 2014. The data refer to the mean of the sector for each year.

*Author*

(Insert Figure 1: Investments in Italian Companies Listed on the Technology Sectoral Index)

Figure 2 instead shows what kind of investments were made by industrial companies during the same period. The data refer to the mean of the sector for each year.

(Insert Figure 2: Investments in Italian Companies Listed on the Industry Sectoral Index)

The two figures demonstrate that the first hypothesis (H1) is true. In fact companies listed on the Italian Stock Exchange and belonging to the technological sector invest the majority of their capital in intangible assets, while listed firms related to the Industry index have the tendency to invest in tangible assets.

After individuating the specific policy of investments, we want to focus on the trend of these elements and on the operating income in order to understand if they have the same evolution during the period analyzed.

(Insert Figure 3: The Trend of Intangible Assets and EBIT of Companies Listed on the Italian Stock Exchange)

*Title*

Figure 4 instead shows the trend of tangible assets and EBIT of firms listed on the Italian FTSE All-Share Industrials during the period between 2007 and 2014.

(Insert Figure 4: The Trend of Tangible Assets and EBIT of Companies Listed on the Italian Stock Exchange)

As we can see in Figure 3, starting from 2011 EBIT seems to follow the trend of investments in the technological sector. In this graph, the two items considered diverge between 2007 and 2009. In the period between 2009 and 2011 if the amount of intangible investments remained stable, the operating income decreased considerably.

On the contrary, in industrial companies tangible assets and the operating income do not have the same trend, except in the first two years. In fact, in 2010 tangible assets declined significantly while the operating earnings rose. Moreover in the period between 2010 and 2013 there was the opposite tendency: the investments slightly increased in 2011 and in the last years they decreased, while EBIT first went down and then it recovered slowly.

After a brief comment on the graphs, it is necessary to calculate mathematically if in 2014 there was a correlation between specific investments and EBIT in order to give a statistical explanation to the figures above. We decided to use the Pearson correlation ratio ( $\rho$ ) for each sector.



*Author*

(Insert Table 3: Correlations in 2014)

As we can see in Table 3, in both sectors there is a negative correlation between tangible assets and operating income.

Consequently, the second hypothesis (H2) cannot be confirmed because the higher tangible investments are, the lower the operating income is. There is an inversely proportional relation.

This table allows to introduce the results linked to the MANOVA regression model, explained in the previous paragraph.

The model is based on the following null and alternative hypothesis:

$$H_0: \beta_1 = \beta_2 = 0$$

$$H_1: \beta_1 \neq \beta_2 \neq 0$$

The following table summarizes the results derived from the application of the model in the two groups of companies, belonging to the two sectors.

(Insert Table 4: The results of the multivariate regression)

Table 4 shows that the multivariate model explains in both sectors more than 50% of the sample.

There are no problems of collinearity between the variables. In fact VIF is lower than 2, Tolerance index is more than 0,50 and the Condition Index is lower than 12.

*Title*

For the industrial sector, the p-value confirms that only the independent variable "Tangible assets" is significant, while the other variable "Intangible Assets" does not influence the operating income.

Moreover, the coefficient  $\beta_1$  of the intangibles is not significant.

In the technological sector instead, the two variables are significant and they both influence the operating income. The only difference between the two groups of companies is represented by the variable "Intangible Assets". In this group is relevant and it explains the model better than the other regressor, as it is confirmed by the confidence interval.

The conclusion about the null hypothesis is that only for the  $\beta_1$  of the industrial sector can be accepted, but in the other cases it has to be rejected.

### **3.2 Discussions**

Our research with its findings underlines that even in Italy companies belonging to the industrial sector did not have the same good economic performance as the technological ones, nor the same perspective of growth and development. It is much more difficult to create value in a long-term period with only tangible investments, as demonstrated by the Pearson correlation ratio, in fact the higher tangible investments, the lower the operating income. There is an inversely proportional relation linked to the fact that the tangible investments can only be seen as a major cost in terms of amortisation and these companies cannot benefit from their investment

*Author*

policy in terms of higher sales or efficiency in the process of production. In addition there is no cause-effect relationship between intangible assets and operating income, as demonstrated by the MANOVA multivariate analysis.

As a consequence, if industrial companies enhanced and aligned intangible assets, they would probably improve their overall performance, satisfying customers' needs and the shareholders' interest in the company.

If we analyse the technological companies, we can notice that their performance is strictly linked to the intangible assets, despite the fact that tangibles are considered as one of the key drivers that influence the operating result.

Consequently our research confirms what many previous studies have stated before: intangibles have achieved a growing importance since the 1990s (Kaplan and Norton, 2004). Nowadays focusing investments on intangible assets means creating a distinctive and sustainable value and being much more competitive on the market because corporate intellectual property, such as patents, trademarks, copyrights, business methodologies, goodwill and brand recognition can directly drive global sales year after year (Amin and Hasan, 2014; Warren, 2000; Zahra, 1999; Winter, 1987; Porter, 1985). In addition, sometimes customers do not focus on the product or service, but on the brand: the more popular the brand, the more successful the company. The impact can either lead a company to success or failure.

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## **Conclusions**

This study focuses on the investment policy of companies listed on the Italian Stock Exchange in the period between 2007 and 2014.

In particular this research concentrates on the industrial and technological sectors, which have deep differences in terms of internal structure and business strategy. In fact industrial companies are likely to have a rigid structure, while the technological ones are more elastic and dynamic. This element directly influences the overall strategic focus, because technology requires firms to adapt more easily and quickly to the needs of consumers and to the aggressive policy of competitors. These views lead to different kinds of investments. In fact this research starts with the hypothesis that in the industrial sector tangible elements are much more relevant, while in the technological system intangibles are prevalent.

As a consequence, there emerged the curiosity to investigate if the specific type of investments have an impact on the economic performance, in terms of operating margin (EBIT).

This study bases its analysis on trends and relationships between tangibles, intangibles and operating income and they were tested empirically by analyzing the financial data extracted from consolidated balance sheets of all companies of the period between 2007 and 2014 provided by a database, called AIDA.

By using the Pearson correlation ratio, we aimed at finding evidence of a hypothetical correlation between tangible and intangible investments and

*Author*

EBIT, in order to demonstrate if they are a direct or an indirect cause affecting the trend of the economic performance.

Moreover, to verify if the trend of the economic performance is affected by the specific type of investments, a MANOVA multivariate analysis is used, by starting from the production function and its development.

This last element can help us introduce all the limits of this research. First of all, this study represents the second step of a far deeper analysis that can consider other variables, financial indicators and margins. In addition, the same analysis can be extended to all Italian listed companies, not only to the industrial and technological ones.

It could be interesting to compare and contrast the Italian situation with the one of other European countries, such as France and Germany.

In addition, as we mentioned before, AIDA database, as regards tangible assets, did not give further information about the specific classification of this item. We could not divide property, plants and equipment from investment property. Consequently, we used the comprehensive data without considering which part concerned operating investments.

The results obtained thanks to the MANOVA analysis contrast what we might have supposed. In fact, investing in tangibles means having a negative impact on the operating income.

In addition we should underline the fact that the intangibles reported in the balance sheet do not represent the entire complex system of intellectual capital, know-how, goodwill and brand-recognition of a company because

*Title*

of the principles expressed by the International Accounting Standard (IAS) 38.

As a consequence the results of our research are influenced by this lack of comprehensiveness of the item and it could be interesting to focus on the impact of all the elements that can be defined as "intangible" and that are not reported in the balance sheet.

Several studies (Kanodia and Lee, 1998; Dutta and Reichelstein, 2003; Kanodia, Sapra, Venugopalal, 2004) concentrated on the disclosure policy and on the relative impact on the pricing rule and consequently on the cash flows.

When the capital market cannot perfectly observe the firm's investments, its pricing rule is affected. This informational factor about the investment policy makes the firm reluctant to take unobservable actions, such as investment in intangibles, which decrease current cash flows. The incentive to cut back investments from first-best levels to increase current cash flow is fully anticipated by the market and built into its pricing rule. Thus, the firm is trapped in a bad equilibrium.

Consequently one of the future development of our research could lie in the study of the maximization of the market price of listed companies derived from the best combination of investments in tangibles and intangibles.

The price in the capital market is endogenously determined and depends on several elements: inferences made by traders from public accounting

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reports and from prior knowledge of the firm's technology and future expectations of profitability; macroeconomics variables that reflect the economic situation of a country and of the market.

Another future development could be represented by the analysis of the impact of specific investments on EBIT in a medium/long term, by considering the way this variable and some others could influence the economic performance of companies.

However there will always be the problem related to the balance-sheet approach: difficulties in terms of comparability and homogeneous analysis among groups of companies will remain until there are informational differences caused by the accounting treatment of intangible elements, which will have a strong impact on the investor's perception and consequently on the stock price.

*Title*

## Tables and Figures

**Table 1: Italian Companies Listed on the Technological Sectoral Index**

<b>Table 1: Technological Companies</b>
Be
Best Union Company
Cad it
Dada
Eems
Ei Towers
Engineering
Esprinet
Eurotech
Exprivia
Fullsix
It Way
NoemaLife
Olidata
Reply
Sesa
Tiscali
Txt



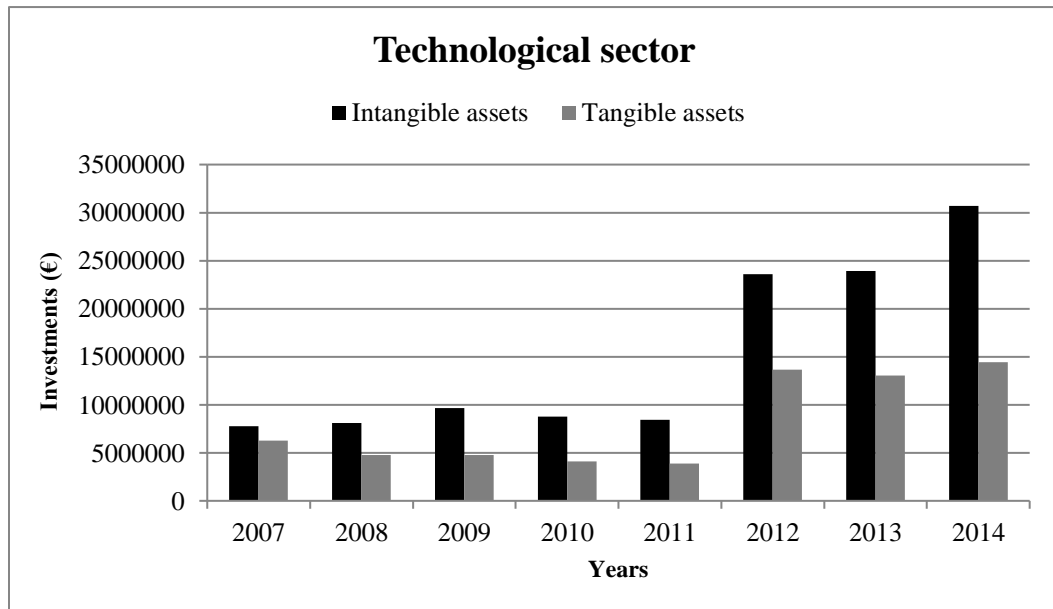
Author

**Table 2: Italian Companies Listed on the Industrial Sectoral Index**

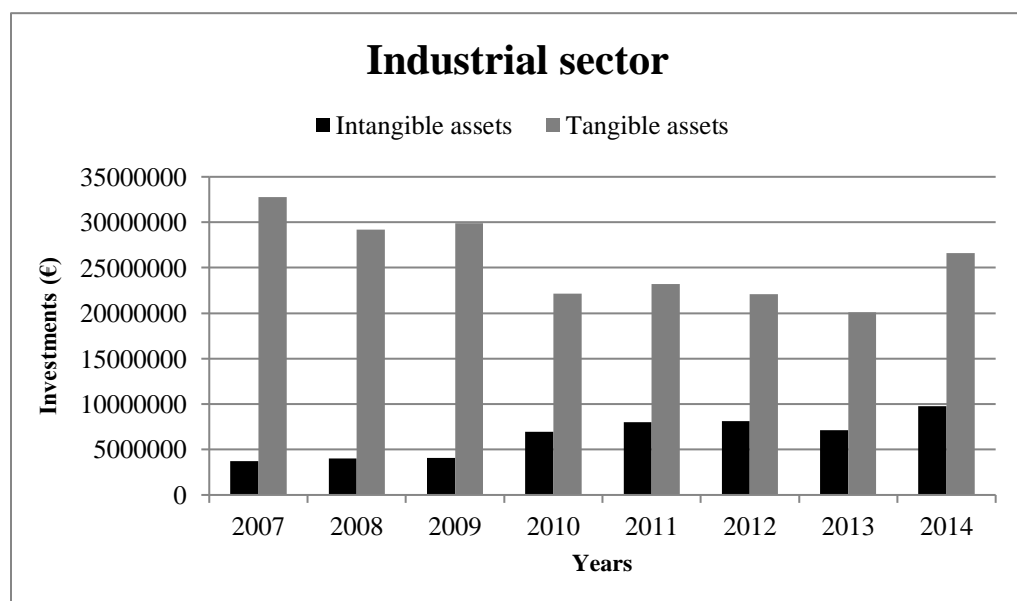
<b>Table 2: Industrial companies</b>	
Ambienthesis	Finmeccanica
Ansaldo Sts	Gefran
Astaldi	Gruppo Ceramiche Richetti
Astm	Ima
Atlantia	Interpoump
Autostrade Meridionali	Irce
Bastogi	Italcementi
Beghelli	Italmobiliare
Biancamano	Nice
Biesse	Panariagroup
Bolzoni	Poligrafica
Buzzi Unicem	Premuda
Carraro	Prima Industrie
Cembre	Prysmian
Cementir Holding	Reno De Medici
Cerved Information Solutions	Sabaf
Cir	Saes Getters
Cnh Industrial	Salini Impregilo
Cofide	Save
D'amico	Servizi Italia
Danieli & C.	Sias
Datalogic	Sintesi
Delclima	Tesmec
El.En.	Trevi Fin Industriale
Fidia	Vianini Industria
Fiera Milano	Vianini Lavori
Fincantieri	Zignago Vetro

Title

**Figure 1: Investments in Italian Companies Listed on the Technology Sectoral Index**

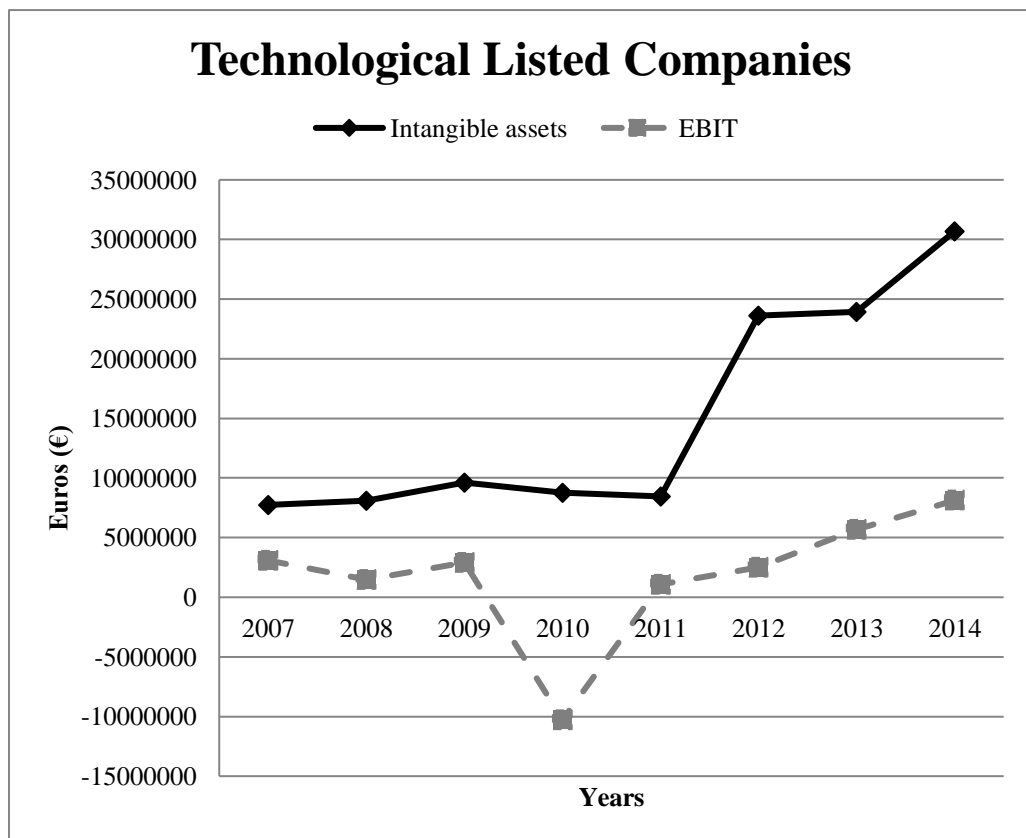


**Figure 2: Investments in Italian Companies Listed on the Industry Sectoral Index)**



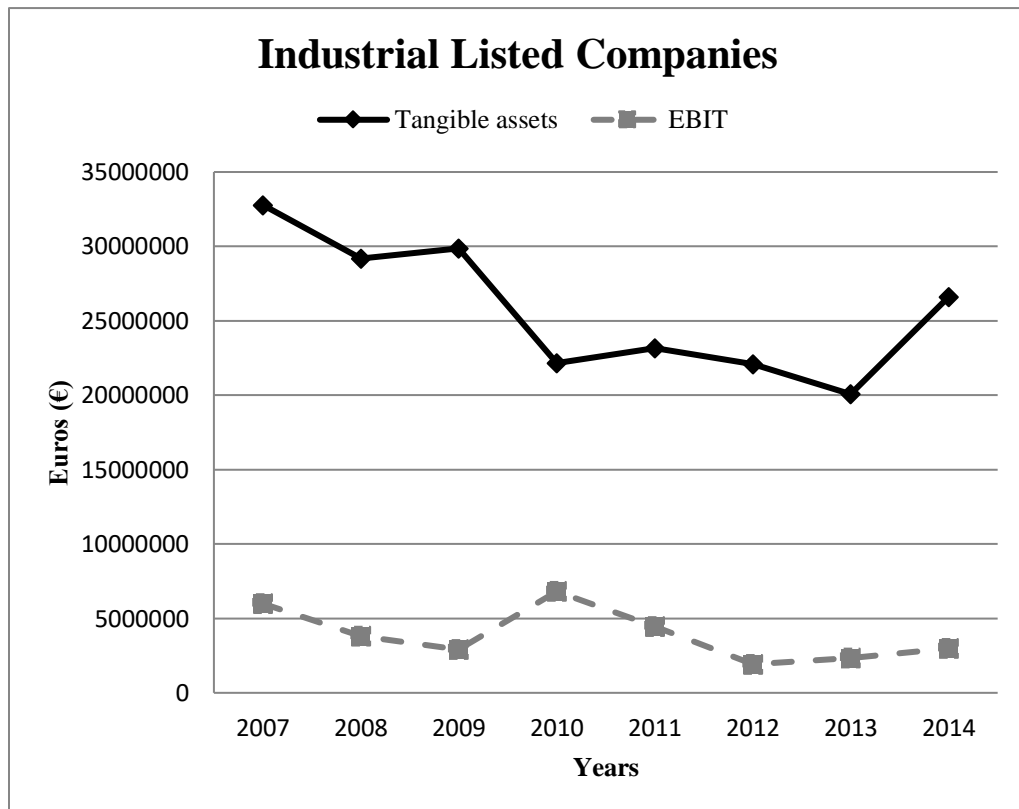
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**Figure 3: The Trend of Intangible Assets and EBIT of Companies Listed on the Italian Stock Exchange**



*Title*

**Figure 4: The Trend of Tangible Assets and EBIT of Companies Listed on the Italian Stock Exchange**



Author

**Table 3: Correlations in 2014**

		INDUSTRIAL SECTOR			TECNOLOGICAL SECTOR		
		EBIT	Intangibles	Tangibles	EBIT	Intangibles	Tangibles
Pearson Correlation Ratio	EBIT	1,000	,048	-,745	1,000	,168	-,775
	Intangibles	,048	1,000	-,032	,168	1,000	,400
	Tangibles	-,745	-,032	1,000	-,775	,400	1,000
Sign. (1- tailed)	EBIT	.	,367	,000	.	,260	,000
	Intangibles	,367	.	,409	,260	.	,056
	Tangibles	,000	,409	.	,000	,056	.
N	EBIT	53	53	53	17	17	17
	Intangibles	53	53	53	17	17	17
	Tangibles	53	53	53	17	17	17

*Title*

**Table 4: The results of the multivariate regression**

	Industrial sector (2014)	Technological sector (2014)
R	.746	.934
R <sup>2</sup>	.556	.872
R <sup>2</sup> -adj.	.538	.854
Standard error	1,47	.30677
p-value:		
- $\beta$ 1	.802	.000
- $\beta$ 2	.000	.000
F	31,322	47,643
Confidence interval - coeff. $\beta$ 1 (5%- significance level):		
- Lower level	-1.632	,588
-Upper level	2,100	1,352
Confidence interval - coeff. $\beta$ 2 (5%- significance level):		
- Lower level	-1,886	-2,647
-Upper level	-1,110	-1,680
VIF	1,001	1,191
Tolerance	.999	,840
Condition Index	2.119	2,062
$\beta$ 1	0,024	,562
$\beta$ 2	-.745	-1,002
b	.342	.088

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