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Cross-Border M&A in High Technology Industries: Does Investor Identity Matter?

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Abstract

This study investigates the relationship between the identity of different international investors and the performance (post M&A)of firms who operate in High Technology Industries. The work is focused on the synergistic behavior of the acquirer, as an endogenous determinant of its identity and, accordingly with the international nature of the transaction, the peculiar internal factors that can be levered to enhance synergistic gains in cross-border settings. This investigation aims to analyze the role played by the identity of different investors on the early success of cross border M&As.

Table of Contents

TABLES AND FIGURES

1. Introduction *General trends in M&As*

The most evident aspect is that M&As come in waves and in America there have been five so far. Even though is not clear the reason of this "wave-nature" of M&As, it is commonly recognized that it ends up with a financial crisis. Indeed, as reported in the article *Riding the wave* from The Economist, "The first, in the 1920s, ended with the onset of the Great Depression" and "a powerful sixth wave is forming" right now. More accurately, the article explains that we are in the third stage of this sixth wave and therefore we should expect an increase in the number of deals. Moreover, it is typically during this third stage that bid premiums overshoot the 50% (of the Target equity value) leading to the fourth stage during which bid premiums can exceed 100% (Clark & Mills 2013). Intuitively, it could be detected it is very unlikely to gain any value with such a high premium. Indeed, we can calculate the value of a transaction[1] as follow:

$$T_{Equity\ Value} + \Delta T - P > 0$$

Where T refers to the target, ΔT are potential synergies and P is the transaction price. Therefore,

$$T_{Equity\ Value} + \Delta T > P$$

A premium of 100% implies that the present value of potential synergies is equal to the pre-bid target equity value. Clearly, it sounds difficult confirming the phenomenon of the winner's curse. Referring to this aspect, in general two-thirds of all mergers and takeovers are not able to deliver what expected (Clark & Mills 2013).

Ultimately, two events are influencing M&A trends: the first relates to some OECD countries that are working to harmonize their tax-landscape in order to avoid phenomenon of profit shifting; the second refers to a reduction in deal brokers' fees to facilitate M&A of smaller businesses, but this only affects the US.

[1] Follows the description of a cash transaction for simplicity and given that the underlying concept is the same of stock transaction (Ray & Ray 2013).

Overall, more than 50% of the entire M&A activity for 2013 had, on the acquirer side, an actor from the Financials, Industrials or High Technology Macro Industries. On the Target side, the same three Macro Industries make up for almost 40% of deals. Figure 1 shows the percentage deals market share per number of deals occurred in 2013. In terms of value, the situation on the acquirer side still shows the supremacy of the Financials while, on the target side, the aggregate deals' value is greater in High Technology Macro Industry.

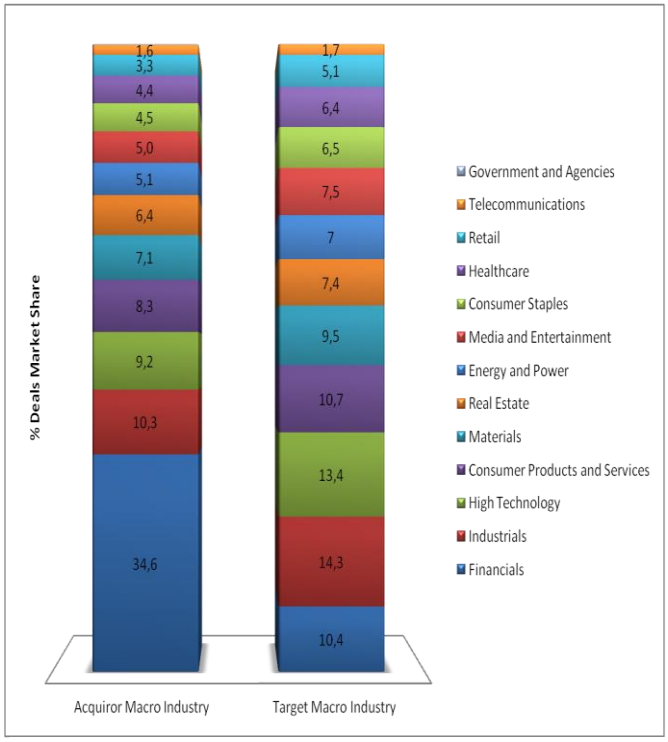

Figure 1 - Acquirer and Target Identities for all Deals occurred in 2013, Data Source: ThomsonOne

Decomposing this aggregate, it results that High Technology itself and Financials drive the market for control of High Technology companies. In Table 1 all deals occurred in 2013 are examined. In these deals, the target company was in the High Technology Macro Industry and strategic buyers characterized by the same innovation intensity of the target led about 50% of transactions, while financial institutions led more than 25%.

Hence, given the relevance of the High Technology Macro Industry in terms of number of deals as well as aggregate value of transactions involving High Technology firms as target, it seems to be worth investigating this aspect of M&As.

Acquirers' Macro Industries	# of deals	% of deals
Government and Agencies	4	0,10%
Real Estate	15	0,38%
Consumer Staples	18	0,46%
Healthcare	29	0,74%
Energy and Power	49	1,25%
Materials	52	1,33%
Retail	62	1,58%
Telecommunications	150	3,82%
Media and Entertainment	165	4,21%
Industrials	173	4,41%
Consumer Products and Services	215	5,48%
Financials	1030	26,26%
High Technology	1960	49,97%
Total	3922	100,00%

Table 1 - Downdrill of High Technology Targets' Acquirers - Data Source: ThomsonOne

1.1. Cross-border M&As

Another significant trend relates to cross-border M&A. Indeed, looking at foreign direct investment (FDI) there has been a shift in their inflows distribution from developed to high-growth markets and this trend is expected to continue (Mike Hughes 2013). Moreover, an increase of more than 20% in cross-border acquisitions in BRIC countries (Brazil, Russia, India and China) is foreseeable.

M&As have a long history representing an alternative to organic growth. Nevertheless, the cross-border activity experienced a sharp acceleration since the 1990s, mainly due to technological development and globalization. Moreover, nowadays it has to be considered that even when talking about domestic M&As, it is likely to observe cross-border issues and concerns since it is likely to deal with operations located in different countries (Child J., Falkner D. 2001). Even though the target's headquarter may be in the same country of the acquirer's, both target and acquirer may have operations in different geographic locations. Hence, it is important to study this phenomenon which already ten years ago pervaded the M&A landscape. Ultimately, light has been shed in 2001 on the M&As' market-value, that has been evaluated around $4Trillion between 1999 and 2000, about 40% of which classifiable as cross-border, thus surpassing $1.5Trillion (Hitt et al. 2001).

After the financial crisis, with globalized and fast changing technological environment one of the best strategies to achieve a long-term wealth growth is to endorse M&As (Beck et al. 2013).

Namely, the financial crisis led to two main consequences. On the one hand, a low interest rate that stimulated an increase in borrowings (leveraging companies). In turn, leveraging causes an increase in discipline in managers' behavior by imposing a stream of interests to be regularly corresponded to lenders (Mahmud 2012; Damodaran 2008). On the other hand, as reported in The Economist in *High-yield bonds: An appetite for junk*, low interest rate led to an increase in the appetite for high-yield bonds, which, are very risky by nature, having a lower rating than investment grade. However, as behavioral economics teaches us, fear has a significant role in influencing decision making and non-making during a crisis. Therefore, a widespread crisis is causing the highest cash holding ever registered (Sánchez & Yurdagul 2013). In other words, investors are looking for opportunities to get the return they are used to; firms are basically modifying their capital structure because their fear towards uncertainty has been containing investments choices. Eventually, companies will be required to exploit all that cash. In January 2014, the Financial Times published an article titled *Pressure mounts for corporates' cash piles to be put to work*, so the question is: is that time now?

The second element to consider is globalization that affects the real economy as well as financial markets. Globalization in the real economy has been driven by different factors:

(1) the economic development of new countries;

(2) "the death of distance" due to transportation and communication technologies development;

(3) the needs for a greater market to reduce the *duration* of the investment aligning it to the faster product life cycle due to innovation pace (especially in ICT);

(4) the political and economic integration and presence of world level institutions whose aims are: facilitate international trades; enhance free circulation of workforce and other resources; harmonize production, trade and accounting standards and regulations;

(5) the general convergence in behavior and preferences.

Therefore, firms are obliged to deal with economic globalization in so far as, in order to achieve economic and competitive growth, they have to adopt an international configuration (Caroli 2012). For what concerns the financial globalization, the main consequences are the following: an increase in inflows-outflows velocity between

monetary zones; the arise in importance of foreign exchange markets and change in currency prevalence within them. As stated in *Triennial Central Bank Survey: Monetary and Economic Developments* (Bank of International Settlements 2013) the global foreign exchange market daily turnover averaged, in Trillions, $5.3 in 2013, up from $3.9 in 2010 and only $1.2 ten years before. Such a development of financial markets goes with the claimed financialization of the world economy. In fact, along a compounded average 3-years growth rate of the foreign exchange market of 45% (since 2001), the market for non-financial counterparties is growing at a slower pace (38%), reducing their share of global turnover to only 8.7%. For what concerns currencies, although the US dollar remains dominant, followed by the Euro and the Japanese Yen, major changes involve emerging markets currencies, e.g. the Mexican Peso and the Chinese Renmimbi which entered the top ten currencies. Such a contingency gives a wider range of options to companies ready to seize open opportunities to finance their activity.

Lastly, technology effects are presented. As already introduced, technology played a significant role in economic globalization but it is for sure a great enhancer of financial globalization as well, as an example bear in mind the technology behind the High Frequency Trading. To grasp the magnitude technology effect, note that in 2013 the operation of Project Express was expected: a new transoceanic fiber-optic cable "5.2 milliseconds faster than the AC-1, with an execution time of 59.6 milliseconds" as reported by *Bloomberg* in 2012. *The Telegraph* was reporting it a year before, just at the beginning of the laying (supposed to be completed by 2013), in *The $300m cable that will save traders milliseconds* it was stated "Hibernia Atlantic, the company behind it, is planning to sell a special superfast bandwidth that will have hyper-competitive trading firms and banks in the City of London and New York queuing to use it. In fact it is predicted they will pay about 50 times as much to link up via the Hibernian Express than they do via existing transatlantic cables [...] it is claimed that a one millisecond advantage could be worth up to $100m (£63m) a year to the bottom line of a large hedge fund.". This example gives a great insight on the impact of technology on financial markets and towards financial globalization. Another example to better understand the rate of such a development in technology is that illustrated in the movie *Trading Places* (1983), where people have to short and long contracts by screaming on the Chicago Mercantile Exchange floor (and jumping on the right step to signal the maturity desired) as opposite to today's practice of pressing buttons. Throughout time, technical progress has been what fueled economic growth and development. However, while in the past it was mainly allowed by labor,

natural resources and machines, the last few decades are recognized as *the information age* as if to say that *knowledge* is fueling economic growth (Hall & Mairesse 2006; Smith 2002; Powell & Snellman 2004; Jaffe & Trajtenberg 2002). Specifically, the idea of knowledge as business product and core productive asset to achieve a long-run sustainable economic performance is at the heart of the *knowledge economy*. Hereby it is possible to describe the High-Technology macro sector as the cluster for knowledge-intensive products and services as defined by OECD (Eurostat 2014). These industries are knowledge-driven and technological learning is considered as one of the main drivers of competitive advantage (Hagedoorn & Cloodt 2003; Cloodt et al. 2006; Brakman et al. 2008). Moreover, in such industries it is possible to approximate the economic performance with their innovative performance (Cloodt et al. 2006). Moving to the impact of innovation, it can be observed how it is shortening product lifecycle, hence intensifying the effort of companies to research for new products or upgrades of existing ones. Such a condition of *knowledge depreciation* engenders firms to invest uninterruptedly on research and development in order to avoid losing market for their products/services. This run makes innovation a virtuous cycle able to *fertilize* specific geographical areas while creating complex infrastructures of distributed knowledge, in order to mitigate risks and financial effort for innovation.

In this sense, M&A is a good option to realize a solid strategy of sustainable economic growth and it is no coincidence that has been found a positive correlation between cross-border M&As and the belonging to a technology-intensive industry (Shimizu, M. a Hitt, et al. 2004). Such a phenomenon is explained by the fact that a fast changing environment might not give enough time for internal growth strategies, undermining the perspective of a sustainable competitive advantage.

Importantly, when it comes to strategy, time is a determining variable. Consider as example two different companies: A and B. Company A hires only un-experienced employees with the idea to teach them skills and competencies the company will be needing tomorrow. The first issue relates to the uncertainty of the environment, due to its unpredictability. This leads the company to teach an unclear set of skills and competencies, supposing that the company is able to do so at all. Whereas company B, hires people whose professional profile is already shaped according to its needs due to the contingent environment. In this second approach, the possibility to undertake a decision shortly before the capabilities are needed reduces the uncertainty due to unpredictability of the environment. It allows the company to choose the best match with a specified job

description. Symmetrically, this is the difference between a strategy based on organic growth and on external growth. Particularly, it gives the insight that it is more likely to have success adopting organic growth strategies when environment changes are predictable, clearly in businesses other than High Technology ones.

A good epitome of High Technology Firms (excluding Biotechnology ones) is the ICT industry. The book *Software & Systems Requirements Engineering* (Berenbach et al. 2009) clearly states the main qualitative characteristics that pool together all the players of this industry. So that, to identify factors on which these companies can built their industry-specific competitive advantage. In order to understand better their magnitude of influence on the pace of development of high tech firms they are listed below:

1. Short, unpredictable product/service lifecycle that brings them in a *rough water* environment (Suarez & Lanzolla 2005). It implies:
    a. High investments in R&D
    b. Accurate monitoring of the needs of customers
    c. Deep pockets for marketing investments aimed to affect the perspective buyer perception
2. Highly skilled human resources and an effective engineered system of documentation able to retain knowledge independently to the pace of employees turnover
3. High risk in development projects, due to:
    a. Complex estimation of Total Cost of Ownership (TCO)
    b. Trade-off between time-to-market and quality of the resulting product/solution
    c. Intense competition in the marketplace

All together these features lead to a generally growing trend in strategic alliances, subsidiary mergers and acquisitions within the industry in order to leverage their resources and share risks (Rai et al. 1996). In other words, such a fast changing environment makes external growth strategies a reasonable option within the range of opportunities available. Given the most recent turbulence in the High Technology industries, it seems ongoing up until today.

Symmetrically, the acquisition of high technology target can represent a good revenue stream for financial investors, being a good bet for high-yield seekers. More specifically, it is recognized that High Technology firms are in need for greater financial sources. However, the greater the volatility of the project undertaken by the company, the greater the interest it will have to pay. Therefore, a value creating strategy from high tech project financing is achievable with a privileged access to financial sources. The critical node of this is represented by the ability of the financial acquirer to assess the potential of the project. The theory of financial intermediation is based on information advantage, in particular for institutions like banks, and therefore their competitive advantage stands in the reduction of moral hazard and adverse selection phenomenon (Diamond 1984; Fama 1985). However, in 2002, a study involving high technology start-ups based in the Silicon Valley, revealed that a specific category of financials, namely venture capitalists, are able to foster the development of human capital acting on the *professionalization* of this small firms (Hellmann & Puri 2002).

This study aims to analyze the role played by the identity of different investors on the success of cross border M&As. Specifically, 1) What is the effect of international investor identity on the (post M&A) economic performance of High Tech firms and 2) How the cross border connotation of an M&A influences the relationship between ownership and performance. In particular, in cross-border context, a reverse sign of the relationship is expected between institutional investors and performance with respect to strategic investors and performance.

1.2. Relationship between Ownership and Performance

Cross-border M&As are a significant aspect within the decision-making setting. It is recognized as one of the tools, in the hands of management to achieve long-term sustainable growth of the firm and shareholder value. Indeed, as cross-border presents greater challenges than domestic in all deal phases, it also gives the opportunity for higher returns (Swenson 1993; Markides & Ittner 1994). In other words, cross-border M&As projects are characterized by high variance, which is a measure of risk. Therefore, management risk aversion has a significant impact on the choice. Moreover, according to

the classical theory of finance[2] and the managerial view of the firm, stock is the expression of the management's performance[3], which manifests mainly through effective coordination and resources' allocation efforts. Then, consistently with Liebenstein's X-Efficiency Theory (1966[4]) and the Agency Theory (1973[5]), it is only by achieving the desired level of engagement of management that is possible to maximize the value of the firm. Only shareholders will benefit of such a maximization. From what has been presented so far, it is clear that the interest of the ownership is to lead to such a maximization and the tool they can use is their influence on corporate level strategies. Actually, to pursue a defined corporate strategy, a more and more focused breakdown of plans is required (business strategy; operating strategy) and increasingly detailed and verifiable plans are passed down the management staircase (tactic; operations). The synthesis of such a process, that embeds corporate governance guidelines, is summarized in mission and culture statements of a company and leads to the achievement of the vision[6].

In other words, it can be argued that there is a relationship between corporate performance and ownership identity on the wake of what contributed by Jensen from 1970s. In *Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure* (Jensen & Meckling 1976) the Authors present the *nexus* between the three economic theories in order to come up with a theory of the firm more accurate than Coase's contribution. In strict relationship to the matter of study of this work, they distinguished between different forms of financing (internal and external equity and debt) and introduced the idea of *financing specialization* affirming that *"where the incentive effects of outside equity or debt are widely different, we would expect to see specialization in the use of the low agency cost financing arrangement"*. Lowering agency costs is an objective of the principal (owners) to achieve better corporate performance, and in turn, greater profit. Basically, financing specialization, beside incentives and monitoring, is a tool to achieve this goal. Furthermore, the primary reason for agency costs is *moral hazard* which is due to information asymmetry. Therefore, it is expected that the ownership will be activating the leverages it is more familiar with in order to overcome agency costs as much as it can. In particular, a financial investor will be leveraging on financing opportunities while a

[2] Stock gives the owner rights on cash flow (to equity) generated by the activity financed (Myers 1984)
[3] Where the firm is interpreted having a coordination function
[4] Harvey Liebenstain, *Allocative Efficiency vs, "X-Efficiency"*, (Leibenstein 1966)
[5] It refers to *Fiduciary rationality and public policy: the Theory of Agency and some consequences*, by Stephen Ross (The first paper explicitly proposing the agency theory).
[6] Also authors like Hofstede contributed in building the theoretical connection between value systems, organizational culture and organization's founder(s) nationality (Hofstede 1985).

strategic investor will be leveraging on the strategic ones. However, both are expected to positively impact on corporate performance.

As already introduced, globalization and communication technologies are amplifying the need for economic agents to get involved internationally. Such a connotation can be reached to a different extent according to the organizational and financial efforts affordable (for the company) and the desired foreign market penetration degree (see Figure 2).

Figure 2- Mode of Entry options by financial and organizational effort and foreign market penetration

Caroli (2012) stated that reasons for internationalization can be clustered in two main categories: internal and external. The first being the retention of corporate' competitive position, the latter the opportunity to exploit or the need to adapt to a changing environment (Caroli 2012). Adjusting for high technology industries, to be open to internationalization became a matter of necessity. It has been broadly investigated that technology-intensive industries tend to build a great number of links with other institutions worldwide in order to enhance their innovative capabilities and enlarge their end market, therefore improving their economic performance or simply in order to maintain its competitive position (Chesbrough 2003). When these relationships are strong enough, the phenomenon analyzed is a Foreign Direct Investment (FDI) of which cross-border Merger and Acquisitions are an example. In literature has been often studied the part played by acquiring firms operating in technology-intensive industries (Cassiman et al. 2005; Cohen & Levin 1989; de Man & Duysters 2005; Hitt et al. 1996; Hitt et al. 1991; Nocke & Yeaple

2007; Yokota & Chen 2012; Cloodt et al. 2006), even if rarely in cross-border settings. However, lately financial institutions have the leading role in M&As scenarios, as showen in Figure 1, and they preserve a considerable position as acquirers of high-tech targets. Moreover, when moving to international transactions, financial institutions, such as private equity firms, demonstrate a greater advantage in detecting better deals than non-financial antagonists (Humphery-jenner et al. 2013). Reasons of this being explained by an information advantage and previous business relationships with other internationally active professionals. Therefore a question comes to mind: is their value creation ability only due to an effective identification process of undervalued targets or they are able to fuel financial as well as operating synergies even in a highly-skilled technological environment?

This work is organized in five sections. After the following Literature Review, the Theory Building will take place in section three, in which the theoretical constructs are introduced (identity and CB context). Section four includes model, sample, variables and summary of results. Each component is deeply analyzed and procedures are reported. The model used to test the hypotheses is the Multiple Regression method which has been applied on different subsamples. Each subsample results from the operationalization of the construct transaction context. Section five concerns conclusions and limitations of the research.

2. Literature Review

It is generally recognized that M&As is a complex field, especially due to the multiple perspectives through which this phenomenon can be studied and analyzed. Moreover, it is a relatively new subject of study with its less than 70 years of research, counting only 518 papers in the 19 top tier business journals in this time frame (Rouzies 2013). For what concerns cross-border M&As, this statement is confirmed and amplified by the "international" nature of the transaction involving additional country-, corporate- and firm-level variables. According to a distinguished theoretical review (Shimizu, M. a Hitt, et al. 2004), researchers have been studying cross-border M&As under three main perspectives: (1) a mode of entry in a foreign market; (2) a dynamic learning process from a foreign culture and (3) a value-creating strategy. The first accounts for market-relatedness between acquirer and target, which is outside the scope of this research. The second perspective will be taken into consideration when the impact of the international nature on the acquirer synergistic behavior and its strategy to create value will come to analysis. The third is indeed the main perspective adopted in this research. It will be examined as the link between investor identity and innovative - therefore economic - performance. Such a connection between innovative and economic performance is strongly supported in literature (Bloom & Reenen 2002; Lubos & Veronesi 2009; Nicholas 2008; Cloodt et al. 2006). Moreover, Holmström and Roberts demonstrate in 1998, that many M&A transactions take place due to innovation purposes. Specifically, it often represents the only feasible option since a great level of disclosure is required to properly forecast the value of innovation. Basically, this investigation will analyze the influence of the learning process on the value-creating strategy put in place by the acquirer. That is, either the technology transfer process or the asymmetric information reduction according to the identity of the international investor and the specific leverages it will put in action to create value.

2.1. Cross-border M&As as a process

In order to analyze cross-border M&As in a systemic way it is helpful to study it as a process, therefore decomposable in interrelated phases. Namely, identification, negotiation and integration stages (Gaughan 2011; Reed et al. 2007). Furthermore, the international

environment introduces challenges due to different economic, institutional and cultural structures. For this reason, in order to identify the opportunity for cross-border merger/acquisition it is important to analyze three macro-categories of conditions afferent to country, industry and specific corporate. These factors are:

- Country-level: legal framework and regulation, market growth rate in host (target's) country; idiosyncrasies between home and target country; risk-avoidance or risk-seeking culture of acquiring firms

- Industry-level: industries technology intensive, advertising intensive or sales force intensive increase the likelihood of M&As (Anand J. 2002)

- Firm-level: multinational experience; local experience; product adaptation required; international isomorphism; international strategy (this impacts strongly on the entry modes choice: multidomestic strategy leads to acquisitions while a global strategy to Greenfield investments); possible anti-trust concerns.

The identification process, technically recognized as due diligence, leads to the negotiation phase that in turn results in the integration stage. Different theoretical contributions are available for each phase. The **IDENTIFICATION STAGE** is fuelled by the rationale of the merger/acquisition. Historically, it has been studied under the economic perspective by authors such as Williamson (1967) and Dunning (1981). The entry mode is determined by the gain of **transaction costs economies** (e.g. through vertical integration of supplier and distributor located in different countries) for the first author and to **ownership location internationalization** (OLI) by the latter. Subsequently, new theoretical supports have broaden such interpretative alternatives with the **resource-based-view** (RBV) and the **organizational learning perspective**[7]. In order to move from the identification stage to the negotiation it is necessary to assess the proper value and risk associated with the target. This is made possible by the implementation of due diligence in which different institutional environment are analyzed in all their dimensions (financials, tax matters, asset valuation, operations, provide assurances to actual and potential stakeholders) in order to evaluate to which extent the *marriage* is feasible. During the **NEGOTIATION PROCESS** investment banks act very often as intermediaries due to the complexity of the interrelated

[7] "Operating in different circumstances increases the variety of events and ideas to which a firm is exposed (Huber 1991), leading to a more extensive knowledge base, stronger technological capabilities, and more innovative skills."(Shimizu, M. a Hitt, et al. 2004)

set of information derived in the previous phase. In general it has been demonstrated that foreign buyers tend to pay higher premiums due to aggressive bidding. Finally, the **INTEGRATION PHASE** takes place after the actual acquisition. Here, the cultural fit is the main concern. As a consequence of the investigation in this sector, different types of integration mechanisms have been developed in order to obtain the most suitable degree of interdependence between the different entities. Overall, it is recognized as a critical phase and in most cases, for companies which growth strategy takes place through acquisitions, put in place an integration team. From integration capabilities depends the project' success in terms of positive Net Present Value, that is, if the target has been overpaid. Indeed, as multiple boundaries are in place during this stage, the integration phase determines if the expected synergies are achieved.

2.2. International Investor Identity

As previously introduced, during the identification stage multiple variables are under examination. Hence, the acquiring firm will be undertaking its decision by processing these variables according to specific criteria. In particular, the chosen set of criteria is expected to be consistent with the identity of the acquiring firm. In order to achieve a clear definition of the acquirer identity, the firm core competences are taken under examination as they will be used to create value from the acquired firm, therefore being the determiner of the transaction success. Furthermore, considering that such competences are main determinants of the synergistic behavior of the acquirer, they will be taken into account during the entire cross-border transaction process.

In particular, two diverse identities are detected: Strategic acquirer and Financial acquirer. The former includes acquirers technologically related with respect to their target. Cassiman and his colleagues (2005) argue that the relationship between the impact of M&A on R&D and innovation can be explained by technological- and market-relatedness between target and acquirer. In particular, it is demonstrated that “rival firms reap little technology gains from mergers” therefore, making the market-relatedness unimportant. Simultaneously, within the technological-relatedness two degrees are detailed: complementary and substitutive. Hence, it is enlightened that complementarities enhance the innovative performance through the mean of economies of scope (Cassiman et al. 2005). Due to the fact that the investigation of this work is related to High Technology

Industries, which are knowledge-intensive (Smith 2002; Eurostat 2014), economies of learning (Ray & Ray 2013; Teece 1977) will have to be taken into account as well. Eventually, this kind of economies should capture, more than others, the effect of national boundaries (Erel et al. 2012).

The latter pools together financial institutions that own majority stakes and conglomerate firms, basically technologically-*un*related entities. They will be leveraging the same core competencies to achieve an effective financing and obtain greater return for their investments. However, within this ample cluster a variety of entities can be identified analyzing their core businesses. Particularly, a distinction needs to be made in the following. Hitt (1996) investigated the impact of financial control and strategic control on the innovation strategy of the acquired company. Due to the definition of these two variables as short term financial return of the investment vs. long term development strategy the analysis resulted in the negative relationship between financial control and internal innovation performance as opposite to the positive relationship to external innovation strategy (such as through further acquisitions) (Hitt et al. 1996). Similarly, PE-backed firms tend to be more acquisitive in particular in cross-border settings (Humphery-jenner et al. 2013) gaining financial synergies from their core competences. The other item of this distinction are conglomerates. Too often they have been considered as an inefficient market structure on the wake of Porter's arguments. It is clear the blame to the internal capital market of the structure as coverage of inefficiencies (Porter 1987). However, because knowledge in technological fields is characterized by path-dependency (Cohen & Levinthal 1990; Shimizu, M. A. Hitt, et al. 2004; Lichtenthaler & Lichtenthaler 2010), high technology companies tend to represent great volatility due to information asymmetry between the innovator and the financier. Therefore, it is expected that reducing this asymmetry, value will be created in the short term thanks to two effects: firstly, a lower cost of capital is expected assisting the management of the target firm; secondly, an increase in innovation performance due to the possibility for the management to focus on the day-to-day activity (Wruck 2008). In a cross border environment, financial institutions and conglomerates are expected to have an advantage in terms of access to information and financial sources as well as relationship with professionals from other countries (Humphery-jenner et al. 2013).

2.3. Peculiarities of Target Firms

Since the investor side has been introduced in the previous paragraph, the category of targets taken into account will be presented in the following.

The target firms investigated belong to the high-technology industry. It is worth to investigate this category of targets since high-tech firms, being knowledge-intensive, represent a strikingly sensitive ground for synergies. According the *Standard International Trade Classification* (SITC) and consistently with the *Organization for Economic Cooperation and Development* (OECD) definition, products whose manufacturing involve high intensity of R&D are high-technology products. Namely they are: Aerospace; Computers Office Machines; Electronics and Telecommunications; Pharmacy; Scientific Instruments; Electrical Machineries; Chemistry; Non-electrical Machineries; Armaments. In literature there is agreement that all these industries are knowledge intensive and, therefore, the economic performance of companies in these industries is knowledge-driven (Hall & Mairesse 2006; Smith 2002; Shimizu, M. A. Hitt, et al. 2004) to such an extent that their innovation capabilities approximate their economic performance with their innovative performance (Cloodt et al. 2006). As already mentioned, the consequence is that technological learning is considered as one of the main drivers of competitive advantage (Brakman et al. 2008; Hagedoorn & Cloodt 2003; Cloodt et al. 2006). Another characterizing aspect of high-tech firms is the need for significant financing, even though having low tangible assets capable to better their class of merit. As a matter of fact, R&D investments are predominantly absorbed by salaries which have a little salvage value in case of failure (Carpenter & Petersen 2002). Carpenter and Petersen examined how capital markets imperfections affect firms in high-tech industries, and stated the three main reasons of that. "First, the returns to high-tech investments are skewed and highly uncertain […] Second, substantial information asymmetries are likely to exist between firms and potential investors.[…] Third, high-tech investments often have limited collateral value".

Therefore, it can be argued that knowledge enhancement and financing gathering creates the opportunity to boost the economic performance of a high-tech firm. In other words, the synergistic behavior of the acquirer should trigger either one or both these leverages: technology transfer through technological learning and/or effective financing gathering through the reduction of the perceived risk.

In this research a model is developed, integrating the synergistic behavior of an investor as endogenous determinant of its identity, and its effect on value creation through the enhancement of the innovative performance of high-tech acquired firms. Indeed, in this particular class of target industry, the economic performance is mainly driven by its innovation capabilities (Nicholas 2008; Lubos & Veronesi 2009; Cloodt et al. 2006; Bloom & Reenen 2002). Hence, the purpose of this research is to investigate on the ability of either financial or strategic international acquirers to impact on operating synergies of knowledge-driven targets in the short-run. Ultimately, the purpose of this evaluation is to assess the inclination to early success of a cross-border transaction. Therefore, the contribution of this research consists in ascertaining the impact of institutional and strategic investors in international transactions on the innovative performance of High-Tech targets.

3. Theory Building

3.1. Synergistic Behavior of Different Investors: Accordance with the Transaction Context

The general reason for cross-border transactions is exactly the same of domestic ones: it occurs in the event that the combination of the two entities is held to increase value according to the acquiring firm's management expectations. Such an improvement is measured in terms of synergistic gains and success of the transaction, depending on how they are split between stockholders of target and acquiring firms (Bradley et al. 1988). However cross-border transactions bring with them additional factors that can either act as obstacles or facilitate the merger. For instance it has been found that "weaker-performing economies tend to be targets", while firms in countries whose stock market has increased in value or currency has recently appreciated and with a high market-to-book value tend to be purchasers (Erel et al. 2012; di Giovanni 2005). Clearly, when factors that would obstacle cross-border M&As are mitigated, the likelihood of their happening increases.

According to the RBV perspective, this category of determinants, which deals with macroeconomic trends, belongs to the so called *external motivations* for a cross-border equity transaction. In the sense that whichever firm would be able to speculate on a macroeconomic disequilibrium and have good chance of success. However, the likelihood to succeed is enhanced by firm specific factors, leading to the shaping of another pool of drivers, recognized as *internal motivations*. Similarly to the nomenclature used for risk measures, the term *specific* refers to determinants driven by the investor identity and specific business. In particular, it is only by combining corporate strategy and core business that a company becomes able to undertake value creating, reasonable and consistent decisions. Moreover, as already brought to attention, the value created by the acquisition depends on the specific ability of the investor firm to generate both operating and financial synergies (Chaplinsky & Schill 2000). Therefore, it is advisable to group these *internal motivations* according to the identity of the investor into *strategic determinants* or *financial determinants*. At this point, it stands to reason that strategic determinants will be prevalent in case of *strategic* investors, while the latter will rule the action of *financial* investors. The analysis of synergistic behavior of the acquiring firm determines what leverages will be activated by the specific acquirer in order to succeed in

the M&A process. Particularly, expected synergies achieved can be attributed to different factors, e.g. informative advantage, expertise in a complementary phase or product.

In general, synergies enhance the performance of the combined companies by increasing operating income or growth rate (operating synergies) or generating a higher cash flow or achieving a lower cost of capital (financial synergies). Operating synergies concern of: (1) economies of scale; (2) increase in market share; (3) economies of scope; (4) higher growth in new or existing markets[8]. While financial synergies include: (1) increase in investment possibilities though offering a greater range of opportunities to put to work eventual excess cash[9]; (2) increase in debt capacity thanks to a more stable cash flow; (3) tax benefits deriving from taking advantage of tax laws or from the use of net operating losses to shelter income.

Although synergies are considered the first reason for takeovers, it has to be taken into consideration that the increase in value of the combined firms can be also explained by undervaluation of the target stock[10] or by the change in corporate control. Specifically, McConnell and Mikkelson (1983) found out that corporate control has a specific value embodied in the stock price and which is higher the greater the protection that shareholders have. As it can be noticed, these two factors are eligible for the cluster of *external motivations*.

Turning to *internal motivations*, these specific factors are the cornerstone of synergistic gains insofar as they determine what leverages will be activated (by the specific acquirer) in order to succeed in the M&A process. The literature generally recognizes that there are three different value creating strategies that can be put in place when the target is a high-tech one. In the case of high-tech acquirers, Cassiman at al. (2005) identified two main strategies based on technological or market relatedness. In the case of financials, the

[8] E.g. a company that acquires a foreign firm with an established distribution network and/or brand recognition in an emerging market, as it was the case of the strategy adopted by Kraft in the acquisition of Cadbury with strong presence in India ; http://www.ft.com/intl/cms/s/0/f3970f88-0475-11df-8603-00144feabdc0.html#axzz2xvpgo1JL; http://www.reuters.com/article/2010/01/19/us-cadbury-kraft-idUSTRE60H56R20100119)

[9] " This synergy is likely to show up most often when large firms acquire smaller firms, or when publicly traded firms acquire private businesses" Prof. Damodaran

[10] An example is the acquisition of Time Warner by AOL, exploiting its overvalued stock (year 2000). The operation was judged a strategic error for AOL at the time, since the price was considered too high. (links to articles http://www.nytimes.com/imagepages/2010/01/11/business/11merger_graphic.html; http://www.nytimes.com/2010/01/11/business/media/11merger.html?pagewanted=all&_r=0) Although it is impossible to know what would have been AOL's value if it didn't buy Time Warner it seems reasonable to think that Time Warner held back the combined value during the tech bubble (in 2001).

key strategy to explicit a potential conspicuous capital gain is the ability to activate an expert and international network of professionals (Humphery-jenner et al. 2013). Therefore, a joint analysis of acquirer and target firms specific capabilities to ascertain the opportunity for value creating strategies leads to the following three contexts:

(1) financial, when the acquiring firm is part of the industry of financials;

(2) same technology fields (STFs)[11], when acquirers and targets operate in the same industry;

(3) complementary technology fields (CTFs)[12], when the acquiring firm is not a financial but operates in a different industry.

The first lays on financial purposes while second and third refer to transactions with strategic purposes. For each context a hypothesis will be formalized, in order to summarize the concepts and build the theoretical frame in which the econometric results will be presented.

3.1.1. Transactions with financial acquirers

For what concerns financial synergies, they can be achieved lowering the discount rate, which would immediately follow in the event of acquisition of the high-tech target by a mature company. Discount rate reduction would be achieved either by means of internal financing (acquirer's cash availability) or guaranteeing the borrower. Clearly, the lowering of the discount rate can be pursued by strategic investor as well as financials. However, in cross-border settings, financial institutions are better prepared to overcome information asymmetries and regulatory barriers (Humphery-jenner et al. 2013). Moreover, institutional investor can solicit further equity investments in the acquired company allowing for reaching the critical mass to go international. Due to the information-intensity of their business, financial institutions tend to have a capillary structure and a network of business relationships with complementary professionals. In other words, the competitive advantage for financials stands in the ability to access and process information (Fama 1985; Diamond 1984). Symmetrically to the connotation of this process, within Financials

[11] Following the acronyms introduced by Cassiman et al. (2005)
[12] *Ibidem*

can be identified a multitude of agents that act according to different scopes (e.g. Private Equities, Hedge Funds, Investment Banks, Financial Conglomerates and so forth). Particular investors like Venture Capitalists are recognized for their impact on the professionalization of the acquired company (Hellmann & Puri 2002). The relationship between financial synergies and innovative performance is based on the assumption that when managers do not have to worry about how to finance their projects they can better focus on the ordinary business and this focusing is likely to result in a positive effect on the innovative performance. Besides, in most cases a managerial support is given to the target organization, especially if it is not complitely structured yet, causing a further benefit. These phenomena are observable in particular when the management of the target entity have technical skills but not mature managerial capabilities. Yet, if it is true that the financing is just an hassle for the manager the intervention of a financial institution would not lead to *conflicts,* while experiencing an immediate positive effect on the economic performance. In addition to this, Financials have in common the short-term perspective (typically 3-7 years) of the investment. It should be emphasized that the short-run perspective of financials and the fast pace of development of high tech is a good match.

Hp1-a : The higher the percentage of ownership possessed by a financial investor the better will be the post M&A performance of the acquired firm

3.1.2. Transactions with strategic acquirers

Cohen and Levinthal introduced the concept of *absorptive capacity* as the "ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends is crucial to its innovative capabilities" (Cohen & Levinthal 1990). In this sense, one of the main contributions of their work is that innovative performance needs to be considered as a path-dependent variable, leading to the argument that the merging of technology-intensive firms tend to amplify operating synergies. However, it is not always the case. On the one hand, when technologically substitutive entities are combined their R&D level decreases significantly. On the other hand, when actors own ex-ante complementary technologies their innovation performance is enhanced (Cassiman et al. 2005). The Authors are able to support the operating synergies as economies of scope withdrawing the hypothesis of economies of scale. Specifically, economies of scale will

likely impact on the economic performance, eventually bypassing any impact on innovation and knowledge base. Eventually, economies of scale in R&D activities can be thought as a shift in the innovation source within the company.

3.1.2.a. Transactions with actors in the same technology fields

In case of firms active in the same technology field the prevalent result on innovation performance is caused by the implementation of economies of scale. Although, in transactions with actors in the same technology field the net effect is expected to decrease the innovative performance, while the impact on the economic performance is ambiguous. Such a divergent impact is embedded in the customer behavior of two very different target markets of high-tech products. Hence, a distinction between consumer and governmental supply needs to be done. In consumer markets an increase in innovation efficiency might result positive. Specifically, in technology push demands markets the decrease in innovation effort for a given market share can deliver a positive impact on profitability by rationalizing similar technologies and shaping the demand for the product through strong marketing efforts. In governmental markets the entire product lifecycle is part of the solution provided. Therefore, a rationalization of similar technologies often compromises the longevity of the solution provided, resulting in a significant reduction of market share. Clearly, it might be observed that a decrease in market share not necessarily is the cause of a worse economic performance, e.g. if accompanied by an increase in margins.

Hp1-b : The percentage of ownership acquired by a strategic investor who operates in the same technology field (of the target) and the post M&A performance of the target firm are negatively associated or not associated

3.1.2.b. Transactions with actors in complementary technology fields

In case of firms active in complementary technology fields the prevalent result on innovation performance is due to economies of scope. In this context, resource redeployment is the source for the attainment of critical mass on different technological fields. Another possible result is the access to new R&D fields and the enhanced

exploitation of internal competences. Hence, the impact on innovative performance is expected to be positive as well as the impact on the economic performance (Nicholas 2008; Lubos & Veronesi 2009; Cloodt et al. 2006; Bloom & Reenen 2002).

Hp1-c : The percentage of ownership acquired by a strategic investor who operates in a complementary technology field and the post M&A performance of the target firm are positively associated

3.2. Cross-Border Context

In *Empirical Studies of Innovation and Market Structure* (Cohen & Levin 1989), diversification (as it is the case of complementary technologies) and financial capabilities impact positively on the innovative performance of a company, which is consistent with what analyzed in this work. However, the Authors do not take into account the cross-border connotation.

As already demonstrated in multiple investigations (Stiebale 2013; Hitt et al. 1991; Cassiman et al. 2005) strategic buyers tend to have positive impact on the innovative performance, particularly in the case of complementary technologies. However, it is expected that in cross-border settings such an impact will appear negative, mainly due to limitations occurring in the integration phase. Although the production and transmission of technological knowledge is "intimately connected with the problem of uncertainty reduction" (Arrow 1969), therefore increasing returns, it has been subsequently shown that technology transfer costs are at least industry specific (Teece 1977). It is in the wake of the latter that an increase in costs and organization efforts is expected to mitigate if not postpone synergies from economies of scope in case of cross-border acquisitions. For this reason, beside knowledge management, a merger/acquisition involves change management during the integration phase. In particular, the greater the uncertainty about organizational changes, the greater the structural inertia experienced between the organization (Hannan & Freeman 1984). Moreover, the greater the cultural distance the longer the time for adaptation. All these divergent factors will increase the likelihood for *conflicts* at different organizational levels (Kenneth 1992; Pondy 1967). Similarly, referring to studies concerning cultural distance (Hofstede 1985) it is reasonable to expect that the innovative

performance will be negatively affected by the cross-border connotation of the transaction at least in the short-run. Therefore leading to the following hypotheses:

Hp 2-b : In CB M&A the higher is the percentage of ownership possessed by a strategic investor who operate in the same technology field the lower will be the post M&A performance of the target firm

Hp 2-c : In CB M&A the higher is the percentage of ownership possessed by a strategic investor who operate in a complementary technology field the lower will be the post M&A performance of the target firm

Financial investors have an advantage over strategic investors in cross-border settings (Humphery-jenner et al. 2013). This advantage is represented by the ability to deal more effectively with information asymmetry. Furthermore, it seems unlikely to expect conflicts, unless the financial investor chooses to interfere with the R&D strategy of the target.

Hp 2-a : In CB M&A the higher is the percentage of ownership possessed by a financial investor the higher will be the post M&A performance of the target firm

4. Method

4.1. Sample selection and data

The hypotheses are tested on all mergers, acquisitions and institutional buy-outs completed in the time window 2005-2009 having a target active in a high-technology industry. The sample consists of 321 companies of what 167 worldwide targets active in high-tech industries. 169 is the number of firms endorsing in 177 deals in the selected period of time. No industry restriction was introduced for the acquirers. The four high-tech industries are: aerospace and defense (SIC-codes 372 and 376); computers and office machinery (SIC-code 357); pharmaceuticals (SIC-code 283); and electronics and communications (SIC-code 36). The target sample consists of 167 companies, of which 3.95% operate in the aerospace and defense industry, 4.52% are found in the computer and office machinery, 29.38% are active in pharmaceuticals, 62.15% operate in the electronics and communications sector. The process that led to this sample is composed of the following three phases.

1) Using the Bureau Van Dijk Merger and Acquisitions database, Zephyr[13], a first query was searched for: Target companies active primarily in high-tech industries as defined by the OECD (US SIC 283,357,36,372-6). This first selection led to a population of 83,409 companies. The constraint for time period was then introduced requiring all deals completed and confirmed on and after 1/01/2005 up to and including 31/12/2009. This reduced the population to 25,400. The third restriction was given by the deal type. The deal was required Acquisition or Mergers or Institutional Buy-out. It is common in the literature to find Acquisitions only (Ahuja & Katila 2001; Humphery-jenner et al. 2013; Vermeulen & Barkema 2001a; Bertrand 2009a; Mandel & Carew 2011; Hitt et al. 1991; Hitt et al. 1996) or Merger and Acquisitions (Cassiman et al. 2005; Takechi 2011; Cartwright et al. 2012; Bertrand & Zuniga 2006; Erel et al. 2012; Cloodt et al. 2006; Makri et al. 2010), however it needs to be stressed that typically this approach to analysis excludes financial actors. It is relevant to recall that this analysis aims to investigate the impact of the value creating strategy of the acquirer firm on the innovative performance of the target, therefore it is fundamental to keep both institutional and

[13] see Appendix 1 for coverage Zephyr

strategic investors. The final population from Zephyr counted 5,562 deals compliant with the requirements just presented.

2) Phase two was accomplished using another Bureau Van Dijk database, Orbis[14], which contains company information around the globe. Due to the ownership of the two databases it was possible to adopt as primary key the BvD ID number to recognize the target company, that is the Bureau Van Dijk identification code for companies. However, moving from one platform (Zephyr) to the other (Orbis) the 3,997 target companies for what the BvD ID number was available on Zephyr were further reduced to 3,623. Another constraint was then introduced so that the company data must include Research & Development expenses, for at least one year of the period that goes one year before the acquisition to three years after. This request has been put in place in order to check for R&D intensity. This choice led to a resulting target sample of 344 elements. It is important to underline that such a restriction has implicitly introduced an extra constraint on the analysis, namely that the buyer takes the control of the target firm but keep it going as a separate entity. Such a constraint is a consolidated practice in the field when the aim is to study the impact of acquisitions on targets companies performance and post-acquisition process (Bertrand & Zuniga 2006; Bertrand 2009b).

3) The third phase referred to the elimination of all not available data cells and their respective records. First of all, all records lacking of the Acquirer BvD ID number that would have made impossible to back trace further information related to the Acquirer, leading to 278 observations. Afterwards, all targets with not available either R&D or sales (Y is calculated as R&D divided by sales three years after the deal) were deleted, obtaining 198 observations. The last reduction was caused by the merging of multiple transactions involving the same acquirer and target in the same year. It results that the final sample takes into account 177 transactions.

[14] see Appendix 2 coverage Orbis

4.1.1. Transaction Context

The transaction context was used as a criterion to identify the multiple subsamples on what to run the regressions. The transaction context is composed of two dimensions: value creation strategy pursued and cross-border vs. domestic.

On the first dimension, it was operationalized using the industry classification codes (Hitt et al. 1991; Cassiman et al. 2005; Bertrand & Zuniga 2006), particularly, four-digits SIC codes of the acquirer and its respective target were compared. This measure is meant to capture the extent to which two firms develop technology in the same field. This allows for the following distinction: Financial when the acquiring firm SIC code lays in the interval 6000-6799; Same Technology Field when acquirer and target are active in the same four-digits industry; Complementary Technology Field when acquirer and target are active in different four-digits industries and the acquirer is not an institutional investor.

On the second dimension, the cross-border context, was operationalized using a binary dummy variable equal to one when acquirer and target were headquartered in different countries, and zero otherwise.

It led to the subsamples contained in Table 2.

Observations by Transaction Context

	Total (177)		Cross-Border (69)		Domestic (108)	
	# obs	%	# obs	%	# obs	%
Financial	55	0.31	21	0.30	34	0.31
Same Technology Field	34	0.19	18	0.26	16	0.15
Complementary Technology Field	88	0.50	30	0.43	58	0.54
Total obs	177	1.00	69	1.00	108	1.00

Table 2 - Subsamples by transaction context

4.2. Model

The econometric model adopted is a Multiple Linear Regression (MLR), formally:

$$Y = X\beta + \varepsilon$$

where

$$\boldsymbol{Y} = \begin{pmatrix} y_1 \\ y_2 \\ \cdots \\ y_{i-1} \\ y_i \end{pmatrix}, \boldsymbol{X} = \begin{bmatrix} x_{11} & \cdots & x_{1j} \\ \vdots & \ddots & \vdots \\ x_{i1} & \cdots & x_{ij} \end{bmatrix}, \boldsymbol{\beta} = \begin{pmatrix} \beta_1 \\ \beta_2 \\ \cdots \\ \beta_{j-1} \\ \beta_j \end{pmatrix}, \boldsymbol{\varepsilon} = \begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \cdots \\ \varepsilon_{i-1} \\ \varepsilon_i \end{pmatrix}$$

Let it be x_{i1}=1 for *i=1,2,3....* the corresponding element of **β** is then the intercept. **X** is the matrix of the *explanatory variables* while **Y** is the vector of the *response variables*, **β** is a j-dimensional parameter vector and its elements are called *regression coefficients*, **ε** is the vector of the *error terms* and captures all other factors which influence the dependent variable y_i other than the explanatory variables $\boldsymbol{x}_i$.

According with the definition above, the **Y** is the measure of innovative performance of the target and the $\boldsymbol{x_j}$ is composed by the following elements: ownership, profitability, size, liquidity and leverage of the target, profitability and size of the acquirer, cultural distance. Formally:

$$\boldsymbol{x_j} = \{1;\ \%Own\ ;\ ROA\_T\ ;\ Ln(A)\_T\ ;\ CurRatio\_T\ ;Lever\_T\ ;ROA\_A\ ;\ Ln(A)\_A\ ;Hof\_CD\}$$

All these variables are defined as in section *Variables*.

This Method has been adopted on the different sub-samples.

4.3. Variables

4.3.1. Dependent Variable

This study focuses on the effects of the acquirer value creation strategy on target firm innovation performance. A recognized measure of innovation is R&D intensity. Although it is clear that it represents an input more than an output it needs to be stressed that in high-technology industries, the three fundamental measures of innovation can be substituted with each other (Hagedoorn & Cloodt 2003), namely patent, new product announcements and R&D expenses. Moreover, distinguished Authors (e.g. Jaffe & Trajtenberg 2002; Cohen & Levin 1989) underline that the use of patents as a measure of innovative output has limitations. Some inventions are not patentable or not patented and, within patented inventions, economic values may vary on a large scale. The third element that can be used is new product announcements, however Devinney (1993) demonstrated that there is a positive relationship between patents and new product announcements at industry level but not at firm level. In this study the R&D intensity is scaled on sales, as common. The embraced view is that R&D effort indicates the innovative competences of the company, this effort is found to affect the economic performance in agreement with the evolutionary theory of economic change (and authors like Nelson and Winter, Duysters, Hagedoorn, Henderson and Cockburn). The basic idea is that previous R&D expenditures affect subsequent R&D inputs. In other words, successful R&D projects at a previous stage will increase the allocation of future R&D resources (Nelson & Winter 1982). Such a perspective is also consistent with the idea of the research asset, tested by Professor Damodaran that will also support further analysis in the Implications section.

4.3.2. Independent Variable

It is required by the model to identify, at least, one empirical measure that captures the synergistic behavior of either financials or strategic acquirers. Therefore, it is operationalized using the final percentage of ownership obtained by the acquirer. Such a choice results consistent with Kochhar and David (1996) which, in their study distinguished between three main categories: myopic, superior and active investor (Kochhar & David 1996). The Authors examined “how differences in their (institutional

investors') ability to influence firms may vary their effect on firm innovation" by using the percentage of ownership as dependent variable. Symmetrically, the underlying idea for strategic investors is that the greater the percentage of ownership the more accentuate the footprint of the acquirer on the innovation performance of the target. However, it is important to underline that there is not a straightforward relationship between the percentage of ownership and the integration level. Bear in mind the Post-Merger Integration Approaches Matrix (Haspeslagh & Jemison 1991) because it affects the synergistic behavior as well. Clearly such a trade-off between accuracy and data availability will impact the accuracy of the results.

4.3.3. Control Variables

Several variables were used to help control for alternative explanations of the findings. Target characteristics used as controls include profitability, size, liquidity and leverage, as defined in the following.

Profitability. Profitability affects decision-makers optimism and their propensity to invest in R&D (Hitt et al. 1991). It is relevant to point out that the literature focuses on the profitability of the acquiring firm and not of the target. Here, it was necessary to take into account both. It has been achieved by using the Orbis' item "ROA using Net Income".

Size. Shumpeter hypothesized that large firms are more prone to innovation than small ones. Large firms have greater ability and incentives to invest in R&D (Cloodt et al. 2006; Kochhar & David 1996), bear in mind that legal protection of knowledge and innovation requires a stable expense capacity by the owner. However, conflicting results have been revealed by the literature. Moreover, as in the case of profitability the literature of the matter typically analysis the impact of the acquirer size or relative size. In order to study this effect, on both (acquirer and target, separately), Assets obtained from Orbis were included in the model. As it is common, a logarithmic transformation is used.

Liquidity. A firm access to short term resources also affect available funding. Specifically, liquidity determines the maximum investment level a firm can undertake in a given period without incurring in additional debt. Therefore the current ratio is used, defined as current assets over current liabilities, as obtained from Orbis (Yeh 2012; Hitt et al. 1996; Hitt et al. 1991; Reed et al. 2007).

Leverage. Since the late '50s (Modigliani & Miller 1958) financial theories suggested to take under examination leverage when examining investment choices. As a matter of fact debt impacts on management risk-aversion (e.g. Mahmud 2012; Cassiman et al. 2005; Hitt et al. 1991; Smith & Warner 1979; Lerner et al. 2011) and therefore on the management investment choices (of what a stable R&D program is great example (Hitt et al. 1991)). In the present study, leverage is defined as long-term debt divided by equity[15].

Cultural Distance. Testing for cultural distance has been used in the form of a Euclidean distance index based on Hofstede (1980) (see e.g., Vermeulen & Barkema 2001; Brouthers & Brouthers 2001). The peculiarity of this measure is that it assumes different weights for each dimensional distance. "In line with the concept of Euclidean distance, it computes their distance in a six- dimensional space as the square root of the sum of the squared differences in the scores on each cultural dimension" (Drogendijk & Slangen 2006). Formally,

$$CD_j = \sqrt{\sum_{i=1}^{6} \left\{ \frac{\left(I_{ij} - I_{iA}\right)^2}{V_i} \right\}}$$

where CDj is the cultural distance between country j and the Acquirer, Iij is country j's score on the ith cultural dimension, IiA is the score of the Acquirer on this dimension, and Vi is the variance of the score of the dimension. Specifically, six cultural dimensions have been used as available from The Hofstede Centre 16 (see Appendix 3 for detailed definition).

1. Power Distance Index (PDI)
2. Individualism versus Collectivism (IDV)
3. Masculinity versus Femininity (MAS)
4. Uncertainty Avoidance Index (UAI)
5. Pragmatic versus Normative (PRA)
6. Indulgence versus Restraint (IND)

[15] In Orbis the item "Equity" was not available, therefore it has been calculated by dividing the "P/L after before tax" for "ROE using P/L before tax (%)". Formally, $Equity = \frac{\text{P/L after before tax}}{\text{ROE using P/L before tax (\%)}} * 100$

[16] Available at http://geert-hofstede.com/the-hofstede-centre.html

4.4. Results

4.4.1. Descriptive statistics

Table 3 provides some descriptive statistics for all variables in relationship to the entire sample.

	Mean	Median	S.D.	Kurtosis	Skeweness	Min	Max	Obs
Innovative Performance	0.984	0.001	8.393	95.187	9.677	-0.032	91.152	177
%Ownership	0.752	0.740	0.206	-1.039	-0.184	0.224	1.000	165
Profitability of the Target (ROA_T)	-1.255	2.326	21.504	2.664	-1.396	-76.465	51.892	177
Size of the Target (Ln(A)_T)	11.558	11.520	2.111	2.876	-0.657	1.000	17.300	177
Liquidity of the Target	3.538	1.600	9.143	48.958	6.762	0.000	81.715	177
Leverageof the Target	0.327	0.022	0.625	14.348	3.250	0.000	4.513	160
Profitability of the Acquirer (ROA_A)	-0.585	0.000	13.863	15.805	-3.323	-76.882	35.342	177
Size of the Acquirer (Ln(A)_A)	8.196	10.940	6.778	-1.566	-0.163	0.000	21.515	177
Cultural distance (Hof_CD)	0.965	0.000	1.546	-0.131	1.203	0.000	4.938	157

Table 3 - Descriptive statistics referred to the entire sample

In Table 4 the correlation within all the independent variables is summarized. There is very little correlation between each variable with no exception. The greater correlation is between the profitability measure of the target and the one of the acquirer, which still lower then 0.5 (precisely 0.30). Little correlation between the independent variable and each control variable is also confirmed. All this can be observed at subsample level with the same conclusion (see Table 5 to 7).

	%Own	*ROA_T*	*Ln(A)_T*	*CurRatio_T*	*Lever_T*	*ROA_A*	*Ln(A)_A*
%Own	1						
ROA_T	-0.0643	1					
Ln(A)_T	-0.1521	0.2068	1				
CurRatio	0.0892	-0.1051	-0.0871	1			
Lever_T	-0.0750	-0.0251	0.3280	-0.0995	1		
ROA_A	-0.1653	0.3018	0.1730	0.1473	0.0560	1	
Ln(A)_A	0.1829	0.0798	0.0416	0.0691	0.1565	0.0732	1
Hof_CD	0.0311	0.0869	-0.0588	0.1322	-0.1344	-0.0396	0.1092

Table 4 - Correlation Table

	%Own	*ROA_T*	*Ln(A)_T*	*CurRatio_T*	*Lever_T*	*ROA_A*	*Ln(A)_A*
%Own	1						
ROA_T	-0.10	1					
Ln(A)_T	-0.23	0.33	1				
CurRatio	0.27	-0.29	-0.39	1			
Lever_T	-0.24	-0.11	0.34	-0.16	1		
ROA_A	-0.39	0.49	0.30	-0.16	0.07	1	
Ln(A)_A	0.01	0.05	0.16	0.22	0.20	0.06	1
Hof_CD	-0.42	-0.01	0.23	-0.01	-0.01	0.18	0.15

Table 5 - Correlation Table: subsample *Financial*

	%Own	*ROA_T*	*Ln(A)_T*	*CurRatio_T*	*Lever_T*	*ROA_A*	*Ln(A)_A*
%Own	1						
ROA_T	0.00	1					
Ln(A)_T	-0.33	0.29	1				
CurRatio	0.05	0.47	-0.16	1			
Lever_T	0.18	-0.14	0.03	-0.11	1		
ROA_A	-0.04	0.15	-0.12	0.18	-0.19	1	
Ln(A)_A	0.24	0.26	0.09	-0.09	0.19	0.08	1
Hof_CD	0.26	-0.11	-0.30	0.01	-0.33	-0.27	-0.12

Table 6 - Correlation Table: subsample *Same Technology Field*

	%Own	*ROA_T*	*Ln(A)_T*	*CurRatio_T*	*Lever_T*	*ROA_A*	*Ln(A)_A*
%Own	1						
ROA_T	-0.06	1					
Ln(A)_T	-0.08	0.18	1				
CurRatio	0.15	-0.03	-0.13	1			
Lever_T	-0.04	0.05	0.46	-0.10	1		
ROA_A	-0.14	0.31	0.16	0.13	0.06	1	
Ln(A)_A	0.15	-0.03	0.02	0.08	0.11	0.09	1
Hof_CD	0.06	0.21	-0.16	0.29	-0.11	-0.09	0.17

Table 7 - Correlation Table: subsample *Complementary Technology Field*

However due to the fact that the analysis has been carried out on multiple subsamples, in order to analyze the relatedness between each other's variables a one-factor ANOVA test is used. Table 8 illustrates the results of ANOVA. In particular, the results show a significant difference between the three subsamples only for the first variable. In other words, the independent variable (%ownership acquired) specifically depends on the subsample under examination. Therefore, the acquisitive behavior is different between investor identity and it can be considered as a good proxy for the construct of investor identity and synergistic behavior. Although some of the other factors approximate

statistical significance, they are all part of the same population given that $F < F_{critical}$. For these two reasons, the null hypothesis cannot be rejected.

	F		$F_{critical}$
%Ownership	7.557	***	3.066
Profitability of the Target (ROA_T)	1.111		
Size of the Target (Ln(A)_T)	0.831		
Liquidity of the Target	0.669		
Leverageof the Target	1.949		
Profitability of the Acquirer (ROA_A)	0.229		
Size of the Acquirer (Ln(A)_A)	1.797		
Cultural distance (Hof_CD)	1.748		

Table 8 - One-way ANOVA test: results

Moreover, a two-factor ANOVA with replication has been run on the dependent variable. Indeed, it is common knowledge that an analysis of variance can be used as alternative model of a regression in the case of non-countinous, categorical dependent variables. However, the results show that each of the six subsamples is part of the same population, meaning that the innovation performance cannot be explained only by these two factors: value creation strategy adopted by the acquirer and cross-border context. This is the main reason way a Multiple regression is more suitable for the analysis under examination.

Another ANOVA has been adopted to test for possible industry specific characteristics of the firms. As expected, it resulted that size and leverage are characteristics which depends on industry sector.

PROFITABILITY						
Subgroups	***Count***	***Sum***	***Mean***	***Variance***		
Pharmaceuticals	52	157.73	3.03	296.52		
Computers and office machinery	8	-6.96	-0.87	66.22		
Electronics and communications	110	-356.96	-3.25	562.88		
Aerospace and defense	7	-15.99	-2.28	507.47		
F					1.010	
F critical					2.657	
SIZE						
Subgroups	***Count***	***Sum***	***Mean***	***Variance***		
Pharmaceuticals	52	638.68	12.28	3.35		
Computers and office machinery	8	100.62	12.58	1.79		
Electronics and communications	110	1212.78	11.03	4.48		
Aerospace and defense	7	93.77	13.40	3.71		
F					7.519	***
F critical					2.657	
CURRENT RATIO						
Subgroups	***Count***	***Sum***	***Mean***	***Variance***		
Pharmaceuticals	52	208.22	4.00	71.15		
Computers and office machinery	8	14.15	1.77	1.56		
Electronics and communications	110	372.60	3.39	99.66		
Aerospace and defense	7	31.19	4.46	27.40		
F					0.176	
F critical					2.657	
LEVERAGE						
Subgroups	***Count***	***Sum***	***Mean***	***Variance***		
Pharmaceuticals	48	19.68	0.41	0.45		
Computers and office machinery	8	6.80	0.85	0.79		
Electronics and communications	97	23.18	0.24	0.33		
Aerospace and defense	7	2.63	0.38	0.15		
F					2.909	**
F critical					2.663	

** p < 0.1; ** p < 0.05; *** p < 0.01*

Table 9 - One-way ANOVA to test for industry specific characteristics

4.4.2. Transaction context without accounting for cross-border factor

As previously introduced, the analysis examines different subsamples. First a multiple regression was adopted on each subsample representing a different transaction context without distinguishing for cross-border factor. Table 10 (next page) illustrates that Hp1-a is consistent to what available in literature (Hellmann & Puri 2002; Humphery-jenner et al. 2013; Kochhar & David 1996) although not statistically significant. On the contrary Hp1-b and Hp1-c are not consistent with the literature neither statistically significant. The profitability of the target is always significant although negative, this is clearely due to the fact that the Net Income accounts for R&D expenses (further explaination refers to accounting standards which are beyond the scope of this investigation). Liquidity and leverage of the target have a negative impact on R&D intensity when the target is acquired by Financials. The greater the liquidity (leverage) of the target the less the R&D intensity. The negative relationship with the leverage can be caused by the institutional investors' ability to solicit equity. It exists a positive and significant relationship between the profitability and size of the acquirer and the R&D intensity. So that, the greater the profitability (size) of the acquirer the greater the R&D intensity, which is consistent with published literature on the subject (Erel et al. 2012; Hitt et al. 1996). In complementary technology fields, a positive and statistically significant relationship exists with leverage of the target and with profitability of the target as expected. A positive impact is also shown by the measure of cultural distance, although being statistically significant only in the financial context subsample.

Variables	*Financial* β		S.E.	*Same Technology Field* β		S.E.	*Complementary Technology Field* β		S.E.
%Ownership	0.626		0.524	15.983		18.151	-3.653		4.350
Profitability of the Target (ROA_T)	-0.023	***	0.004	-0.551	**	0.254	-0.109	**	0.049
Size of the Target (Ln(A)_T)	-0.002		0.053	-0.834		2.659	-0.552		0.493
Liquidity of the Target	-0.189	**	0.071	-0.440		2.463	-0.018		0.116
Leverage of the Target	-0.151	*	0.098	-3.295		6.445	4.641	*	2.416
Profitability of the Acquirer (ROA_A)	0.020	***	0.006	0.202		0.422	0.151	**	0.057
Size of the Acquirer (Ln(A)_A)	0.030	**	0.012	-0.378		0.555	0.105		0.140
Cultural distance (Hof_CD)	0.169	**	0.070	1.737		2.387	0.290		0.603
R-squared	0.656			0.486			0.202		
F	5.981***			1.888*			2.020**		

** p < 0.10; ** p < 0.05; *** p < 0.01*

Table 10 - First set of regressions without accounting for the geography of the transaction

4.4.3. Transaction context accounting for cross-border factor

The second set of regressions accounts for cross-border and domestic connotations and results are reported in Table 11. Hp2-a, Hp2-b and Hp2-c are tested on different subsamples accounting for the geography of the transaction. It results that Hp2-a and Hp2-c are confrimed and statistically significant at p (t) < 0.1 level. Therefore, in CB M&A the higher is the percentage owned by a financial investor, the higher will be the post M&A performance of the target firm (Hp2-a) while in CB M&A, the higher is the percentage of ownership possessed by a complementary field strategic investor, the lower will be the post M&A performance of the target firm (Hp2-c). Another aspect to be underlined is that the only other relationships that change in sign (with respect to the full sample) are the ones of cultural distance, resulting in a negative relationship in the Financial-CB subsample while becoming positive for the Complementary Technology Field – CB subsample. Therefore, the greater the cultural distance between acquirer and target the higher the post M&A performance of companies owned by strategic investors active in a CTF. The opposite effect is recorded for institutional investors, that is, the smaller the cultural difference, the better the performance.

	Cross-Border Transactions						Domestic Transactions					
	Financial		***Same Technology Field***		***Complementary Technology Field***		***Financial***		***Same Technology Field***		***Complementary Technology Field***	
Variables	**β**	**S.E.**	**β**	**S.E.**	**β**	**S.E.**	**β**	**S.E.**	**β**	**S.E.**	**β**	**S.E.**
%Ownership	8.008*	1.405	119.020	103.684	-15.225*	10.988	0.035	0.067	-0.016	0.048	0.332	0.393
Profitability of the Target (ROA_T)	-0.033*	0.004	-1.318	1.140	-0.202	0.191	-0.002**	0.001	-0.001	0.002	0.000	0.005
Size of the Target (Ln(A)_T)	-0.415	0.097	-12.504	13.133	1.255	1.586	0.005	0.006	0.007	0.011	-0.019	0.044
Liquidity of the Target	-1.396*	0.254	-0.900	7.493	0.160	0.195	0.017*	0.009	0.008	0.007	0.052*	0.034
Leverage of the Target	-0.175	0.068	118.614	160.222	14.933*	7.341	-0.012	0.013	-0.009	0.014	-0.145	0.219
Profitability of the Acquirer (ROA_A)			-0.656	1.998	0.151*	0.098	0.001	0.001	0.000	0.002	-0.016**	0.007
Size of the Acquirer (Ln(A)_A)	0.040*	0.008	2.616	2.901	0.442	0.420	0.001	0.002	0.002	0.002	0.016	0.013
Cultural distance (Hof_CD)	-0.145	0.066	-27.819	42.037	-5.376**	2.384						
R-squared	0.999		0.752		0.673		0.596		0.309		0.262	
F	127.076*		0.756		3.864**		3.575**		0.383		2.075*	

** p < 0.10; ** p < 0.05; *** p < 0.01*

Table 11 - Regressions accounting for cross-border context

5. Conclusions

According to this analysis it results that the identity of the acquirer has a significant impact in cross-border contexts. In particular, a positive relationship between percentage of ownership and R&D intensity has been found in the case of cross-border institutional investors. Symmetrically, a negative relationship held in the case of strategic international acquirers active in a complementary technology field was highlighted. In other words, Hp1-b and Hp2-b are confirmed and statistically significant. Therefore, according to this analysis, it can be argued that investor identity matters in cross-border contexts.

Before concluding some limitations are described. First of all, previous studies in the M&As field applied more complex and articulated econometric models, in particular able to control for time. Secondly, a better measure of knowledge overlap and technological proximity is usually achieved through patent-based variables. Thirdly, as shown in the descriptive statistics section, a variable to control for the industry would contribute to the accuracy of the model. However, one of the greatest peculiarities (and at the same time limitations) of this investigation is to have taken into account both institutional and strategic investors at the same time.

In Conclusion, although these critical aspects, this investigation gives insights for further studies. Moreover, the focus on the comparison between different investor identities and a measure of their specific contribution towards the value creation is a compelling topic in light of the general trends in M&As and the increasing pace of change in High-Technology industries.

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7. Appendixes

Appendix 1 – Zephyr Coverage: Detailed information on financial deals, completed, announced or rumoured, worldwide. Includes 1,176,778 (08/05/2014).

Appendix 2 – Orbis Coverage

Last data update: 08/05/2014

Total number of compagnie	125970258
Number of countries covered	219

	Active companies	Inactive companies	Unknown status	Total
Total	103448299	19644979	2876980	125970258
of which				
Headquarters/single locations	92460168	18516535	2871084	113847787
Branch locations	10988131	1128444	5896	12122471
of which				
publicly quoted	62480	756	69	63305
of which				
Industrial compagnie	60526324	8587375	768381	69882080
Banks	22450	9161	1	31612
Insurance compagnie	9045	2009	3	11057
of which				
Very large compagnie	266154	30413	3963	300530
Large compagnie	1208602	142181	27356	1378139
Medium sized compagnie	7236727	828539	99486	8164752
Small compagnie	94736816	18643846	2746175	116126837
Number of companies with specific information				
With				
Directors	62251574	13897735	2020738	78170047
Ownership	26733381	496178	38603	27268162
Shareholders	25160380	464619	29772	25654771
Subsidiaries	3110084	53384	11823	3175291
News*	584056	104961	9133	698150
Overview information	2005911	174015	32431	2212357
Original documents	18918504	6935828	346384	26200716
Datamonitor company reports	15239	243	10	15492

* Note that we receive a continuous feed of company news, hence these figures may slightly change.

Table 12- Orbis Coverage, *source: Orbis*

Appendix 3 - Hofstede six dimensions

		PDI	IDV	MAS	UAI	PRA	IND
AT	Austria	11	55	79	70	60	63
AU	Australia	36	90	61	51	21	71
BE	Belgium	65	75	54	94	82	57
BM	Bermuda	-	-	-	-	-	-
CA	Canada	39	80	52	48	36	68
CH	Switzerland	34	68	70	58	74	66
CN	China	80	20	66	30	87	24
DE	Germany	35	67	66	65	83	40
DK	Denmark	18	74	16	23	35	70
EG	Egypt	70	25	45	80	7	4
ES	Spain	57	51	42	86	48	44
FI	Finland	33	63	26	59	38	57
FR	France	68	71	43	86	63	48
GB	United Kingdom (the)	35	89	66	35	51	69
HK	Hong Kong	68	25	57	29	61	17
IL	Israel	13	54	47	81	38	0
IN	India	77	48	56	40	51	26
IT	Italy	50	76	70	70	61	30
JP	Japan	54	46	95	95	88	42
KR	Korea (the Republic of)	60	18	39	85	100	29
KY	Cayman Islands (the)	-	-	-	-	-	-
LV	Latvia	44	70	9	63	69	13
MX	Mexico	81	30	69	82	24	97
MY	Malaysia	100	26	50	36	41	57
NL	Netherlands (the)	38	80	14	53	67	68
PA	Panama	95	11	44	86	0	0
PL	Poland	68	60	64	93	38	29
PT	Portugal	63	27	31	99	28	33
RO	Romania	90	30	42	90	52	20
RU	Russian Federation (the)	93	39	36	95	81	20
SE	Sweden	31	71	5	29	53	78
SG	Singapore	74	20	48	8	72	46
SI	Slovenia	71	27	19	88	49	48
TH	Thailand	64	20	34	64	32	45
TW	Taiwan (Province of China)	58	17	45	69	93	49
UA	Ukraine	-	-	-	-	-	-
US	United States (the)	40	91	62	46	26	68
VG	Virgin Islands (British)	-	-	-	-	-	-

The table contains the correspondence[17] between ISO country code and country name (first two columns). The country name and the six cultural distances measured with the WVS (World Values Survey) Methodology[18] are reported in the following columns. Overall, 38 different countries were found to host all the acquirers and targets in the sample. As it can be noticed there is no dimension available for the so called tax haven (Bermuda, Cayman Islands, Virgin Islands). This led to a reduction of observations impacting significantly on the subsample of institutional investors.

1. Power Distance Index (PDI) - *This dimension expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally. The fundamental issue here is how a society handles inequalities among people. People in societies exhibiting a large degree of power distance accept a hierarchical order in which everybody has a place and which needs no further justification. In societies with low power distance, people strive to equalise the distribution of power and demand justification for inequalities of power.*
2. Individualism versus Collectivism (IDV) - *The high side of this dimension, called individualism, can be defined as a preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families. Its opposite, collectivism, represents a preference for a tightly-knit framework in society in which individuals can expect their relatives or members of a particular in-group to look after them in exchange for unquestioning loyalty. A society's position on this dimension is reflected in whether people's self-image is defined in terms of "I" or "we."*
3. Masculinity versus Femininity (MAS) - *The masculinity side of this dimension represents a preference in society for achievement, heroism, assertiveness and material rewards for success. Society at large is more competitive. Its opposite, femininity, stands for a preference for cooperation, modesty, caring for the weak and quality of life. Society at large is more consensus-oriented.*
4. Uncertainty Avoidance Index (UAI) - *The uncertainty avoidance dimension expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity. The fundamental issue here is how a society deals with the fact that the future can never be known: should we try to control the future or just let it happen? Countries exhibiting strong UAI maintain rigid codes of belief and behaviour and are intolerant of unorthodox behaviour and ideas. Weak UAI societies maintain a more relaxed attitude in which practice counts more than principles.*
5. Pragmatic versus Normative (PRA) - *This dimension describes how people in the past, as well as today, relate to the fact that so much that happens around us cannot be explained. In societies with a normative orientation most people have a strong desire to explain as much as possible. People in such societies have a strong concern with establishing the absolute Truth and a need for personal stability. They exhibit great respect for social conventions and traditions, a relatively small propensity to save for the future and a focus on achieving quick results. In societies with a pragmatic orientation, most people don't have a need to explain everything, as they believe that it is impossible to understand fully the complexity of life. The challenge is not to know the truth but to live a virtuous life. In societies with a pragmatic orientation, people believe that truth depends very much on*

[17] Backed from the International Standard Organization website, source https://www.iso.org/obp/ui/#search

[18] Available at the Hofstede Centre, source: http://geert-hofstede.com/countries.html

situation, context and time. They show an ability to accept contradictions, adapt according to the circumstances, a strong propensity to save and invest, thriftiness and perseverance in achieving results. .(Geert Hofstede and Michael Harris, 1991)

6. Indulgence versus Restraint (IND) - *Indulgence stands for a society that allows relatively free gratification of basic and natural human drives related to enjoying life and having fun. Restraint stands for a society that suppresses gratification of needs and regulates it by means of strict social norms.*(Geert Hofstede and Michael Minkov, 2010)