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Drivers of M&As and Strategic alliances: a Cross-Industry Analysis

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ABSTRACT

The creation of business ecosystems and collaboration among competitors is becoming an ever more important topic in manager's minds. The importance of collaboration to improve technology, share costs and risks, is today fundamental for firms to establish a competitive position and grow. Collaboration can be achieved by signing formal agreements of M&As or strategic alliances. This study focuses on analyzing three industry based drivers that push firms to choose between M&As or strategic alliances in different industries. By looking at M&A and strategic alliances agreements in the US signed between 2015 and 2020 in several different industries, this research tries to give an overall view of the topic. Specifically, in this thesis I try to demonstrate 1. how increased industry concentration pushes towards a choice of M&As, 2. a highly innovative industrial environment drives toward strategic alliances and 3. that capital intensive industries firms will be most inclined to choose M&As with respect to labor intensive ones. To further deepen the research, I also looked into the themes of convergence and of hybrid competition and hybrid demand by analyzing the sectors in which there is a prevalence of cross-industrial M&A agreements. Looking at convergence of industries is important not only to see how markets are moving but it may also provide insight for managers trying to satisfy the ever more sophisticated consumer demand.

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INTRODUCTION

Business ecosystem is a key concept that is nowadays ever more present in managers' minds and is studied in many industrial business articles and research papers. A business ecosystem is the network of all actors that take part in the creation and delivery of a product and it includes all entities involved in the activities (Basole et al 2015). Similarly to what happens in nature, firms within an ecosystem may either survive or cease to exist (Moore 1993). For this reason, in an increasingly globalized world, the concept of business ecosystems is of upmost importance in every firm's mind and it is seen as a fundamental way to gain knowledge, know-how and a stable competitive position within a market. Research suggests that firms can't live in isolation, but rather, must interact with one another. Interacting through cooperation and competition, in fact, firms are able to innovate, support each other and progress (Moore 1993). Firms that work together in ecosystems are granted significant benefits as collaboration allows for the creation of synergies, risk sharing in development and ability to respond to external environmental changes (Thompson 2017 and Basole et al 2015). Above all, aggregating in business ecosystems, through formal agreements in particular, also represents a way to achieve resources and capabilities which are driver of the heterogeneity that allows to achieve sustained competitive advantage (Barney 1991).

Ecosystems and its benefits may be achieved either through geographical vicinity or through proper formal agreements. When looking at the benefits derived from being closely located, research has shown that firms with similar businesses are able to create and exploit of ecosystem benefits (Downing 2018; Mccan, Reuer & Lahiri 2016 and Schilling & Phelps 2007). Studies on agglomeration theories have shown that geographical proximity favors information flow and grants superior benefits to the firms within the cluster with respect to the isolated ones (Mccan, et al. 2016). Thus, mere proximity allows for the generation of positive externalities (Callois 2006). Two famous examples are the Silicon Valley, California or the Motor Valley in Emilia Romagna, Italy. These areas are famous for having high concentrations of some of the most advanced high-tech firms, in the former, and acclaimed automotive firms, in the latter. They are today world renowned for their excellence and technological development.

When discussing formal agreements, instead, working with other industry players may happen through strategic alliances or Mergers and Acquisitions. Strategic alliances see firms pooling resources for specific projects or for a limited amount of time, in a relationship which ends as the contract expires. Joint Ventures, which represent a specific kind of strategic alliance, are based on the formation of a new company which is born from the economic effort of two larger entities. In recent years, moreover, research has analyzed the specific kind of strategic alliance of coopetition for its almost paradoxical dynamic (i.e. Luo 2007; Gnyawali & Park, 2009 and Depeyre, Rigaud & Seraidarian 2018). Coopetition denotes a kind of alliance in which firms compete and cooperate at the same time. Mergers and Acquisitions (M&A), instead, fund their idea on an exchange of shares. In detail, Mergers usually happen among parties of similar sizes (i.e. merger of equals) who create a new company by the union of the two and acquisitions usually involve a takeover in which the acquired company legally ceases to exist (Gomes 2011). However, differentiating between the two agreements in practice is not always easy as they are often referred jointly as M&A (Gomes 2011). This paper will focus on ecosystems created through these formal agreements.

In the moment of choice between M&As and strategic alliances, however, studies argue that managers won't consider both options thoroughly enough as to select the correct one (Dyer, Kale & Singh 2004). Several reasons have been found to be the cause of this. The first thing that has been noticed is related to the fact that they are rarely perceived as comparable alternative options (Yin & Shanley 2008). Managers may often follow pre-existing market trends and thus fail to consider both, even if it is the professional's duty to look at the choice in the firm's present context so to choose the most appropriate. Another reason for which mangers won't select the right agreement is due to the fact that often the choice between strategic alliances versus M&As is determined by prior experience in agreements made by the same firm (Villalonga & Mcgahan 2005) Managers will in fact follow previous decisions made by the firm without evaluating the alternative as if it were within the firm's practices. Choosing the wrong option may result in failure of the move. Given the high risk and high investments that both agreements intrinsically carry, this may impact the company negatively. Moreover, difficulties in sustaining the agreements in the long run have been found to be frequent.

M&As, in particular, have been proven to be very complex to sustain in the long term (Rahman & Lambkin 2014). Tension in management arisen from the merging action and other internal issues have often created significant problems in companies and distanced managers' focus from customer related issues (Homburg & Bucerius 2005). Moreover, academic studies have found that, more often than not, mergers are unsuccessful also because key objectives, such as share price increase, are not reached (Rahman & Lambkin 2014). In particular, from a financial point of view, value in post-merger and post-alliances has been proven to either decrease or stay at the original level (Dyer, Kale & Singh 2004). In marketing, as well, in post-merger situations, it has been shown that while aspects such as economies of scale or scope increased thanks to synergies and lower marketing spending, there were no effects on return on sale (Rahman & Lambkin 2015). However, even given these findings, M&As are still happening, with a 7% growth in value of agreements just in 2019 (Boston Consulting Group 2019). A recent example could be LVMH's acquisition of Tiffany last November (LVMH 2019), with a deal worth $16.2 billion (CNN 2019).

Alliances, on the other side, are less binding than M&As as they have a time limit and solely involve pooling resources. These are generally perceived as less risky than M&As. However, strategic alliances too present many complexities and often fail. Because of competitive dynamism, in fact, even if the agreement is signed for a long time horizon, it is suggested that the actual work relationships should respond to short term requirements (Stuart 1997). Studies show that often alliances among competitors fail because of firms pursuing their own interests. A way to avoid this may be to add contractual clauses to avoid opportunistic behavior (Ho Park & Ungson 2001). Confirming this theoretical suggestion, lack of trust towards the opposing party has been identified as one of the elements that still fail to be present in many alliance agreements (Deloitte 2019). Another possible cause of failure has been recognized to be related to managerial complexities which arise when having to integrate two independent companies (Park & Ungson 2001).

In general, as has been previously pointed out, collaboration is still necessary. At the basis of both types of agreements, in fact, motives which push managers to consider collaboration with other actors are related to resource requirements (Park & Ungson 2001), consolidation motives (i.e. to strengthen one's position in a market), diversification motive (i.e. in order to acquire knowledge or

economies of scope) (Swaminathan, Murshed & Hulland 2008 and Luo 2007) and motives related to a response to environmental uncertainty (Burgers, Hill & Chan Kim 1993). Uncertainty which may arise due to demand, given by changes in consumers' purchasing habits, or by competition, derived from the idea for which competition among firms is actually interdependent and that the actions of one player may influence the realm of another (Burgers et al 1993).

Real life examples of this may be found in the high tech industry where alliances are numerous because of the uncertainty that comes with the great innovation level. In the luxury industry, as well, the market is dominated by three major players (i.e. LVMH, Richemont Group and Kering S.A.) and acquisitions of small entities are very common. Lastly, in business services, alliances and M&As are also very frequent as firms often outsource or acquire skills and capabilities that are missing.

Theory on M&As and strategic alliances is copious and has received increasing attention starting from the 1990s. We assume, to the best of our knowledge, that there is a gap with respect to an industry based analysis of resource based drivers of M&As vs strategic alliances. While single industries have been analyzed in previous research, the relationship between M&As and strategic alliances has not been analyzed considering more sectors simultaneously. Our question, thus, is whether there exist resource based industry wide elements that could influence the choice between M&As and strategic alliances. In detail, we want to see if industry concentration, innovation level and capital intensive vs labor intensive industry represent significant drivers for the choice between M&As and strategic alliances in different industries.

The analysis will take into consideration quantitative data related to a number of industries and consider them within a model. On one side, the scope is to determine whether and which are specific aggregate industrial elements driving firms to either M&As or strategic alliances and on the other side, comparisons will be made cross industry trying to look for common trends so to extrapolate general concepts. If managers were to have objectively defined standards to follow when deciding whether to choose a strategic alliance or an M&A, they may be able to partly predict the outcome of the move based on how other firms in the industry have acted in the past..

We will see that the underlying guiding line of the decisions is related to resource necessities. This study will analyze the aggregate levels of industry

concentration, innovation and capital intensity vs labor intensity. By looking into these elements this research adds to resource dependency theory which focuses on the idea that resources are the elements that shape firm behavior (Tsang 1998). The underlying assumption, in fact, is that specific resources and capabilities are somewhat intrinsically tied to each firm and that at times it is necessary to unify with other entities in order to acquire these resources and capabilities. More specifically, we will contribute to resource dependency theory by showing that resource necessities in an industrial context determined by industry concentration, innovation development and capital vs labor intensity, will influence managers' choice between M&As and strategic alliances.

From a managerial point of view, we believe that this study will aid both managers and government institutions. This approach will also help managers by contributing to business governance strategy theories by giving a data-based tool to evaluate whether strategic alliances or M&As are to be preferred. It will also help government institutions who deal with anti-trust legislation or financial regulations. By including industry concentration in our model, in fact, this research will attempt to capture the dynamic convergence of competitive environments giving insights on industrial structures.

As a *post hoc* consideration, this study will also briefly consider the concepts of hybrid competition and hybrid demand, trying to see to what extent, within the selected sample, are cross-industry agreements present and whether consistency within industry class is present. The aim of this second section of the study is to assess whether firms may be drawn to expand their original domain through conglomerate agreements due to necessities to differentiate in hyper competitive environments or to accommodate an increasingly sophisticated demand (Ancarani, Costabile & Valdani 2009 and Ancarani & Costabile 2010).

LITERATURE REVIEW

Literature on M&As and strategic alliances is copious, academics have focused on many different aspects of this theme given the popularity of the strategic choice and the complexity of reasoning required. At the basis of the topic of M&As and strategic alliances, researchers have highlighted the necessity of firms to collaborate by examining the competitive rationale leading to the creation of business ecosystems (Moore 1999, Downing 2018 and Schilling & Phelps 2007). Firms will in fact collaborate and create business ecosystems in order to benefit from shared risk, resources and information flow, for example.

One of the fundamental elements that moves firms to collaborate is a resource rationale. Authors suggest through resource dependency theory that resource requirements move firm behavior and consequently, that need for collaboration often stems from an economical thought of resource scarcity (O'Dwyer & Gilmore 2018 and Tsang 1998). Through collaboration agreements and M&As firms are not only able to gather the necessary group of resources but are also able to exploit synergies (Dyer, Kale & Singh 2004). Resource requirements required to stay in business are often influenced by industry or environmental benchmarks. Research has in fact proven that this type of decision making is also driven by norms present in the market environment that significantly influence firm behavior (Shamsie 2003). In particular, when uncertainty arises and firms need to equip in order to absorb industry shifts.

Environmental uncertainty of demand and of competition have, in fact, been hypothesized to be drivers for alliance agreements among firms (Burgers, et al. 1993). Academics suggest that environmental changes affecting inter firm dynamics such as power balances and technology shocks, force firms to quickly adapt by innovating and or shifting resources in the firm to improve their performance (Tse & Soufani 2003).

Another branch of studies have been shown that firm behavior related to M&As and alliances is also dependent on the size of the actor involved in the move (Burgers, et al. 1993 and Tse & Soufani 2003). More specifically, it is hypothesized that middle sized firms will probably be most incentivized to engage in horizontal agreements so to be able to compete against multinationals (Burgers et al 1993). Firm size is also examined by the propositions made by the Rule of Three which discusses profitability and performance within a given market on the basis of

market share (Uslay, Altinting & Winsor 2010). The Rule suggests that three major generalists will acquire smaller players and that middle sized ones will perish.

Another element that has largely been studied, is the impact of innovation and technology as a driver for strategic alliances and M&As. Studies regarding the importance of collaborating in order to foster innovation are long-since available, as first contributions date to as back as the 1990s (Jorde and Teece 1990). Technology and innovation not only create a need for funding in R&D (Gnyawali & Park 2009), but also builds highly competitive environments pushing firms to engage in strategic alliances (i.e. Li, G. Qian & Z. Qian 2011). In these industrial environments alliances will be preferred as they grant agreement flexibility (Bengtsson, Kock, Lundgren-Henriksson & Näsholm 2016). Specifically, with respect to alliances and technological development, a significant amount of academics has focused on the topic of coopetition, a specific kind of strategic alliance that sees firms competing and cooperating at the same time (i.e. Luo 2007, Gnywali & Park 2009 and Quintana Garcia, & Velasco, C. 2002).

Much attention has also been given to knowledge as a source of competitive advantage as this, as well, is an inimitable resource which firms need to acquire. The fundamental relevance of knowledge, tacit knowledge and know-how sharing through collaboration agreements has been studied (Tsang 1998), in particular regarding its positive impact on technological development (Yin & Shanley 2008, Von Hippel 1987 and Vyas, Shelburn & Rojers 1995). These themes have also been examined in information economics theory studies (Mccann, et al. 2016). In their paper, Mccann et al (2016) they contribute to these themes by showing how information asymmetries, technological knowledge disparity and proximity have an effect on the choice between strategic alliances and M&As. In the study they also stress how the choice of one agreement over the other will be dependent on requirements of knowledge resources related to technology that the parties in the transaction possess.

Together with analyzing singularly alliances and M&As, studies have also compared the two agreements to see when one is to be favored to the other. When discussing managers' specific decision making regarding the alternatives of M&As or strategic alliances, researchers have found evidence related to managers' tendency to stick with environment trends and norms, failing to consider both options (Yin & Shanley 2008). Alongside industry norms, Yin and

Shanley (2008), suggest that elements regarding required flexibility, demand and environmental decisions are determinants for ultimate choice between the two alternatives. Wang and Zajac (2007), instead, propose that the choice is determined by resources, capabilities and partner specific knowledge. Similar propositions are also made in a paper by Villalonga and Mcgahan (2005). In their paper, they suggest that the choice between M&A or strategic alliances is determined from intangible resources related to technology. In the same study it is also proven that other elements that influence the choice between M&As and strategic alliances are related to ownership structure and firm prior experience in agreements.

Lastly, studies have also focused on post agreement performance. The reason for which there has been a line of research on post-agreement performance is due to the fact that M&As and strategic alliances have proven to be often unsuccessful, but, nevertheless growing in incidence. Post-performance analysis has shown that often these strategic moves are unsuccessful since pre-set financial and cost reduction objectives are not always achieved (i.e. Rahman & Lambkin 2014 and Dyer, Kale & Singh 2004). In an interesting paper it is shown that marketing integration in post-merger performance in case of horizontal M&As, impacts positively on financial performance is and has a greater impact than savings in cost given by synergies (Homburg & Bucerius 2005). Post-performance has also been examined relatively to value creation, showing that value for stakeholders is created through marketing actions and that low strategic alignment among firms, lead to high abnormal returns in mergers (Swaminathan, et a. 2008). When considering strategic alliances one of the main issues has been found in trust among contract parties who engage in opportunistic behavior (Ho Park & Ungson 2001).

Shifting to observations of real life dynamics, analysis has been made on specific industries and firm agreements. Depeyre, Rigaud & Seraidarian (2018), for example, have examined alliance dynamics in the French luxury market. They have shown how there is a presence of acquisitions from major industry players as well as a rising of alliances among suppliers. Similarly, the automotive sector has been under scrutiny (Taifi 2007). In particular, Akpinar and Vincze (2016) have examined the German automotive industry where, due to power distance, it is common for firms to end up in full acquisitions. Research has also been done for other industries such as, for example, the biotechnology industry (Quintana Garcia

& Benavides Velasco 2002) or in the hi-tech one (Gnywali & Park 2009). An interesting paper has also examined a case of collaboration among the two technology giants Samsung and Sony, demonstrating the huge potential for innovation that is possible to achieve when firms possessing so many resources work together (Gnywali & Park 2011).

To the best of my knowledge, specific general industry analysis examining many sectors identifying common trends with a quantitative approach is missing. We will, therefore, focus our interest on the identified gap.

CONCEPTUAL FRAMEWORK

The aim of this paper is to examine several motives in order to find similarities in the strategical plans which determine M&As or strategic alliances among different industries. Finding solid basis justifying the choice of M&As over strategic alliances which may be recognized in industry trends could help in developing rational *modus operandi* which may be used by managers.

Among the findings, the main theory justifying necessities to unite through agreements has been recognized to be the resource dependency theory. Alongside this, links to the role of market share and profitability (i.e. efficiency theory and Rule of three theory) and market uncertainty reasons (i.e. information economics theory) have also been considered to have a significant impact. Therefore, basing on these elements, it is now proposed that the formation of these merger or alliance agreements may be driven by the following factors: industry concentration; innovation and capital intensity vs labor intensity. All criteria for the identification of variables shall now be outlined individually.

Industry concentration

Merger and alliance agreements are based primarily on strategic and/or competitive ideals. Therefore, in order to find and express common elements for management decisions, it is necessary to understand the competitive environment in which the firms have to interact. Consideration of the context in which these happen is important as researchers suggest that industrial environments have a significant effect on how decisions are made (Yin & Shanley 2008). Determinants may be given both by pre-existing industry norms, such as shared values or industry practices (Yin and Shanley 2008) and characteristics of the market, such as product type or number products offered in the industry (Shamsie 2003) which shape the competitive environment. Thus, often, firms belonging to the same industry will act in similar ways to answer to market requirements (Yin & Shanley 2008).

Market requirements are met through the achievement of specific resources and capabilities. According to the resource dependency theory, in fact, resources represent one of the main forces influencing firm behavior (Tsang 1998). For example, studies have shown that in industries with a high number of middle and small sized entities firms often engage in alliance strategies as means to acquire

know-how and resources necessary to adapt to emerging global trends (Bengtsson et al 2016).

Evaluating the competitive context is necessary as interactions between firms will also depend on the relative role and power of the firms entering in the agreement. Relative bargaining power, given by the number of players and their position in the value chain, may change dynamics and balances among the companies involved in the agreement. Consequently, it may be speculated, that competition and motives driving small firms are different from those driving large firms as requirements and concerns are different. For example, very large firms must consider incurring in problems with anti-trust regulations when engaging in merger agreements while small players don't (Burgers, et al. 1993). Smaller firms with lower bargaining power and market share, instead, not being able to exploit economies of scale, may, for example, need to join with partners in order to diminish risks (Tse & Soufani 2003) and get access assets and distribution channels which more powerful players are able to achieve.

With respect to the type of agreement chosen, it must be noted that some conflicting data on trends regarding M&As versus strategic alliances exist with respect to firm size, the number of players in a market and consequently concentration. Yin and Shanley (2008) in their paper suggest that M&As will be more likely in industries with many players since agreements are more feasible as institutional scrutiny is lower and there are more partners to choose from. A more recent paper by Bengtsson et al (2016), instead, suggests that key drivers are embed in needs of independence and flexibility and that in markets with many small to middle sized firms, alliances are generally favored. Agreement flexibility will allow these firms to respond to environmental uncertainty and frequent changes derived from competitive dynamism.

While this paper, by including industry concentration in the analysis, will provide direct insight on this theme, for the formulation of this hypothesis, we have chosen to follow the Bengtsson et al. paper. The findings presented in this article are more in line with others that have been found on the topic. More specifically, several research papers highlight the intrinsic need for flexibility and independence in emerging markets which is granted by an alliance. This choice is justified by the considerations made on the basis of market share. In markets with many players, uncertainty levels are high and market share growth can be achieved by growing faster than competitors as no major players have yet

established (Edeling & Himme 2018). In these highly dynamic environments with possibility of unexpected change in power balances require great firm responsiveness and prompt adaptation. Alliance will thus be preferred in these cases. In moderately to highly concentrated markets, instead, market share is particularly important as its effects on profitability are stronger than they would be in more diluted markets (Edeling & Himme 2018). Therefore, in case of highly concentrated markets, M&As with competitors represent a sure and effective way to achieve market share in the industry in which a firm belongs (Thompson et al 2017 and Edeling & Himme 2018). It must be noted that market share is particularly relevant to this discussion as industry concentration is calculated on the basis of the market share of each firm.

In relations to market share, an interesting empirical explanation for the increasing happening of agreements in line with ecosystem building is represented by the "Rule of Three" (Uslay, Altinting & Winsor 2010). This rule states that an optimal industry structure will see three generalists (i.e. large firms accounting for 50% - 90% of the market share in total, each with a 10% - 40% share) and many specialists (i.e. small firms accounting for less than 5% of the market) competing among each other (Uslay et al. 2010). This specific situation, the authors explain, represents the result of the evolving towards an equilibrium point in which all firms will be profitable. Middle sized players (i.e. those with 5% - 10% market share) will be the only to perish as they will be inadequate to compete both against small and large players (Uslay at al. 2010). Since this theory is only valid for M&As, we suggest that it may be used as further proof of a preference towards M&As in case of highly concentrated markets. Example of this can be found in the music industry. This environment is dominated by three main firms (i.e. majors) Universal Music Group, Sony Music Entertainment and Warner Music Group which control more than 80% of the market.

Another branch of research, analyzing drivers for M&As and strategic alliances is related to entry barriers and resource requirements. As a matter of fact, as concentration rises so do entry barriers and firms lacking resources may not be able to overcome them alone (Cotterill and Haller 1992). For this reason, in this case we suggest that M&As represent a viable market access option. On the opposite side, industries with many players and a decentralized power are often characterized by low-entry barriers which create fast entry and exit for competitors (Downing 2018). Highly variable competitive dynamism not only

supports the flexibility claim, but also implies that such consolidating agreements as M&As may not only be unnecessary, but also, carry significant transaction costs due to adverse selection (Downing 2018). We suggest that this environment would then encourage resource collection through strategic alliances.

In real life, considering concentration in general, it can be seen that companies having highly centralized powers and large market shares often see these players vertically acquire smaller entities that perform tasks that are ancillary to the production process. This has been seen in the luxury industry (Depeyre, Rigaud & Seraidarian 2018) and in the automotive industry (Akpinar & Vincze 2016), for example. In the former there have been frequent acquisitions both horizontally (i.e. LVMH acquiring Sephora in 2007) and vertically in different areas of the value chain (i.e. Hermés acquiring a tanner to be more in control on leather) (Depeyre, Rigaud & Seraidarian 2018). In the latter, there has recently been a tendency to resort to full acquisitions in order to diminish transaction costs with firms such as spare part suppliers, creating huge holdings controlling many different smaller brands (Akpinar & Vincze 2016).

We propose that when industrial structures present high levels of industry concentration (i.e. with few players controlling most of the market share), market players will mainly engage in acquisitions. When the environment presents a decentralized (i.e. low concentration) and segmented power structure (i.e. with numerous players controlling low market shares), instead, firms will engage in alliances.

This hypothesis, if it were to be confirmed, provides an empirical example of the Rule of Three, as it shows how industries dynamics will converge towards further concentrated markets with three large generalists and many micro specialists.

Therefore, the first hypothesis that will be examined is:

H1: M&As will be positively correlated with highly concentrated industries over strategic alliances

Innovation

A second factor which significantly affects industry power balance is innovation or, more in general, the level of innovative effort in the industry.

Technological development in the past decades has been moving fast and still shows no sign of stopping. As innovation creates benefits for most, it carries uncertainty and change in power equilibria. Firms in all industries must be flexible enough to absorb all changes coming with the novelty, so to offer products which are up to date and to ensure a stable competitive position in the market. When perceiving changes in business environments, managers must respond immediately to guarantee growth and survival (Lòpez-Gamero, Molina-Azorìn & Claver-Cortés 2010). As a matter of fact, the concept of "technology shock" (i.e. sudden and radical change in technology) has been defined to be a catalyzer for drastic changes in production functions and in the very core of the business (Hansen & Prescott 1993). These types of radical activities often require significant funding and resources. As can be drawn from resource dependency theory, when resources are not promptly available, firms will behave accordingly in order to acquire them and may engage in agreements with other players in their industry. Following this idea, the concept of interdependence within the market, suggests that while similarities amongst market players increase competition, resource asymmetry, in contrast, increase the need to collaborate (Luo 2007). The simultaneous model of innovation, as well, suggest that it is fundamental for firms to involve other competitors and external entities in order to foster innovation (Jorde & Teece 1990). Through collaboration, in fact, firms will be able to engage in risk and resource sharing. Cooperation among firms may in fact be triggered by R&D-related expenses, short product life and convergence of technology as it allows for firms to gather the necessary resources (Gnyawali & Byung-Jin Park 2009). As a matter of fact, as companies need to accommodate the demand of customers who ask new technologies, cooperation increases (Luo 2007).

All these elements help in confirming background for the real life peaks in strategic alliance which have been recognized to happen in times of great technological shocks (Schilling 2015). In the 1990s, for instance, when the global economy was subject to numerous drastic innovations, these were directly correlated with a significant amount of both formal and informal agreements among firms, which created great opportunities for innovation (Schilling 2015). Studies have, in fact, shown that desire to stabilize one's position or to seek for opportunities, in case of high technological levels, are significant drivers that induce firms to collaborate, even if they had been long since competitors (Gnyawali & Park 2009).

These propositions are also confirmed when observing markets. In the highly innovative biotechnology sector, for instance, high levels of strategic alliances can be observed (Quintana Garcia & Benavides Velasco 2002). In hi-tech industries, as well, there are numerous new start-ups which increase competitive uncertainty. These high levels of uncertainty push firms to establish strategic alliances frequently (Li, G. Qian & Z. Qian 2011). A real-life example of this can be found in the case study analyzed by Gnyawali and Park (2011), who examined the strategic alliance between Sony Corporation and Samsung Electronics. They have seen that when two "giants" such as these collaborate thanks to the extensive resources they dispose of, they are able to generate great innovation.

As of now, only elements pushing firms to collaborate have been examined, we shall investigate when strategic alliances are favored over M&As and vice versa. While, resource requirement and dependency are at the basis of the need to collaborate, information and transaction costs will determine the choice between M&As and strategic alliances.

Strategic alliances by being less binding and characterized by a pre-set time limit, in environments which are subject to frequent changes are favored to more intense moves such as M&As. This happens since they are able to ensure flexibility and possibility to opt out from them when needed (Li, G. Qian & Z. Qian 2011) allowing prompt adaptation to changes (Bengtsson et al. 2016 and Luo 2007). This kind of flexibility in highly innovative environments is required as uncertainty and market changes are high and costs of adverse selection may be too much to bear if firms were to engage in deeply binding contracts. In more static industries instead, these characteristics may be seen as secondary. The environment is less volatile and deep knowledge regarding the prospect partner may be achieved. Research suggests that firms will be interested in highly binding agreement, such as M&As, only when problems of adverse selection may be avoided, and thus, when competitor's and environment information is clear and established (Mccan, et al. 2016). In collaboration agreements, information regarding the other party's specific knowledge is fundamental (Gnyawali & Byung-Jin Park 2009). In general, partner-specific knowledge has been shown to be one of the main elements determining the tipping decision between M&As over strategic alliances (Wang & Zajac 2007). In low innovation industries, novelty is not very frequent and positioning strategies are quite stable. This kind of stability allows not only, for people to gain clear information on their partners, but also possibility to partially predict market

responses (Li, G. Qian & Z. Qian 2013). Agreements are pursued for market purposes, since possibility of product development are low (Vyas, Shelburn & Rogers 1995). In high innovation industries, instead, the situation is opposite, levels of uncertainty and environmental dynamism are very high (Li, G. Qian & Z. Qian 2013). This compromises knowledge due to constant change in power balance dynamics and increases risks of adverse selection. In this cases in fact, strategic alliances will be preferred.

Hence, the following reasoning is proposed. To achieve the necessary but unavailable resources, as stated by the resource dependence theory, firms will collaborate. In industries with low uncertainty and high predictability of the market, firms can know other players deeply and will be inclined to choose stable agreements. As traditional game theory concepts of repeated games suggest, players will be more inclined to collaborate without defecting on a potentially infinite horizon. This entails that firms will be more willing to arrange binding types of agreements such as M&As. In highly dynamic industries, with frequent innovation and technology shocks, uncertainty and sudden development in the market will push industry participants to engage in strategic alliances in order to counteract to external forces driven by novelty while ensuring strategic flexibility. In the alliances, firms will share resources and work together to accomplish required levels of innovation. Therefore, the hypothesis that will be examined is:

H2: High industry innovativeness is positively associated with strategic alliances over M&As

Capital intensive vs labor intensive

The third element that shall be addressed is related to the nature of assets of the firms within the industry. This means differentiating between prevalently capital intensive and labor intensive industries.

With capital intensive we mean industries in which firms need high levels of investments on capital assets necessary for production (Weil 2016). In construction industry, for example, capital investments and fixed assets represent a significant part of firms' operations. Labor intensive industries, on the contrary, are those in which most of the production is done by labor and low levels of capital investment are required (Weil 2016). In service industry, for example, higher importance is given to human resource and knowledge and the concept of

intangibility is at the very core of the offering type (Vargo & Lusch 2004), with some business models consisting of no fixed assets at all (Andreassen, Lervik-Olsen, Snyder et al 2018).

Similarly to what has been said in the previous sections, even in this case, the main reason to unify is related to resource requirements (Swaminathan et al 2008). Basing on the propositions made by the resource dependence theory, we deduce that depending on industry capital or labor requirements, firms will want to engage in either M&As or strategic alliances to gain specific types of assets. Collaboration will happen to improve competitive position, growth and diminish transaction costs.

With respect to M&As and strategic alliances, attention given by research to capital or labor intensity specifically is scarce. What has been thoroughly discussed, instead, is the management of knowledge, human resource and specific asset requirements. We suggest that these elements can be useful for the formulation of our third hypothesis, given that they represent key differentiating factors between capital intensive and labor intensive industries. In labor intensive firms, for instance, knowledge, know-how and, more generally, human resources often represent the very basis of a firm's success. Studies state that specific knowledge not only helps in finishing the final product but often represents a crucial factor to gain competitive advantage (Vyas, Shelburn & Rogers 1995).

We suggest that in labor intensive industries, alliances are to be preferred to M&As. More specifically, when looking at knowledge, studies show that in industries in which knowledge is intensive and quickly becomes obsolete, alliances will be preferred given the intrinsic flexibility of the agreement type (Yin & Shanley 2008 and Vyas, Shelburn & Rogers 1995). This will grant firms with the ability to end the agreement when its purpose has been served. When considering human resources, as well, academics suggest that in human asset intensive firms, since these represent the key of the added value of the agreement, acquisitions are to be avoided since attrition may happen due to feelings of dissatisfaction of employees (Dyer, Kale & Singh 2004). In particular, expert and specialized human resources, which can easily move from one company to the other, may decide to move away from a firm involved in the M&A (Yin & Shanley 2008). This may occur since one of the main obstacles that researchers have seen to be encountered in case of M&As is given by the lack of compatibility among the firms or the lack of care of managers towards human resources (Schweiger & Weber 1992). Losing human resources in

a merger agreement may represent one of the reasons determining its failure as features such as tacit knowledge may only be transferred through direct human contact. Confirming this thought, studies suggest that effective organizational actions may be taken only when human resources and organization are efficiently integrated within the company (Tsang 1998).

On the other side, firms which depend on specific types of assets for production, will most likely prefer to engage in M&As so to have more control over the level of technical knowledge leaks and processes (Yin & Shanley 2008). These industries will be interested in merging with the objective of reducing redundancy and increasing effectiveness (Wang & Zajac 2007). As efficiency theory suggests, with increased production, firms will be able to exploit economies of scale and thus reduce costs (Edeling & Himme 2018). The economic motive to collaborate for asset intensive firms is thus determined by lower costs of production given by efficiency and increased productivity (Seth 1990 and Luo 2007).

Following the resource dependence theory, we propose that, in order to achieve the necessary resources (i.e. capital or knowledge and human assets) firms will engage in either one of a M&A or a strategic alliance. The type of agreement to be chosen will depend on the resource needed which will be conditional on the industry characteristic (capital intensive vs labor intensive). More specifically, in case of capital intensive industries M&As will be favored over strategic alliances. In case of labor intensive industries, the opposite will happen. Therefore, the following proposition may be made:

H3: M&As will be positively correlated with capital intensive industries over strategic alliances

ADDITIONAL THEORETICAL CONSIDERATIONS

Hybrid Competition and Demand

Another element which may be interesting to take into consideration as a driver of collaboration is related to the idea of hybrid competition. Market development and changing demand have caused the unification of sectors which once were perceived to be distinct, giving primary importance to the theme of *convergence* (Ancarani et al. 2009 and Ancarani and Costabile 2010) in the determination of hybrid competition. Convergence happens whenever boundaries between diverse industries are crossed creating products that bring added value to customers by being a crossover of two industries (Ancarani and Costabile 2010). Three main convergent factors have been identified as main drivers of this phenomenon: technology, competition and demand.

More specifically, it has been said that hyper competition diminishes the advantages that a company may achieve, and thus, creating new products that overlap over more industries helps in satisfying today's highly sophisticated demand, in which consumers search differentiation and abstraction of values (Ancarani, et al. 2009). This process is possible thanks to the development of technology which allows firms to unify previously distinct sectors (i.e. food and pharmaceuticals) (Ancarani, at al. 2009).

Many examples of convergence are present in today's economy, some of which are extremely successful. It is of high relevance to point out that these projects should be based on customer centric ideals as purely technology driven initiatives which fail to consider thoroughly demand often fail (Ancarani, et al. 2009). Much research, in fact, stresses the importance of customer centricity in today's economy, you must not only create a good product but a product that people want (Shah et al. 2006). Research on agglomeration theory also suggests that M&As in closely geographically located companies are more likely to happen as the degree of technological disparity among industries increases as well as non-alignment of resources (Mccann et al. 2016; Luo 2007 and Swaminathan, et al. 2008).

From a marketing point of view, as well, convergence may be justified as a way to achieve a simplification of consumers' processes of choice which may be achieved, for example, through a technical or symbolic bundling, through co-branding or the production of multifunctional products (Ancarani, et al 2009).

Unifying more industrial areas is also beneficial for the simplification of consumers' choice process by giving them all products necessary in one bundle without having them to choose twice. Moreover, once technological impulses settle, managers will strive for convergence as a way to branch out and offer novelty to consumers (Ancarani, et al. 2009).

Convergence, as previously briefly discussed is obtained from the overlapping of different industries. Branching out to new frontiers is not immediate and may often require the intervention of external actors (Thompson et al 2017). Companies may achieve these new capabilities through acquisition of firms which are specialized in the required sector, by hiring specialized personnel or through time-limited contracts with third parties (Thompson et al 2017). As a matter of fact, alliances made to contrast hybrid competition and to gather new resources which elude the company's core business are frequent and have also been referred to as "alliances of scope" (Ancarani, et al. 2009).

We shall see whether this phenomenon is present in some of the industries under examination in this study and try to assess the underlying rationales.

METHODOLOGY

In order to test the proposed hypothesis, all US agreements regarding M&As and strategic alliances in the past five years will be gathered from the Reuter's SDC Platinum database. Industry categorization for each firm will be defined according to the Standard Industrial Classification (SIC), so to be able to identify patterns within and among industries.

Industry concentration will be classified through concentration index calculations using a Herfindahl-Hirschman Index (HHI) and then reported in a three-point interval scale.

With respect to the level of innovation present in the industry a numerical value will be attributed to each industry based on the number of patents issued for all firms in the same industrial sector within a given period. More specifically, a five-point scale (Low Outlier, Low Spending, Medium Spending, High Spending and High Outlier) will be defined basing on the average of the number or patents issued in the years 2010-2018.

Finally, capital intensive and labor intensive will be represented through the use of a dummy variable (i.e. 1= capital intensive, 2= labor intensive). This dummy will be based on capitalization ratios and labor ratios and industry specific research.

In order to test significance for each variable, a Logistic model will be set with the Type of agreement as a binomial dependent variable (i.e. 1=M&As, 2= Strategic Alliance) and all other as independent covariates. For all independent variables, significance and impact will be tested.

Once significance will be assured, comparisons among firms and industries will be made, looking for trends or interesting patterns.

Data

Agreement data We have gathered all data regarding M&As and Strategic alliances in the United States of America completed between January 1st 2015 and January 1st 2020 from the Reuter's SDC Platinum database. We were able to gather 43126 M&A agreements and 7825 Strategic alliances from 53 different Industry sectors (see appendix Tables 1 and 2).

Concentration Rate – Herfindahl-Hirschman Index (HHI) The HHI is an index which calculates industry concentration taking into consideration market shares for each player in the industry. Concentration levels are calculated from the

squared sum of all market shares and represented in a three-point scale (i.e. 1= Low concentration, 2=Moderate concentration and 3=High concentration). More specifically the index 1 was given when HHI<0.15; the index 2 was given then $0.15 \leq$ HHI < 0.25 and index 3 was given when HHI $\leq$ 0.25 (see appendix Table 4). Market shares have been calculated from the revenues for each company in an industry classification accordingly with the SIC primary representation. Data for this ratio has been gathered from balance sheet data for the period 2015-2020 from Wharton Research Data Services' Compustat database and cross compared with the US Government Economic Census. All revenue data has been gathered in US dollar ($) currency. The indexes have been calculated separately for each year, I noticed that they barely changed across the years so no further measure was necessary to specify change within the period.

$$HHI = \sum market\ share_i^2$$

$$Market\ share = \frac{Value\ of\ firm\ revenue_i}{Total\ industry\ revenue}$$

Innovation To calculate innovation indices, data on the number of patents released per technology has been gathered from the World Intellectual Property Organization (WIPO) for the period 2010-2018 (see Appendix Table 3). These totals have then been averaged and converted into a five-point scale (i.e. 1=Low Outlier, 2=Low Innovation, 3=Medium Innovation, 4= High Innovation and 5=High Outlier) with each point representing an interval of 20.000 patents. The technologies and indexes have been associated to each industry (see appendix Table 3 and 4).

Capital Intensity and Labor Intensity Capital intensity and labor intensity has been determined through individual research for each industry and by checking capitalization rate data gathered from Wharton Research Data Services' Compustat database (see Appendix Table 4). With this information, a dummy variable has been created in which the value of 1 has been attributed to a capital intensity industry and a value of 0 to a labor intensity industry.

Control Variables In order to be clear of issues related to endogenous variables, two control variables have been added: total market value and market uncertainty.

Including them in the model will avoid the independent variables being correlated with the error thus ensuring exogeneity.

The values of total market value have been retrieved from the Wharton Research Data Services' Compustat database. Market uncertainty instead, has been taken from the historic volatility by sector indexes calculated by the Chicago Board Options Exchange (Cboe) in the period 2012-2017.

Hybrid demand and hybrid competition descriptive data on the types of M&As that have been made has been collected from previously discussed sample of agreements collected from the Reuter's SDC Platinum database.

The Model

Main model The tool that has been chosen to analyze the data is a binary Logistic model. A logit model sees a binary dependent variable which in our case will represent the type of agreement chosen (i.e. 1=M&A, 0= Strategic Alliance) and several independent variables that will determine the likelihood of the event to occur. The variables that will be included in our model are *"concentration level"*, *"innovation", "capital intensity"* together with their interactions and control variables. Therefore, the general model equation that will be proposed is:

$$\text{logit(Y)} = \log_e\left(\frac{p}{1\text{-}p}\right) = \alpha_0 + \alpha_1 \text{concentration level}_i + \alpha_2 \text{innovation}_i + \alpha_3 \text{capital intensity}_i$$

Hybrid Demand and Competition A separate analysis has been done to see if we can identify hybrid demand and competition. Descriptive statistics have been gathered on a sample of US M&A agreements. Difference in frequency between the amount of within-industry vs cross-industry agreements has been assessed (See Appendix Table 5).

RESULTS

The Sample

      The sample presents a total of 50951 agreements of both M&A and Strategic Alliances. Most of these agreements belong to labor intensive industries (75.4%). Innovation index level is mainly represented by industries with a level of 1 (i.e. low outlier level of innovation) (61.6%) followed by those with an index of 2 (i.e. low level of innovation) (16.2%), 3 (11.9%) and lastly 5 (10.3%). Industrial concentration as well is mainly represented by industries with an index level of 1 (78.9%), followed by moderately concentrated industries (i.e. index level 2) (18.7%) and finally by highly concentrated industries (2.3%) (i.e. index level 3) (see tables 1, 2 and 3).

Table 1

Frequency of innovation levels in the sample

INNOVATION LEVEL

		Frequency	Percentage	Valid percentage	Cumulative percentage
Valid	1	31362	61,6	61,6	61,6
	2	8264	16,2	16,2	77,8
	3	6083	11,9	11,9	89,7
	5	5242	10,3	10,3	100,0
	Total	50951	100,0	100,0	

Table 2

Frequency of capital intensive vs labor intensive in the sample

CI/LI

		Frequency	Percentage	Valid percentage	Cumulative percentage
Valid	0	38442	75,4	75,4	75,4
	1	12509	24,6	24,6	100,0
	Total	50951	100,0	100,0	

Table 3

Frequency of HHI index levels in the sample

HHI INDEX

		Frequency	Percentage	Valid percentage	Cumulative percentage
Valid	1	40214	78,9	78,9	78,9
	2	9545	18,7	18,7	97,7
	3	1192	2,3	2,3	100,0
	Total	50951	100,0	100,0	

Main Model

A Logistic Binomial Regression Model has been set up in order to measure and assess if, and to what extent, each variable impacted the likelihood of one of the two conditions (M&A vs Strategic Alliances) to happen.

This model has been built with three categorical variables and two metric control variables as independent variables and a binomial dependent variable. The categorical independent variables are "HHI index" (i.e. concentration index on a three-point scale, differentiated as 1=low concentration, 2=moderate concentration and 3= high concentration); "innovation level" (i.e. innovation level on a 5-point scale, differentiated as 1=low outlier; 2=low innovation; 3=medium innovation; 4=high innovation and 5=high outlier) and "capital intensity vs labor intensity". From the results, we can say that, generally speaking, the model is significant (χ^2(19, 50951) =4290.092; p=.000).

We hereby present the details of the model (Tables 4, 5 and 6). Only statistically significant variables are shown in Table 3 (for the full model see Appendix Table 10). The null model is only reported in the Appendix (see Appendix Table 8 and Table 9). The first thing to notice and keep in mind throughout the analysis of the model, is that it presents a low Naglekerke R-squared (Naglekerke R^2=0.14). While the interpretation of the R-squared is not exactly the same as it would be for a linear regression model, this value suggests that the independent variables only explain about 10% of the variation of the dependent variable. Possible explanations of this result will be later addressed in the limitations section of the paper.

From the classification table (Table 5), when the cut-off is set at 0,5, we can see that the Hit Rate of the model is very high (HR=84.7%). The aim of a Logit Regression model is to represent with what probability an event is likely to occur having a high hit rate is of primary importance. In this case specifically, the level

of the hit rate suggests that the model may wrongfully predict the outcome only in 15.3% of cases. Interestingly, it must be noted that while the model is very accurate in predicting M&As it is a little less in predicting strategic alliances, we assume that this may be due to the effect of both the low percentage of strategic alliances in the sample and the overall low variability of the data. Further details regarding these aspects are analyzed in the limitations section of this paper.

Table 4

Summary of the model

Step	-2Log likelihood	Cox e Snell R-squared	Nagelkerke R-squared
1	39412,333[a]	,081	,14

Table 5

Classification Table[a]

			Predicted		
			M&A/SA		
	Observed		0	1	Hit Rate
Step 1	M&A/SA	0	230	7595	2,9
		1	187	42939	99,6
	Global Percentage				84,7

   a. The cut-off level is .500

Table 6

Logistic regression full model

Variables in the equation

		B	S.E.	Wald	df	Sign.	Exp(B)
Step 1[a]	INNOVATION LEVEL			438,563	3	,000	
	INNOVATION LEVEL(1)	-,822	,054	235,612	1	,000	,439
	INNOVATION LEVEL(3)	-3,860	,279	191,123	1	,000	,021
	CI/LI(1)	2,233	,127	309,615	1	,000	9,324
	HHI INDEX			82,979	2	,000	
	HHI INDEX(1)	1,229	,160	58,776	1	,000	3,418

	B	S.E.	Wald	df	Sig.	Exp(B)
HHI INDEX(2)	2,348	,461	25,925	1	,000	10,460
market share total	,000	,000	95,301	1	,000	1,000
MARKET VOLATILITY	,335	,016	460,193	1	,000	1,398
CI/LI * INNOVATION LEVEL	*		135,673	3	,000	
CI/LI(1) by INNOVATION LEVEL(1)	-,989	,148	44,700	1	,000	,372
CI/LI(1) by INNOVATION LEVEL(2)	-1,787	,195	83,711	1	,000	,168
CI/LI(1) by INNOVATION LEVEL(3)	1,611	,229	49,549	1	,000	5,010
CI/LI * HHI INDEX			185,336	2	,000	
CI/LI(1) by HHI INDEX(1)	-3,289	,245	180,462	1	,000	,037
CI/LI(1) by HHI INDEX(2)	-1,233	,551	5,001	1	,025	,291
HHI INDEX * INNOVATION LEVEL			283,754	5	,000	
HHI INDEX(1) by INNOVATION LEVEL(1)	1,455	,253	33,072	1	,000	4,286
HHI INDEX(1) by INNOVATION LEVEL(2)	-1,765	,214	67,896	1	,000	,171
HHI INDEX(1) by INNOVATION LEVEL(3)	1,891	,229	68,383	1	,000	6,628
CI/LI * HHI INDEX * INNOVATION LEVEL			13,542	1	,000	
CI/LI(1) by HHI INDEX(1) by INNOVATION LEVEL(1)	-1,232	,335	13,542	1	,000	,292
Costante	-3,158	,216	213,361	1	,000	,042

a. Variables inserted in step 1: INNOVATION LEVEL, CI/LI, HHI INDEX, market share total, MARKET VOLATILITY, CI/LI * INNOVATION LEVEL , CI/LI * HHI INDEX , HHI INDEX * INNOVATION LEVEL , CI/LI * HHI INDEX * INNOVATION LEVEL .

Main effects. As previously mentioned, in Table 6 only statistically significant variables are reported. We shall now examine all of the main effects separately.

When considering industry concentration levels, confirming the proposed hypothesis, probabilities for M&A agreements over strategic alliances increases as the level of concentration rises. When looking at a moderately concentrated industry (i.e. index level 2) (β=1.229, p=.000), according to the change in odds, M&As will be 2.4 times more likely to happen than in a scarcely concentrated industry (i.e. index level 1). More specifically, if we were to keep all else equal, M&As are 70,7% more likely to happen than in a scarcely concentrated industry. In case of highly concentrated industries (i.e. index level 3) (β=2.348, p=.002), the change in odds ratio is of 9.460. More specifically, if we were to keep all else equal, M&A agreements over strategic alliances are 90,4% more likely to happen than in scarcely concentrated industries (i.e. index level 1).

As suggested from the hypothesis, we see that as innovation increases, the likelihood of a M&A happening diminishes. More specifically we see that, with respect to an industry with a "low outlier" level of innovation (i.e. index level 1), all else equal, the odds ratio for M&As to happen decreases odds of 56.1% in case of a "low" innovation industry (index level 2) (β=-.822, p=.000) and decreases odds of 97.9% in case of a "high outlier" innovation industry (index level 5) (β=-3.860, p=.000) over strategic alliances.

In capital intensive industries (β=2.233, p=.000) , confirming the proposed hypothesis, changes in odds suggest that M&A agreements will have an increase of 8.3 times from the original value or are 89.3% more likely to happen compared to labor intensive ones over strategic alliances if we were to keep all other variables equal.

The control variable that was added, total market value, has no impact on the likelihood of M&As happening (β=0.00 p=.000). Increasing market volatility of one unit (β=.335; p=.000), instead, all else equal, changes in odds increase of 0.398 or the likelihood of M&A happening increases of 28.5%.
These results can also be seen by descriptive statistics in the data.

The Motion Picture Production and Distribution industry for example, which is a moderately innovative but highly concentrated capital intensive industry, presents a significant amount of M&As (76.5%) as well as a few strategic alliances (23.5%). This may be due to the fact that two of the indexes

according to the model push towards M&As while the innovation index suggests that even strategic alliances should be present (See Figure 1).

The Health Services sector, instead, presents a more evenly distributed situation. This industry presents 32.1% of strategic alliances and 67.9% of M&As. This result is in line with what the model suggests as this industry present moderate levels of innovation, moderate concentration and is labor intensive. While one would have expected a greater number of strategic alliances, this may be due to the disparity in the general frequencies of the two agreement types in the sample (See Figure 1).

One last interesting example may be seen in the case of the Stone, Clay, Glass and Concrete Products industry sector which presents 100% of M&As agreements. This industry sector fully embodies the findings as it is highly concentrated, capital intensive and does not present high innovation (i.e. index level 2) (See Figure 1).

Figure 1

Percentage of incidence of M&As and Strategic alliance
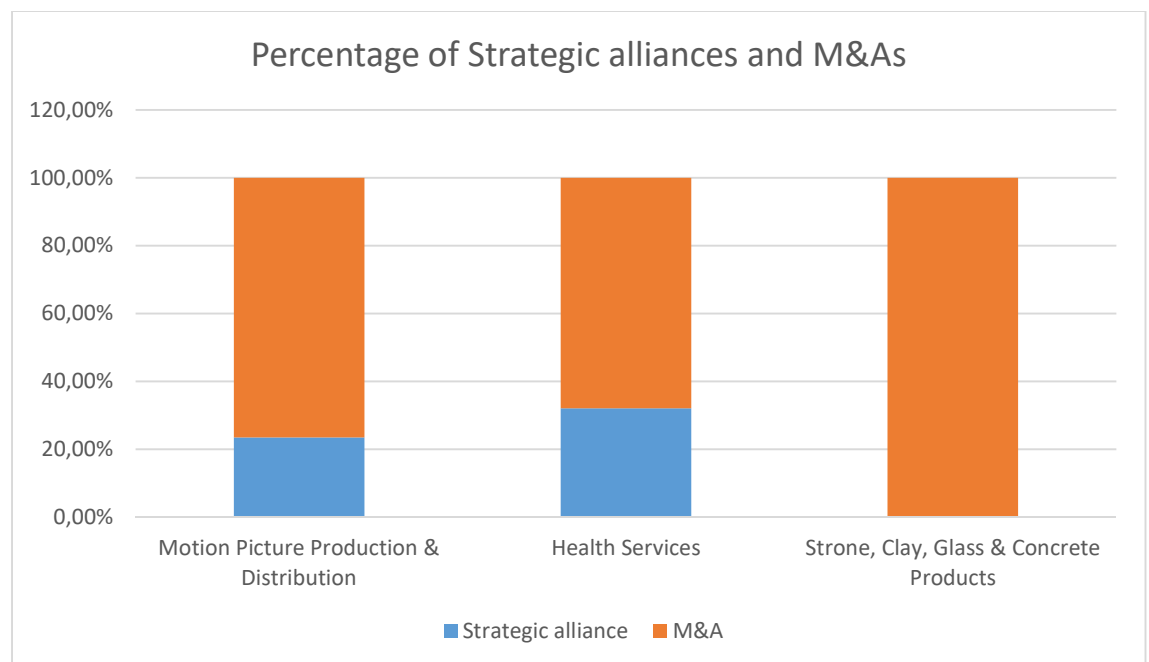
Because of the high disproportion between total M&As and strategic alliances the differences in agreement type are not clearly visible. We will thus, look at these results looking at the relative amount of strategic alliances that these industries have with respect to the overall average of the industries. This will help

in highlighting the differences among the presented examples. In the Health Services industry for example, the significantly greater amount of strategic alliances with respect to the average, reflects more clearly expectations (Figure 2).

Figure 2

Number of strategic alliances of the selected industries compared with the average amount of strategic alliances of the sample
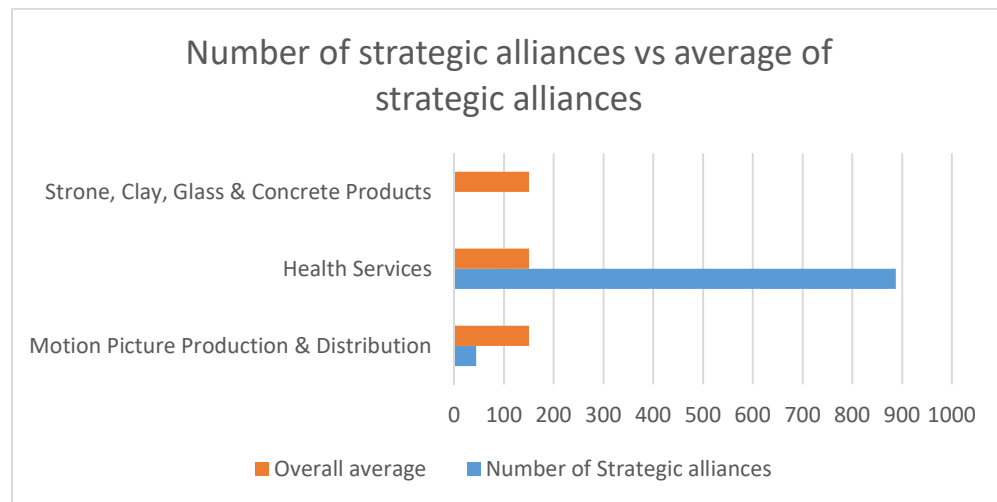
Interaction effects. Even though we were most interested in the main effects for the model, we also wanted to check whether interactions of two cases could've augmented the effect of the variables. We shall now interpret these interaction terms into detail.

When capital intensity and innovation are interacted, we see that in case of a capital intensive low innovative (i.e. index level 2) industry (β=-.989; p= .000) all else equal, for the formation of M&A agreements over strategic alliances odds decrease of 62.8% than in a labor intensive low outlier innovative (i.e. index level 1) industry; all else equal, in case of a moderately innovative (i.e. index level 3) industry (β=-1.787, p=.000) odds decrease of 83.2%. Interestingly, instead, in case of a capital intensive high outlier innovative (i.e. index level 5) industry (β=1.611, p=.000) instead, odds increase of 4.01 or is keeping all other variables equal, the likelihood increases of about 80%.

When interacting capital intensity and concentration levels, instead, results show that as concentration in a capital intensive industry increases, likelihood of M&As over strategic alliances lowers with respect to a labor intensive scarcely |concentrated (i.e. index level 1) one. In detail, in case of a capital intensive

moderately concentrated (i.e. index level 2) industry (β=-3.289, p=.000), all else equal, the odds ratio decreases of 96.3% and in case of a capital intensive highly concentrated (i.e. index level 3) industry (β=-1.233, p=.025) of about 70.9%.

Results also show what happens in case of concentration and innovation seen jointly, compared to a situation with low outlier innovation (i.e. index level 1) and a low concentration (i.e. index level 1) industry. With a moderately concentrated industry (i.e. index level 2) results vary depending on level of innovation. With low innovation (i.e. index level 2) (β=1.455, p=.000), odds increase of 3.286 or if keeping all else equal, likelihood increases of 76.67%; moderate innovation (i.e. index level 3) (β=-1.765, p=.000), odds of M&As over strategic alliances decreases of 82.9%. When innovation increases (i.e. index level 5) and concentration is low (i.e. index level 1) (β=1.891, p=.000) odds of M&As over strategic alliances increase of 5.6 or, if keeping all else equal, the likelihood of M&As increases of 84.9%.

Finally, when looking at a situation with the three indexes jointly (i.e. capital intensive, concentration index 2 and innovation index 2) (β=-1.232, p=.000), as expected from the results of the main effects, keeping all else equal, odds of M&As over strategic alliances decreases of 70.8% over a labor intensive, low concentration and low outlier innovation industry.

Hybrid Demand and Hybrid Competition

Descriptive data on frequency has been done to analyze and identify the sectors in which cross-industry agreements were most present. The descriptive data considered shows that, in most cases, industries present an equal share of cross industry vs same industry agreements. Polarization towards one or the other can be found in a few industries. We shall now analyze them and see whether the industries presenting a frequency of one of the two is equal or above 70.0% have similar elements.

The bar graph below shows the industries which have a visibly greater amount of cross-industry agreements over same industry ones (1= Cross-industry agreement; 0= Same industry agreement).

Figure 3

Percentage of cross industry vs within industry M&As
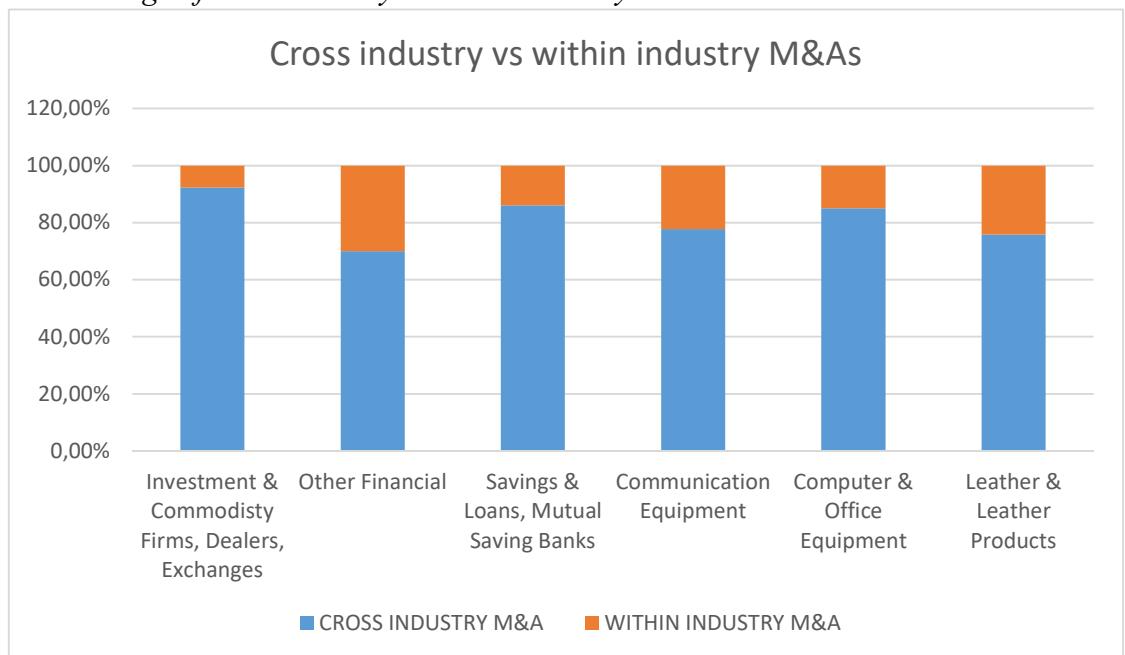
We shall now look at the industries in two groups. The first to take into consideration are: Saving and Loans, Mutual Saving Banks; Investment & Commodity Firms, Dealers and Exchanges and Other Financial. Frequency of cross industry M&As are respectively: 86.0%, 92.3% and 70.0% (see Appendix Table 5). All of these firms are labor intensive and present a low outlier level of innovation (i.e. index level 1) and low to moderate levels of industry concentration (i.e. index levels 1 or 2).

We shall now look at the second group of cross-industry polarized industries: Communication Equipment, Computer and Office Equipment and Leather and Leather Products. These three classifications present frequencies of cross-industry M&As of respectively: 77.7%, 85.0% and 75.8% (see Appendix Table 5). These industry sectors are quite diverse as they innovation levels, concentration levels and capital intensity are quite different (see Appendix Table 4). Communication Equipment is a capital intensive, highly concentrate (i.e. index level 3) and moderately innovative (i.e. index level 3) industry. Computer and Office Equipment is a capital intensive, moderately concentrated (i.e. index level 2) and high outlier innovative (i.e. index level 5) industry. Leather and Leather Products is a labor intensive, highly concentrated (i.e. index level 3) and low level innovative (i.e. index level 2) industry.

We shall now consider those industries with an opposite polarization, hence those that present primarily agreements within the same industry (i.e. inter-industry agreement equal or above 70%). In this group we find Agriculture, Forestry and Fishing (72.4%); Air Transportation and Shipping (71.6%); Food and Kindred Products (72.9%); Health Services (83.3%); Hotels and Casinos (82.0%); Insurance (78.8%); Oil & Gas, Petroleum Refining (73.5%); Retail Trade – Eating and Drinking Places (80.0%) and Transportation and Shipping (except air) (72.3%). The only similarity that can be found in these industries, with the exception of Agriculture, Forestry and Fishing, is that they all present low to moderate levels of concentration (see Appendix Table 4). More specifically, Agriculture, Forestry and Fishing is a labor intensive, low outlier innovative (i.e. index level 1) and highly concentrated (i.e. index level 3) industry. Air Transportation and Shipping and Transportation and Shipping (except air) are capital intensive lowly concentrated (i.e. index level 1) and moderately innovative (i.e. index level 3) industries. Food and Kindred Products is a capital intensive, low outlier innovation and low concentration (i.e. both index level 1) industry. Health services, Hotels and Casinos, Insurance services and Retail Trade – Eating and Drinking are labor intensive respectively moderately concentrated (i.e. first two named index level 2) and lowly concentrated (i.e. last two named index level1) and all present low outlier level innovation (i.e. index level 1) with the exception of Health Services which is moderately innovative (i.e. index level 3).

Figure 4

Percentage of cross industry vs within industry M&As

DISCUSSION

The aim of this research is to identify the drivers that push firms towards either M&As or strategic alliances on an industrial base differentiation. The results of this study contribute, generally, to literature on M&As and Strategic alliances and business governance theories. In particular, by considering the three elements of industry concentration, innovation and capital intensity vs labor intensity, it contributes to resource dependency theory as all of the hypothesis use its propositions as the main underlying rationale. Resource necessity will in fact be at the basis of the move. We shall now analyze in detail the implications that can be drawn from the results.

Main Model

Previous studies on M&As have suggested that pre-existing industrial dynamics and norms shape the behavior of firms (Yin & Shanley 2008, and Shamsie 2003). For this reason, the model has taken into consideration industry wide indicators and considerations will be made on the basis of industries and not firms characteristics alone. Firms will only be considered as elements acting within a greater economic context. The variables that have been taken into consideration are industry concentration, innovation and capital intensive vs labor intensive.

When looking at concentration and the choice between M&As and strategic alliances, previous studies have made considerations and assumptions for both scarcely concentrated industries and for highly concentrated ones. On one side, studies have shown that smaller entities in industries with a decentered power balance preferred strategic alliances over M&As (Bengtsson et al. 2016 and Luo 2007). On the other, in highly concentrated industries it has been studied that major entry barriers and market share rationales drive firms to prefer M&As over strategic alliances (Downing 2018 and Edeling & Himme 2018). These statements are confirmed by our model and data, as probability for the incidence of M&As rises proportionally along with industry concentration. This means that as industry concentration increases, the likelihood of an M&A happening over a strategic alliance increases as well. These findings confirm the proposed hypothesis H_1. Moreover, high concentration (i.e. HHI index level of 3), among the variables considered, has been found to be the strongest variables pushing towards M&As as its coefficient is higher than others.

These results may also be used to support the propositions made by the Rule of Three (Usalay, Altintig & Winsor 2010). The scenery of industrial stability described in the theory represents a situation of a highly concentrated market with three major firms. This structure may be achieved through the progressive acquisition of small to medium sized firms by the major players in the market. If one were to look directly into these industries, just as can be observed in the luxury or music production environments which already present the "three major-player" industrial structure, they would most definitely find a predominance of M&A agreements over strategic alliances. Therefore, given that competitive environments are highly dynamic, we suppose that an increased incidence of M&As may signal a progressively changing environment which, not only fosters the creation of business ecosystems, but that it is also converging towards the structure proposed by Usalay et al. (2010).

When looking at our second hypothesis on innovation, previous studies have focused on uncertainty of demand and competition (Burgers et al. 1993) and resource dependency (Tsang 1998) as fundamental drivers for collaboration. Research has specifically addressed the need for collaboration in case of high level of technological development as a way to absorb shocks and avoid being obsolete (Luo 2007, Jorde & Teece 1990 and Gnyawali & Park 2009). Research has shown that as a consequence of the uncertainty carried by innovation, alliances are generally preferred. This is mainly due to the intrinsic flexibility granted by this kind of agreement. (Li & G. Qian 2011; Yin & Shanley 2008 and Z. Qian 2011). Our proposed hypothesis was formed basing on their conclusions and has been confirmed by the data as well. Our findings show that increasing innovation levels push firms to choose strategic alliances over M&As. From the data we can infer that industry innovation level has a very strong effect on choice between strategic alliances and M&A. However, it must be said that the intermediate level of "moderate innovation" (i.e. index level 3) came out as non-significant, thus, no conclusions may be drawn from it. We assume that this last non-significant result may be a product of a low variability in the data set. This concept will be further analyzed in the limitation section. Real life example confirming our findings, has been identified and studied by Gnyawaly and Park (2011) who described the strategic alliance of two hi-tech firms of Samsung and Sony. Moreover, the numerous collaborations between computer equipment firms such as Apple and Beats by Dr. Dre or Hewlett-Packard and Bang & Olufsen all

represent examples of this observed phenomenon. Both hi-tech and computer equipment are sectors with very high levels of innovation.

In a similar manner to the first two afore mentioned hypotheses, also the third hypothesis on capital intensity vs labor intensity has been confirmed. In Capital intensive industries, M&A agreements are more likely to be chosen over strategic alliances. The rationale following this type of outcome and our hypothesis in existing literature has mainly been linked to a resource point of view (Tsang 1998; Schweiger & Weber 1992; Dyer et al. 200; Taifi 2007 and Vyas et al 1995). With resource we are considering the full encompassing terminology considering all resource forms from capital to knowledge to human. Research shows that when considering human resources, M&A agreements are perceived with hostility by companies' employees. This hostility may cause dissatisfaction which may result in the loss of key employees (Yin & Shanley 2008 and Dyer, Kale & Sign 2004). On the opposite side of the coin, firms which rely on asset specific capital, will be more inclined towards M&As in order to decrease redundancies and increase effectiveness through economies of scale. These considerations are all confirmed by our numerical results and thus our third proposed hypothesis is confirmed. It must also be noticed that this effect in the model is quite strong.

In the model we have also considered market volatility as a control variable. When considering market volatility, we are looking into the uncertainty related to the market since the stock market volatility often reflects industry shocks. The slight increase in probability in M&A is a signal to confirm the fact that agreements are reached in order to decrease uncertainty. Hybrid demand and competition

The second part of this discussion comes from the descriptive analysis that have been made on the sample of M&As collected. This kind of data will allow somewhat a preliminary exploratory type of research which may be deepened in future studies.

The first group of industries that we shall discuss is related to a subgroup that present a polarization towards cross industrial agreements: Saving and Loans, Mutual Saving Banks; Investment & Commodity Firms, Dealers and Exchanges and Other Financial. A clear common element which can be seen among these industries is that they are all part of the greater macro area of the financial sector. We assume that the reason for which these firms present a high level of cross-

industry agreements is due to the very nature of the transactions that happen in this economic environment. Stock exchange markets, for example, are not industry specific and investors do not need to be able to undertake the tasks that each firm does. Acquisitions happening with a firm in the financial sector as the parent company usually justify the input with funding necessities and not by reasons related to specific asset or capability requirements. By not needing to learn and apply the skills necessary for the target firm's production, we suppose that the acquisition process is probably faster. In particular, when looking at listed firms, it must be noted that often ownership is transferred in purely banking financial transactions.

It may be interesting to look at the industrial indexes and shape. When looking at the industrial characteristics related to these sectors we can see that all three are all labor intensive, present low to moderate levels of concentration and low levels of innovation. However, given the previously discussed nature of these sectors, we assume that this agreement polarization is not given by hybrid demand or competitive reasons but rather by the very nature of the financial sector.

Still looking into the industries that present a polarization towards cross industrial M&As, a different situation is shown when considering the other three sectors: Communication Equipment, Computer and Office Equipment and Leather and Leather Products. Differently from the first group of three discussed, these industries are quite different one with the other, thus we shall consider the agreements made more in detail and try to assess whether this polarization may be explained by demand purposes.

When looking at the industries that have been connected through these M&A agreements, we see that in case of the Communication Equipment and Computer and Office Equipment two common target industries are Prepackaged Software and Business Service. We assume that both these industrial crossing may be related to an attempt to increase product quality and better fit demand. This is assumption is drawn from the similarity of core activities undertaken in firms in these industries and realms of which they are part of.

For the Leather and Leather Products, instead, we suggest that agreements are probably mostly determined by vertical integration purposes as the industries may all be connected a same larger industry sector (i.e. Miscellaneous Manufacturing, Wholesale Trade, Retail Trade: General Merchandise and Apparel and Textile and Apparel Products) but present in different places in a value chain.

This suggests that the rationales justifying the M&As are given by two different drivers: in the first case firms are trying to improve their product and reach a larger demand while in the second, the agreements are justified by economic and cost saving reasons. More specifically, by indulging in M&A agreements explained through a vertical integration design. Moreover, we believe, that with these agreements, the firms avoid incurring into dissatisfaction by their employees as their everyday work life is not touched.

When looking at the industries which are polarized in an opposite way (i.e. Agriculture, Forestry and Fishing; Air Transportation and Shipping; Food and Kindred Products; Health Services; Hotels and Casinos; Insurance; Oil & Gas, Petroleum Refining; Retail Trade – Eating and Drinking Places and Transportation and Shipping (except air)) no visible similarity among them can be found through the descriptive statistics. Further analysis and data would be needed to assess the true reason explaining this phenomenon. What we can see, however, is that even when the M&A agreements were not signed within the same industry, they were primarily signed in "sister" industries in which activities highly related to their core businesses are performed. Vertical integration and related diversification may be possible strategic reasons driving these choices. For example, in the Food and Kindred Products cross industrial agreements are signed primarily within the Wholesale Trade (i.e. vertical integration of the distributor) or Agriculture, Forestry, and Fishing (i.e. vertical integration of the raw material for production) industries. In the Agriculture, Forestry, and Fishing, instead, most cross industry agreements have been made within the Wholesale Trade of Non-Durable Goods and in the Hotels and Casinos industry most agreements have been made within Amusement and Recreation Services (i.e. highly related to Casinos) and Real Estate; Mortgage Bankers and Brokers.

MANAGERIAL IMPLICATIONS

The aim of this paper is to address the topics of M&A and strategic alliances, giving particular attention to drivers moving management in their decisions. We shall now go into depth of what could be the implications that managers and government authorities may make basing on the presented research.

Before we start this discussion however, we must advance a preliminary specification. The managerial implications that are going to come as a result of this analysis alone will not guarantee sure success of the M&A or strategic alliance. It must be kept in mind, that as of now, both agreement types often fail. Failure is connected to post-performance management of the agreements as it presents high degrees of complexity. This specification has been made also becuase, it has been studied that opportunistic behavior of the involved parties often determined the success of the collaboration agreement (Shakeri & Radfar 2016).

We believe that this research may be useful for three different categories: managers who must make organization wide decisions regarding merging or alliance strategies; marketing managers who must decide on new products and, finally, government authorities.

Research states that often firms' behavior is significantly moved and inspired by other players in theindustries (Yin and Shanley 2008and Shamsie 2003). With this paper in fact, we want to present a useful framework that managers may actively use when considering whether to choose an M&A or a strategic alliance. Looking at industry wide trends may be a useful benchmark not only to choose the type of agreement but also to see in what type of integration (i.e. vertical or horizontal) are fellow competitors investing in.It may help to emulate successful moves of others in case of a reactive or emergent strategy plans. With respect to marketing managers, this kind of information may be used as a tool to engage in differentiation purposes.

When looking at trends in "sister" industries, managers may anticipate innovation and adopt them before competitors. This stands particularly when we are considering developments in hybrid competition. Also, when looking at distribution or expansion plans in new segments or markets, it may be extremely helpful to see if there are macro structures of vertical integration controlled by few players. These large entities may cause high entry costs for the entering company.

Highly concentrated markets with high levels of M&A agreements may suggest highly competitive environments in which entrance may not be attractive.

Finally, government authorities, may use the results presented in order to detect possible anti-trust breaches. If authorities are able to see in which industries M&As are most present, they are able to detect possible irregularities. Moreover, this research may help government authorities to see a snapshot of the shapes of the various industry structures present in the market, or simply see where they are converging to and possibly act on them. For example, in high innovation low concentration industries, governments may decide to make micro-subsidies for small and emerging industries. These funds are necessary in order to foster technological development and growth, two aspects which are fundamental for an economy's health. In case of highly concentrated markets with a high ratio of M&As, instead, they may decide to look into redefinition of anti-trust regulation or taxation norms.

In general, adopting an easy and straightforward model which is moved by few clear indexes may be easily understood and adopted by many as a tool in aiding strategic decisions of various types.

LIMITATIONS AND FUTURE RESEARCH

While we have tried to complete this paper as truthfully and thoroughly as it was possible for us, we have to acknowledge several limitations to the study. We shall now display the limitations that we have recognized and offer potential solutions for them, as well as give insights to possible future research.

As has been previously anticipated in the results section our R-squared was very low. We believe that the reason for which this happened is mainly related to the low variability of the data in the sample. The R-squared measure shows how much of the dependence variable's variance is explained by the independent variables in the model. When a category is underrepresented, the variability that it could explain is lost. We shall now consider the data of the sample and highlight in what cases we are presented with low levels of variability. First of all, the distribution between strategic alliances and M&A agreements is not proportional. More specifically, the sample is composed of a 15.4% of strategic alliances and an 84.6% of M&As. The balance between the two types of agreements is not equal. Secondly, among the agreements we have a strong prevalence of certain industry sectors over others (i.e. Business Services alone account for 15.5% of all agreements). The strong prevalence of one industry sector over the other also diminishes the total variability of the indexes' distribution in the sample. In future research, one should try and create a proportion based database for the number of agreements and industries by creating, for example, identifying strata. However, it must be noted that deep knowledge of specific industry movements should be necessary in order to assess the weights.

A second limitation, we assume, is related to the calculation of the HHI index. In order to calculate a reliable HHI index all market shares in a specific industry are necessary. Within the data that was available to us to calculate the HHI, missing data was present. We assume that depending on state regulations, firms may use different standards to calculate company revenues, which are at the basis of our calculation. A unified standard of balance sheet calculation would be necessary for all companies.

While staying in the realm of the index calculation, we believe that also in case of the innovation index that we have used, a more detailed source of data may be necessary. For example, instead of considering the number of patents per

technology it may be useful to have an industry sector based database, possibly for more specific industry classes.

Lastly, we believe that it would be interesting to add year control variables. While it was our intention to add this element in our analysis as they may signal a difference in yearly trends, due to the current pandemic Covid-19 situation, we were unable to retrieve the necessary data for logistics reasons. Difference in years will not only add variability to the sample, but it may also highlight above average agreement activity in one year or another.

Furthermore, we suggest that it may interesting in future research to consider industry agreement success rates in order to give a more complete analysis of the phenomenon and further aid to managers who are using the model to choose what type of agreement to sign. Another interesting view to take into account may be to look at the drivers for a specific industry. This kind of analysis may represent a way to identify commonalities within firm specific characteristics.

Lastly, while this analysis focuses solely on the United States' market, new studies could see if similar behaviors and industry trends are present also in other countries and continents.

EXECUTIVE SUMMARY

Introduction

Business ecosystem is a key concept that is nowadays ever more present in managers' minds and is studied in many industrial business articles and research papers. A business ecosystem is the network of all actors that take part in the creation and delivery of a product and it includes all entities involved in the activities (Basole et al 2015). Similarly to what happens in nature, firms within an ecosystem may either survive or cease to exist (Moore 1993). For this reason, in an increasingly globalized world, the concept of business ecosystems is of upmost importance in every firm's mind and it is seen as a fundamental way to gain knowledge, know-how and a stable competitive position within a market. Research suggests that firms can't live in isolation, but rather, must interact with one another. Interacting through cooperation and competition, in fact, firms are able to innovate, support each other and progress (Moore 1993).

Ecosystems and its benefits may be achieved either through geographical vicinity or through proper formal agreements. When looking at the benefits derived from being closely located, research has shown that firms with similar businesses are able to create and exploit of ecosystem benefits such as information flow or shared risk (Downing 2018; Mccan, Reuer & Lahiri 2016 and Schilling & Phelps 2007). When discussing formal agreements, instead, working with other industry players may happen through strategic alliances or Mergers and Acquisitions. Strategic alliances see firms pooling resources for specific projects or for a limited amount of time, in a relationship which ends as the contract expires. Mergers and Acquisitions (M&A), instead, fund their idea on an exchange of shares. In detail, Mergers usually happen among parties of similar sizes (i.e. merger of equals) who create a new company by the union of the two and acquisitions usually involve a takeover in which the acquired company legally ceases to exist (Gomes 2011). However, differentiating between mergers and acquisitions in practice is not easy as they are often referred jointly as M&A (Gomes 2011). This paper will focus on ecosystems created through these formal agreements.

Because of the fundamental differences among them, in the moment of choice between M&As and strategic alliances, studies argue that managers won't consider both options thoroughly enough as to select the correct one (Dyer, Kale & Singh 2004). Several reasons have been found to be the cause of this. The first thing that has been noticed is related to the fact that they are rarely perceived as comparable alternative options (Yin & Shanley 2008). Also it has been shown that the choice between strategic alliances versus M&As is determined by prior experience in agreements made by the same firm (Villalonga & Mcgahan 2005) Managers will in fact follow previous decisions made by the firm without evaluating the alternative as if it were within the firm's practices. Choosing the wrong option may result in failure of the move. Given the high risk and high investments that both agreements intrinsically carry, this may impact the company negatively. These agreements are in fact very complex strategic moves to keep in the long run.

When considering M&As, tension in management arisen from the merging action and other internal issues have often created significant problems in companies and distanced managers' focus from customer related issues (Homburg & Bucerius 2005). Academic studies have found that, more often than not, mergers are unsuccessful also because key objectives, such as share price increase, are not reached (Rahman & Lambkin 2014). However, even given these findings, M&As are still happening, with a 7% growth in value of agreements just in 2019 (Boston Consulting Group 2019). A recent example could be LVMH's acquisition of Tiffany last November (LVMH 2019), with a deal worth $16.2 billion (CNN 2019).

Alliances, on the other side, are less binding than M&As as they have a time limit and solely involve pooling resources and for this reason are generally perceived as less risky than M&As. However, strategic alliances too present many complexities and often fail. Alliances among competitors, for instance, fail because of firms pursuing their own interests. (Ho Park & Ungson 2001). Confirming this theoretical suggestion, lack of trust towards the opposing party has been identified as one of the elements that still fail to be present in many alliance agreements (Deloitte 2019).

In general, as has been previously pointed out, collaboration is still necessary. At the basis of both types of agreements, in fact, motives which push managers to consider collaboration with other actors are related to resource requirements (Park & Ungson 2001), consolidation motives (i.e. to strengthen one's position in a market), diversification motive (i.e. in order to acquire knowledge or economies of scope) (Swaminathan, Murshed & Hulland 2008 and Luo 2007) and motives related to a response to environmental uncertainty (Burgers, Hill & Chan Kim 1993).

Theory on M&As and strategic alliances is copious and has received increasing attention starting from the 1990s. We assume, to the best of our knowledge, that there is a gap with respect to an industry based analysis of drivers of M&As vs strategic alliances. While single industries have been analyzed in previous research, the relationship between M&As and strategic alliances has not been analyzed considering more sectors simultaneously. Our question, thus, is whether there exist resource-based industrial elements that could influence the choice between M&As and strategic alliances. In detail, we want to see if industry concentration, innovation level and capital intensive vs labor intensive industry represent significant drivers for the choice between M&As and strategic alliances in different industries.

The analysis will take into consideration quantitative data related to a number of industries and consider them within a model. On one side, the scope is to determine whether and which are specific aggregate industrial elements driving firms to either M&As or strategic alliances and on the other side, comparisons will be made cross industry trying to look for common trends. We will see that the underlying guiding line of the decisions is related to resource necessities. This study will analyze the aggregate levels of industry concentration, innovation and capital intensity vs labor intensity. By looking into these elements this research adds to resource dependency theory which focuses on the idea that resources are the

elements that shape firm behavior (Tsang 1998). The underlying assumption, in fact, is that specific resources and capabilities are somewhat intrinsically tied to each firm and that, at times, it is necessary to unify with other entities in order to acquire these resources and capabilities. More specifically, we will contribute to resource dependency theory by showing that resource necessities in an industrial context determined by industry concentration, innovation development and capital vs labor intensity, will influence managers' choice between M&As and strategic alliances.

From a managerial point of view, we believe that this study will aid both managers and government institutions. This approach will help managers by contributing to business governance strategy theories by giving a data-based tool to evaluate whether strategic alliances or M&As are to be preferred and help government institutions who deal with anti-trust legislation or financial regulations. By including industry concentration in our model, in fact, this research will attempt to capture the dynamic convergence of competitive environments giving insights on industrial structures.

As a *post hoc* consideration, this study will also briefly consider the concepts of hybrid competition and hybrid demand, trying to see to what extent, within the selected sample, are cross-industry agreements present and whether consistency within industry class is present. The aim of this second section of the study is to assess whether firms may be drawn to expand their original domain through conglomerate agreements due to necessities to differentiate in hyper competitive environments or to accommodate an increasingly sophisticated demand (Ancarani, Costabile & Valdani 2009 and Ancarani & Costabile 2010).

Conceptual Framework

The aim of this paper is to examine several motives in order to find similarities in the strategical plans which determine M&As or strategic alliances among different industries. Finding solid basis justifying the choice of M&As over strategic alliances which may be recognized in industry trends could help in developing rational *modus operandi* which may be used by managers. We propose that the formation of merger or alliance agreements may be driven by the following factors: industry concentration; innovation and capital intensity vs labor intensity. All criteria for the identification of variables shall now be outlined individually.

Industry concentration Merger and alliance agreements are based primarily on strategic and/or competitive ideals. Therefore, in order to find and express common elements for management decisions, it is necessary to understand the competitive environment in which the firms have to interact. Consideration of the context in which these happen is important as researchers suggest that industrial environments have a significant effect on how decisions are made (Yin & Shanley 2008). Thus, often, firms belonging to the same industry will act in similar ways to answer to market requirements (Yin & Shanley 2008).

Evaluating the competitive context is necessary as interactions between firms will also depend on the relative role and power of the firms entering in the agreement. Relative bargaining power, given by the

number of players and their position in the value chain, may change dynamics and balances among the companies involved in the agreement. Consequently, it may be speculated, that competition and motives driving small firms are different from those driving large firms as requirements and concerns are different. For example, very large firms must consider incurring in problems with anti-trust regulations when engaging in merger agreements while small players don't (Burgers, et al. 1993). Smaller firms with lower bargaining power and market share, instead, not being able to exploit economies of scale, may, for example, need to join with partners in order to diminish risks (Tse & Soufani 2003) and get access assets and distribution channels which more powerful players are able to achieve.

With respect to the type of agreement chosen, it must be noted that some conflicting data on trends regarding M&As versus strategic alliances exist with respect to firm size, the number of players in a market and consequently concentration. Yin and Shanley (2008) in their paper suggest that M&As will be more likely in industries with many players since agreements are more feasible as institutional scrutiny is lower and there are more partners to choose from. A more recent paper by Bengtsson et al (2016), instead, suggests that key drivers are embed in needs of independence and flexibility and that in markets with many small to middle sized firms, alliances are generally favored. Agreement flexibility will allow these firms to respond to environmental uncertainty and frequent changes derived from competitive dynamism.

While this paper, by including industry concentration in the analysis, will provide direct insight on this theme, for the formulation of this hypothesis, we have chosen to follow the Bengtsson et al. paper. The findings presented in this article are more in line with others that have been found on the topic. More specifically, several research papers highlight the intrinsic need for flexibility and independence in emerging markets which is granted by an alliance. This choice is justified by the considerations made on the basis of market share. In markets with many players, uncertainty levels are high and market share growth can be achieved by growing faster than competitors as no major players have yet established (Edeling & Himme 2018). These highly dynamic environments with possibility of unexpected change in power balances require great firm responsiveness and prompt adaptation. Alliances will thus be preferred. In moderately to highly concentrated markets, instead, market share is particularly important as its effects on profitability are stronger than they would be in more diluted markets (Edeling & Himme 2018). Therefore, in case of highly concentrated markets, M&As with competitors represent a sure and effective way to achieve market share in the industry in which a firm belongs (Thompson et al 2017 and Edeling & Himme 2018). It must be noted that market share is particularly relevant to this discussion as industry concentration is calculated on the basis of the market share of each firm. In relations to market share, an interesting empirical explanation for the increasing happening of agreements in line with ecosystem building is represented by the "Rule of Three" (Uslay, Altinting & Winsor 2010). This rule states that an optimal industry structure will see three generalists (i.e. large firms accounting for 50% - 90% of the market share in total, each with a 10% - 40% share) and many specialists (i.e. small firms accounting for

less than 5% of the market) competing among each other (Uslay et al. 2010). Another branch of research analyzing drivers for M&As and strategic alliances is related to entry barriers and resource requirements. As a matter of fact, as concentration rises so do entry barriers and firms lacking resources may not be able to overcome them alone (Cotterill and Haller 1992). For this reason, in this case we suggest that M&As represent a viable market access option. On the opposite side, industries with many players and a decentralized power are often characterized by low-entry barriers which create fast entry and exit for competitors (Downing 2018). We suggest that this environment would then encourage resource collection through strategic alliances.

We propose that when industrial structures present high levels of industry concentration (i.e. with few players controlling most of the market share), market players will mainly engage in acquisitions. When the environment presents a decentralized (i.e. low concentration) and segmented power structure (i.e. with numerous players controlling low market shares), instead, firms will engage in alliances. Therefore, the first hypothesis that will be examined is:

H1: M&As will be positively correlated with highly concentrated industries over strategic alliances

Innovation Technological development in the past decades has been moving fast and still shows no sign of stopping. As innovation creates benefits for most, it carries uncertainty and change in power equilibria. Firms in all industries must be flexible enough to absorb all changes coming with the novelty, so to offer products which are up to date and to ensure a stable competitive position in the market. When perceiving changes in business environments, managers must respond immediately to guarantee growth and survival (Lòpez-Gamero, Molina-Azorìn & Claver-Cortés 2010). These types of radical activities often require significant funding and resources. As can be drawn from resource dependency theory, when resources are not promptly available, firms will behave accordingly in order to acquire them and may engage in agreements with other players in their industry. The simultaneous model of innovation, as well, suggest that it is fundamental for firms to involve other competitors and external entities in order to foster innovation (Jorde & Teece 1990). Through collaboration, in fact, firms will be able to engage in risk and resource sharing. Cooperation among firms may be triggered by R&D-related expenses, short product life and convergence of technology as it allows for firms to gather the necessary resources (Gnyawali & Byung-Jin Park 2009). As companies need to accommodate the demand of customers who ask new technologies, cooperation increases (Luo 2007).

As of now, only elements pushing firms to collaborate have been examined, we shall investigate when strategic alliances are favored over M&As and vice versa. While, resource requirement and dependency are at the basis of the need to collaborate, information and transaction costs will determine the choice between M&As and strategic alliances.

Strategic alliances by being less binding and characterized by a pre-set time limit, in environments which are subject to frequent changes are favored to more intense moves such as M&As. This happens since they are able to ensure flexibility and possibility to opt out from them when needed (Li, G. Qian & Z. Qian 2011) allowing prompt adaptation to changes (Bengtsson et al. 2016 and Luo 2007). This kind of flexibility in highly innovative environments is required as uncertainty and market changes are high and costs of adverse selection may be too much to bear if firms were to engage in deeply binding contracts. In more static industries instead, these characteristics may be seen as secondary. The environment is less volatile and deep knowledge regarding the prospect partner may be achieved. Research suggests that firms will be interested in highly binding agreement, such as M&As, only when problems of adverse selection may be avoided, and thus, when competitor's and environment information is clear and established (Mccan, et al. 2016). In collaboration agreements, information regarding the other party's specific knowledge is fundamental (Gnyawali & Byung-Jin Park 2009). In general, partner-specific knowledge has been shown to be one of the main elements determining the tipping decision between M&As over strategic alliances (Wang & Zajac 2007). Therefore, we suggest that in low innovative industries M&As will be the favored strategic move.

Hence, the following reasoning is proposed. To achieve the necessary but unavailable resources, as stated by the resource dependence theory, firms will collaborate. In industries with low uncertainty and high predictability of the market, firms can know other players deeply and will be inclined to choose stable agreements. As traditional game theory concepts of repeated games suggest, players will be more inclined to collaborate without defecting on a potentially infinite horizon. This entails that firms will be more willing to arrange binding types of agreements such as M&As. In highly dynamic industries, with frequent innovation and technology shocks, uncertainty and sudden development in the market will push industry participants to engage in strategic alliances in order to counteract to external forces driven by novelty while ensuring strategic flexibility. In the alliances, firms will share resources and work together to accomplish required levels of innovation. Therefore, the hypothesis that will be examined is:

H2: High industry innovativeness is positively associated with strategic alliances over M&As

Capital intensive vs labor intensive The third element that shall be addressed is related to the nature of assets of the firms within the industry. This means differentiating between prevalently capital intensive and labor intensive industries.

With capital intensive we mean industries in which firms need high levels of investments on capital assets necessary for production (Weil 2016). In construction industry, for example, capital investments and fixed assets represent a significant part of firms' operations. Labor intensive industries, on the contrary, are those in which most of the production is done by labor and low levels of capital investment are required (Weil 2016). In service industry, for example, higher importance is given to human resource and

knowledge and the concept of intangibility is at the very core of the offering type (Vargo & Lusch 2004), with some business models consisting of no fixed assets at all (Andreassen, Lervik-Olsen, Snyder et al 2018).

With respect to M&As and strategic alliances, attention given by research to capital or labor intensity specifically is scarce. What has been thoroughly discussed, instead, is the management of knowledge, human resource and specific asset requirements. We suggest that these elements can be useful for the formulation of our third hypothesis, given that they represent key differentiating factors between capital intensive and labor intensive industries. We suggest that in labor intensive industries, alliances are to be preferred to M&As. More specifically, when looking at knowledge, studies show that in industries in which knowledge is intensive and quickly becomes obsolete, alliances will be preferred given the intrinsic flexibility of the agreement type (Yin & Shanley 2008 and Vyas, Shelburn & Rogers 1995). This will grant firms with the ability to end the agreement when its purpose has been served. When considering human resources, as well, academics suggest that in human asset intensive firms, since these represent the key of the added value of the agreement, acquisitions are to be avoided since attrition may happen due to feelings of dissatisfaction of employees (Dyer, Kale & Singh 2004). In particular, expert and specialized human resources, which can easily move from one company to the other, may decide to move away from a firm involved in the M&A (Yin & Shanley 2008). On the other side, firms which depend on specific types of assets for production, will most likely prefer to engage in M&As so to have more control over the level of technical knowledge leaks and processes (Yin & Shanley 2008). These industries will be interested in merging with the objective of reducing redundancy and increasing effectiveness (Wang & Zajac 2007). As efficiency theory suggests, with increased production, firms will be able to exploit economies of scale and thus reduce costs (Edeling & Himme 2018). The economic motive to collaborate for asset intensive firms is thus determined by lower costs of production given by efficiency and increased productivity (Seth 1990 and Luo 2007).

Following the resource dependence theory, we propose that, in order to achieve the necessary resources (i.e. capital or knowledge and human assets) firms will engage in either one of a M&A or a strategic alliance. The type of agreement to be chosen will depend on the resource needed which will be conditional on the industry characteristic (capital intensive vs labor intensive). Specifically, in case of capital intensive industries M&As will be favored over strategic alliances. In case of labor intensive industries, the opposite will happen. Therefore, the following proposition may be made:

H3: M&As will be positively correlated with capital intensive industries over strategic alliances

Hybrid Competition and Demand Another element which may be interesting to take into consideration as a driver of collaboration is related to the idea of hybrid competition. Market development and changing demand have caused the unification of sectors which once were perceived to be distinct,

giving primary importance to the theme of *convergence* (Ancarani et al. 2009 and Ancarani and Costabile 2010) in the determination of hybrid competition. Convergence happens whenever boundaries between diverse industries are crossed creating products that bring added value to customers by being a crossover of two industries (Ancarani and Costabile 2010). Three main convergent factors have been identified as main drivers of this phenomenon: technology, competition and demand.

More specifically, it has been said that hyper competition diminishes the advantages that a company may achieve, thus, creating new products that overlap over more industries helps in satisfying today's highly sophisticated demand, in which consumers search differentiation and abstraction of values (Ancarani, et al. 2009). This process is possible thanks to the development of technology which allows firms to unify previously distinct sectors (i.e. food and pharmaceuticals) (Ancarani, at al. 2009).

From a marketing point of view, as well, convergence may be justified as a way to achieve a simplification of consumers' processes of choice which may be achieved, for example, through a technical or symbolic bundling, through co-branding or the production of multifunctional products (Ancarani, et al 2009). Unifying more industrial areas is also beneficial for the simplification of consumers' choice process by giving them all products necessary in one bundle without having them to choose twice. Moreover, once technological impulses settle, managers will strive for convergence as a way to branch out and offer novelty to consumers (Ancarani, et al. 2009).

Convergence, as previously briefly discussed is obtained from the overlapping of different industries. Branching out to new frontiers is not immediate and may often require the intervention of external actors (Thompson et al 2017). Companies may achieve these new capabilities through acquisition of firms which are specialized in the required sector, by hiring specialized personnel or through time-limited contracts with third parties (Thompson et al 2017). As a matter of fact, alliances made to contrast hybrid competition and to gather new resources which elude the company's core business are frequent and have also been referred to as "alliances of scope" (Ancarani, et al. 2009). We shall see whether this phenomenon is present in some of the industries under examination in this study and try to assess the underlying rationales.

Methodology

In order to test the proposed hypothesis, all US agreements regarding M&As and strategic alliances in the past five years were gathered from the Reuter's SDC Platinum database. Industry categorization for each firm was defined according to the Standard Industrial Classification (SIC), so to be able to identify patterns within and among industries.

Industry concentration was classified through concentration index calculations using a Herfindahl-Hirschman Index (HHI) and then reported in a three-point interval scale (i.e. Low concentration, Moderate concentration and High concentration). More specifically the index 1 was given when HHI<0.15; the index

2 was given then $0.15 \leq$ HHI < 0.25 and index 3 was given when HHI ≤ 0.25. Market shares have been calculated from the revenues for each company in an industry classification accordingly with the SIC primary representation. Data for this ratio has been gathered from balance sheet data for the period 2015-2020 from Wharton Research Data Services' Compustat database and cross compared with the US Government Economic Census. All revenue data has been gathered in US dollar ($) currency. With respect to the level of innovation present in the industry a numerical value will be attributed to each industry based on the number of patents issued for all firms in the same industrial sector within a given period. More specifically, a five-point scale (Low Outlier, Low Spending, Medium Spending, High Spending and High Outlier) was defined basing on the average of the number or patents issued in the years 2010-2018. Finally, capital intensive and labor intensive was represented through the use of a dummy variable (i.e. 1= capital intensive, 2= labor intensive). This dummy was based on capitalization ratios and labor ratios and industry specific research.

In order to test significance for each variable, a Logistic Regression model will be set with the Type of agreement as a binomial dependent variable (i.e. 1=M&As, 0= Strategic Alliance) and all other as independent covariates. For all independent variables, significance and impact will be tested.

In order to be clear of issues related to endogenous variables, two control variables have also been added: total market value and market uncertainty.

Hybrid demand and hybrid competition descriptive data on the types of M&As that have been made has been collected from previously discussed sample of agreements collected from the Reuter's SDC Platinum database. Descriptive statistics have been gathered on a sample of US M&A agreements. Difference in frequency between the amount of within-industry vs cross-industry agreements has been assessed.

Results

The sample presents a total of 50951 agreements of both M&A and Strategic Alliances. Most of these agreements belong to labor intensive industries (75.4%). Innovation index level is mainly represented by industries with a level of 1 (i.e. low outlier level of innovation) (61.6%) followed by those with an index of 2 (i.e. low level of innovation) (16.2%), 3 (11.9%) and lastly 5 (10.3%). Industrial concentration as well is mainly represented by industries with an index level of 1 (78.9%), followed by moderately concentrated industries (i.e. index level 2) (18.7%) and finally by highly concentrated industries (2.3%) (i.e. index level 3).

Logistic Regression - Main model This model has been built with three categorical variables and a metric control variable as independent variables and a binomial dependent variable. The categorical independent variables are "HHI index"; "innovation level" and "capital intensity and labor intensity" and two control variables of market volatility and market size. From the results, we can say that the model is

significant (χ^2(19, 50951) =4290.092; p=.000). What must be noticed, however, is that it presents a low Naglekerke R-squared (Naglekerke R^2=0.14). Possible explanations of this result will be later addressed in the limitations section. From the classification table, when the cut-off is set at 0.5, we can see that the Hit Rate of the model is very high (HR=84.7%).

Main effects. When considering industry concentration levels, confirming the proposed hypothesis, probabilities for M&A agreements over strategic alliances increases as the level of concentration rises. When looking at a moderately concentrated industry (i.e. index level 2) (β=1.229, p=.000), according to the change in odds, M&As will be 2.4 times more likely to happen than in a scarcely concentrated industry (i.e. index level 1). In case of highly concentrated industries (i.e. index level 3) (β=2.348, p=.002), the change in odds ratio is of 9.460. As suggested from the hypothesis we see that as innovation increases, the likelihood of a M&A happening diminishes. More specifically we see that, with respect to an industry with a "low outlier" level of innovation (i.e. index level 1), all else equal, the odds ratio for M&As to happen decreases odds of 56.1% in case of a "low" innovation industry (index level 2) (β=-.822, p=.000) and decreases odds of 97.9% in case of a "high outlier" innovation industry (index level 5) (β=-3.860, p=.000) over strategic alliances. Finally, in capital intensive industries (β=2.233, p=.000), also confirming the proposed hypothesis, changes in odds suggest that M&A agreements will have an increase of 8.3 times from the original value or are 89.3% more likely to happen compared to labor intensive ones over strategic alliances if we were to keep all other variables equal. The control variable that was added, total market value, has no impact on the likelihood of M&As happening (β=0.00 p=.000). Increasing market volatility of one unit (β=.335; p=.000), instead, all else equal, changes in odds increase of 0.398 or the likelihood of M&A happening increases of 28.5%.

Hybrid Demand and Hybrid Competition Descriptive data on frequency has been done to analyze and identify the sectors in which cross-industry agreements were most present. The descriptive data considered shows that, in most cases, industries present an equal share of cross industry vs same industry agreements. Polarization towards one or the other can be found in a few industries. We shall now analyze them and see whether the industries presenting a frequency of one of the two is equal or above 70.0% have similar elements. In this group we find Saving and Loans, Mutual Saving Banks; Investment & Commodity Firms, Dealers and Exchanges and Other Financial. Frequency of cross industry M&As are respectively: 86.0%, 92.3% and 70.0% and Communication Equipment, Computer and Office Equipment and Leather and Leather Products. These last three sectoris present frequencies of cross-industry M&As of respectively: 77.7%, 85.0% and 75.8%.

We shall now consider those industries with an opposite polarization, hence those that present primarily agreements within the same industry (i.e. inter-industry agreement equal or above 70%). In this group we find Agriculture, Forestry and Fishing (72.4%); Air Transportation and Shipping (71.6%); Food and Kindred Products (72.9%); Health Services (83.3%); Hotels and Casinos (82.0%); Insurance (78.8%);

Oil & Gas, Petroleum Refining (73.5%); Retail Trade – Eating and Drinking Places (80.0%) and Transportation and Shipping (except air) (72.3%).

Discussion

The aim of this research is to identify the drivers that push firms towards either M&As or strategic alliances on an industrial base differentiation. The results of this study contribute, generally, to literature on M&As and Strategic alliances and business governance theories. In particular, by considering the three elements of industry concentration, innovation and capital intensity vs labor intensity, it contributes to resource dependency theory as all of the hypothesis use its propositions as the main underlying rationale. Resource necessity will in fact be at the basis of the move. We shall now analyze in detail the implications that can be drawn from the results.

Main Model Previous studies on M&As have suggested that pre-existing industrial dynamics and norms shape the behavior of firms (Yin & Shanley 2008, and Shamsie 2003). For this reason, the model has taken into consideration industry wide indicators and considerations will be made on the basis of industries and not firms characteristics alone.

When looking at concentration and the choice between M&As and strategic alliances, previous studies have made considerations and assumptions for both scarcely concentrated industries and for highly concentrated ones. On one side, studies have shown that smaller entities in industries with a decentered power balance preferred strategic alliances over M&As (Bengtsson et al. 2016 and Luo 2007). On the other, in highly concentrated industries it has been studied that major entry barriers and market share rationales drive firms to prefer M&As over strategic alliances (Downing 2018 and Edeling & Himme 2018). These statements are confirmed by our model and data, as probability for the incidence of M&As rises proportionally along with industry concentration. This means that as industry concentration increases, the likelihood of an M&A happening over a strategic alliance increases as well. These findings confirm the proposed hypothesis H_1. Moreover, high concentration (i.e. HHI index level of 3), among the variables considered, has been found to be the strongest variables pushing towards M&As as its coefficient is higher than others.

When looking at our second hypothesis on innovation, previous studies have focused on uncertainty of demand and competition (Burgers et al. 1993) and resource dependency (Tsang 1998) as fundamental drivers for collaboration. Research has specifically addressed the need for collaboration in case of high level of technological development as a way to absorb shocks and avoid being obsolete (Luo 2007, Jorde & Teece 1990 and Gnyawali & Park 2009). As a consequence of the uncertainty carried by innovation, alliances are generally preferred. This is mainly due to the intrinsic flexibility granted by this kind of agreement. (Li & G. Qian 2011; Yin & Shanley 2008 and Z. Qian 2011). Our proposed hypothesis was formed basing on their conclusions and has been confirmed by the data as well. Our findings show that

increasing innovation levels push firms to choose strategic alliances over M&As. From the data we can infer that industry innovation level has a very strong effect on choice between strategic alliances and M&A. However, it must be said that the intermediate level of "moderate innovation" (i.e. index level 3) came out as non-significant, thus, no conclusions may be drawn from it. We assume that this last non-significant result may be a product of a low variability in the data set. This concept will be further analyzed in the limitation section.

In a similar manner to the first two afore mentioned hypotheses, also the third hypothesis on capital intensity vs labor intensity has been confirmed. In capital intensive industries, M&A agreements are more likely to be chosen over strategic alliances. The rationale following this type of outcome and our hypothesis in existing literature has mainly been linked to a resource point of view (Tsang 1998; Schweiger & Weber 1992; Dyer et al. 200; Taifi 2007 and Vyas et al 1995). With resource we are considering the full encompassing terminology considering all resource forms from capital to knowledge to human. Research shows that when considering human resources, M&A agreements are perceived with hostility by companies' employees. This hostility may cause dissatisfaction which may result in the loss of key employees (Yin & Shanley 2008 and Dyer, Kale & Sign 2004). On the opposite side of the coin, firms which rely on asset specific capital, will be more inclined towards M&As in order to decrease redundancies and increase effectiveness through economies of scale. These considerations are all confirmed by our numerical results and thus our third proposed hypothesis is confirmed. It must also be noticed that this effect in the model is quite strong.

Hybrid demand and competition The second part of this discussion comes from the descriptive analysis that have been made on the sample of M&As collected. This kind of data will allow somewhat a preliminary exploratory type of research which may be deepened in future studies. The first group of industries that we shall discuss is related to a subgroup that present a polarization towards cross industrial agreements: Saving and Loans, Mutual Saving Banks; Investment & Commodity Firms, Dealers and Exchanges and Other Financial. A clear common element which can be seen among these industries is that they are all part of the greater macro area of the financial sector. We assume that the reason for which these firms present a high level of cross-industry agreements is due to the very nature of the transactions that happen in this economic environment. Stock exchange markets, for example, are not industry specific and investors do not need to be able to undertake the tasks that each firm does. Acquisitions happening with a firm in the financial sector as the parent company usually justify the input with funding necessities and not by reasons related to specific asset or capability requirements. By not needing to learn and apply the skills necessary for the target firm's production, we suppose that the acquisition process is probably faster. In particular, when looking at listed firms, it must be noted that often ownership is transferred in purely banking financial transactions.

Still looking into the industries that present a polarization towards cross-industrial M&As, a different situation is shown when considering the other three sectors: Communication Equipment, Computer and Office Equipment and Leather and Leather Products. Differently from the first group of three discussed, these industries are quite different one with the other, thus we shall consider the agreements made more in detail and try to assess whether this polarization may be explained by demand purposes. When looking at the industries that have been connected through these M&A agreements, we see that in case of the Communication Equipment and Computer and Office Equipment two common target industries are Prepackaged Software and Business Service. We assume that both these industrial crossing may be related to an attempt to increase product quality and better fit demand. This is assumption is drawn from the similarity of core activities undertaken in firms in these industries and realms of which they are part of. For the Leather and Leather Products, instead, we suggest that agreements are probably mostly determined by vertical integration purposes as the industries may all be connected a same larger industry sector (i.e. Miscellaneous Manufacturing, Wholesale Trade, Retail Trade: General Merchandise and Apparel and Textile and Apparel Products) but present in different places in a value chain. This suggests that the rationales justifying the M&As are given by two different drivers: in the first case firms are trying to improve their product and reach a larger demand while in the second, the agreements are justified by economic and cost saving reasons.

When looking at the industries which are polarized in an opposite way (i.e. Agriculture, Forestry and Fishing; Air Transportation and Shipping; Food and Kindred Products; Health Services; Hotels and Casinos; Insurance; Oil & Gas, Petroleum Refining; Retail Trade – Eating and Drinking Places and Transportation and Shipping (except air)) no visible similarity among them can be found through the descriptive statistics. Further analysis and data would be needed to assess the true reason explaining this phenomenon. What we can see, however, is that even when the M&A agreements were not signed within the same industry, they were primarily signed in "sister" industries in which activities highly related to their core businesses are performed. Vertical integration and related diversification may be possible strategic reasons driving these choices. For example, in the Food and Kindred Products cross industrial agreements are signed primarily within the Wholesale Trade (i.e. vertical integration of the distributor) or Agriculture, Forestry, and Fishing (i.e. vertical integration of the raw material for production) industries. In the Agriculture, Forestry, and Fishing, instead, most cross industry agreements have been made within the Wholesale Trade of Non-Durable Goods and in the Hotels and Casinos industry most agreements have been made within Amusement and Recreation Services (i.e. highly related to Casinos) and Real Estate; Mortgage Bankers and Brokers.

Managerial Implications The aim of this paper is to address the topics of M&A and strategic alliances, giving particular attention to drivers moving management in their decisions. We shall now go into depth of what could be the implications that managers and government authorities may make basing

on the presented research. We believe that this research may be useful for three different categories: managers who must make organization wide decisions regarding merging or alliance strategies; marketing managers who must decide on new products and, finally, government authorities.

Research states that often firms' behavior is significantly moved and inspired by other players in the industries (Yin and Shanley 2008and Shamsie 2003). With this paper in fact, we want to present a useful framework that managers may actively use when considering whether to choose an M&A or a strategic alliance. Looking at industry wide trends may be a useful benchmark not only to choose the type of agreement but also to see in what type of integration (i.e. vertical or horizontal) are fellow competitors investing in. It may help to emulate successful moves of others in case of a reactive or emergent strategy plans. With respect to marketing managers, this kind of information may be used as a tool to engage in differentiation purposes. When looking at trends in "sister" industries, managers may anticipate innovation and adopt them before competitors. This stands particularly when we are considering developments in hybrid competition. Also, when looking at distribution or expansion plans in new segments or markets, it may be extremely helpful to see if there are macro structures of vertical integration controlled by few players. These large entities may cause high entry costs for the entering company. Highly concentrated markets with high levels of M&A agreements may suggest highly competitive environments in which entrance may not be attractive.

Finally, government authorities, may use the results presented in order to detect possible anti-trust breaches. If authorities are able to see in which industries M&As are most present, they are able to detect possible irregularities. Moreover, this research may help government authorities to see a snapshot of the shapes of the various industry structures present in the market, or simply see where they are converging to and possibly act on them. For example, in high innovation low concentration industries, governments may decide to make micro-subsidies for small and emerging industries. These funds are necessary in order to foster technological development and growth, two aspects which are fundamental for an economy's health. In case of highly concentrated markets with a high ratio of M&As, instead, they may decide to look into redefinition of anti-trust regulation or taxation norms.

Limitations and Future Research While we have tried to complete this paper as truthfully and thoroughly as it was possible for us, we have to acknowledge several limitations to the study. We shall now display the limitations that we have recognized and offer potential solutions for them, as well as give insights to possible future research.

As has been previously anticipated in the results section our R-squared was very low. We believe that the reason for which this happened is mainly related to the low variability of the data in the sample. The R-squared measure shows how much of the dependence variable's variance is explained by the independent variables in the model. When a category is underrepresented, the variability that it could explain is lost. We shall now consider the data of the sample and highlight in what cases we are presented

with low levels of variability. First of all, the distribution between strategic alliances and M&A agreements is not proportional. More specifically, the sample is composed of a 15.4% of strategic alliances and an 84.6% of M&As. The balance between the two types of agreements is not equal. Secondly, among the agreements we have a strong prevalence of certain industry sectors over others (i.e. Business Services alone account for 15.5% of all agreements). The strong prevalence of one industry sector over the other also diminishes the total variability of the indexes' distribution in the sample. In future research, one should try and create a proportion based database for the number of agreements and industries by creating, for example, identifying strata. However, it must be noted that deep knowledge of specific industry movements should be necessary in order to assess the weights.

A second limitation, we assume, is related to the calculation of the HHI index. In order to calculate a reliable HHI index all market shares in a specific industry are necessary. Within the data that was available to us to calculate the HHI, missing data was present. We assume that depending on state regulations, firms may use different standards to calculate company revenues, which are at the basis of our calculation. A unified standard of balance sheet calculation would be necessary for all companies. While staying in the realm of the index calculation, we believe that also in case of the innovation index that we have used, a more detailed source of data may be necessary. For example, instead of considering the number of patents per technology it may be useful to have an industry sector based database, possibly for more specific industry classes. We also believe that it would be interesting to add year control variables. Difference in years will not only add variability to the sample, but it may also highlight above average agreement activity in one year or another.

Furthermore, we suggest that it may interesting in future research to consider industry agreement success rates in order to give a more complete analysis of the phenomenon and further aid to managers who are using the model to choose what type of agreement to sign. Another interesting view to take into account may be to look at the drivers for a specific industry. This kind of analysis may represent a way to identify commonalities within firm specific characteristics.

APPENDIX

Table 1
Agreement frequency table

M&A/SA

		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	0	7825	15,4	15,4	15,4
	1	43126	84,6	84,6	100,0
	Total	50951	100,0	100,0	

Table 2

Total sample acquiring industry frequency

Acquirer Industry Sector

		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Advertising Services	397	,8	,8	,8
	Aerospace and Aircraft	142	,3	,3	1,1
	Agriculture, Forestry, and Fishing	328	,6	,6	1,7
	Air Transportation and Shipping	144	,3	,3	2,0
	Amusement and Recreation Services	364	,7	,7	2,7
	Business Services	7918	15,5	15,5	18,2
	Chemicals and Allied Products	419	,8	,8	19,1
	Commercial Banks, Bank Holding Companies	1118	2,2	2,2	21,3
	Communications Equipment	116	,2	,2	21,5
	Computer and Office Equipment	325	,6	,6	22,1
	Construction Firms	841	1,7	1,7	23,8
	Credit Institutions	403	,8	,8	24,6
	Drugs	632	1,2	1,2	25,8
	Educational Services	296	,6	,6	26,4
	Electric, Gas, and Water Distribution	700	1,4	1,4	27,8
	Electronic and Electrical Equipment	570	1,1	1,1	28,9
	Food and Kindred Products	592	1,2	1,2	30,0
	Health Services	2766	5,4	5,4	35,5
	Hotels and Casinos	300	,6	,6	36,1
	Insurance	1912	3,8	3,8	39,8
	Investment & Commodity Firms, Dealers, Exchanges	15094	29,6	29,6	69,4
	Leather and Leather Products	36	,1	,1	69,5
	Machinery	553	1,1	1,1	70,6
	Measuring, Medical, Photo Equipment; Clocks	753	1,5	1,5	72,1
	Metal and Metal Products	496	1,0	1,0	73,0
	Mining	174	,3	,3	73,4
	Miscellaneous Manufacturing	417	,8	,8	74,2

Miscellaneous Retail Trade	689	1,4	1,4	75,6
Motion Picture Production and Distribution	187	,4	,4	75,9
Oil and Gas; Petroleum Refining	804	1,6	1,6	77,5
Other Financial	64	,1	,1	77,6
Paper and Allied Products	140	,3	,3	77,9
Prepackaged Software	3505	6,9	6,9	84,8
Printing, Publishing, and Allied Services	496	1,0	1,0	85,8
Radio and Television Broadcasting Stations	241	,5	,5	86,2
Real Estate; Mortgage Bankers and Brokers	1581	3,1	3,1	89,3
Retail Trade-Eating and Drinking Places	290	,6	,6	89,9
Retail Trade-Food Stores	129	,3	,3	90,1
Retail Trade-General Merchandise and Apparel	73	,1	,1	90,3
Retail Trade-Home Furnishings	56	,1	,1	90,4
Rubber and Miscellaneous Plastic Products	263	,5	,5	90,9
Sanitary Services	189	,4	,4	91,3
Savings and Loans, Mutual Savings Banks	86	,2	,2	91,5
Soaps, Cosmetics, and Personal-Care Products	94	,2	,2	91,6
Stone, Clay, Glass, and Concrete Products	124	,2	,2	91,9
Telecommunications	506	1,0	1,0	92,9
Textile and Apparel Products	125	,2	,2	93,1
Tobacco Products	23	,0	,0	93,2
Transportation and Shipping (except air)	663	1,3	1,3	94,5
Transportation Equipment	285	,6	,6	95,0
Wholesale Trade-Durable Goods	1696	3,3	3,3	98,4
Wholesale Trade-Nondurable Goods	592	1,2	1,2	99,5
Wood Products, Furniture, and Fixtures	244	,5	,5	100,0
Total	50951	100,0	100,0	

Table 3
Patent per Technology Table

INDUSTRY NAME	2010	2011	2012	2013	2014	2015	2016	2017	2018
COMPUTER TECHNOLOGY	64434	72427	85808	89437	93383	89052	103975	112738	114676
ELECTRICAL, MACHINERY, APPARATUS, ENERGY	54656	62206	71253	76538	80801	81504	98965	106254	104795
MEASURMENT	39707	45621	51549	55109	57148	59849	68157	75856	77266
DIGITAL COMMUNICATIONS	34012	40338	47834	50778	57861	61524	68733	71915	81371
MEDICAL TECHNOLOGY	36474	40194	46629	51318	54683	56300	64288	66759	65892
TRANSPORT	37917	39303	43897	48813	49184	51306	63489	66328	67199
SEMICONDUCTORS	37794	43098	46969	48254	50799	46861	53023	52033	48704
AUFDIO-VISUAL TECHNOLOGY	41664	44665	48647	45777	44347	39364	44741	46461	46812
CIVIL ENGINEERING	32470	34958	37738	38977	40718	45450	55028	56839	55058
OPTICS	35664	39059	42189	42560	42418	37538	41111	40680	39299
PHARMACEUTICALS	29114	33694	37378	39782	41673	38782	42366	40645	39411
TEXTILE AND PAPER MACHINES	25852	28642	32991	35459	36875	38847	44862	46605	46544
TELECOMMUNICATION	31981	35217	38461	37804	37508	33029	33598	33400	34728
MACHINE TOOLS	21731	24791	28905	30076	31581	36085	42341	43019	41025
MECHANICAL ELEMENTS	24191	26903	30663	31810	30734	33008	39186	41027	41320
ORGANIC FILE CHEMISTRY	25046	27583	31921	34151	35686	35499	38567	35950	33778
HADNLING	24566	26167	29498	30501	31030	31873	38970	40057	38914
ENGINES, PUMPS, TURBINES	23341	24984	28645	29614	29990	32859	39406	40171	40042
BASIC MATERIALS CHEMISTRY	19530	21975	26957	33972	35370	33696	37700	34476	34426
MATERIALS, METALLURGY	20138	23073	27141	29643	30866	32753	37887	36525	35089
FURNITURE, GAMES	21369	23179	26177	28640	30934	29138	34181	33618	33988
CHEMICAL ENGINEERING	19849	21790	25425	25831	27003	29334	33327	33850	34170
BIOTECHNOLOGY	15787	17763	20728	23452	23972	24340	26464	26000	27558
OTHER SPECIAL MACHINES	19878	21806	22270	21039	21839	21665	23802	22234	21970
SURFACE TECHNOLOGY, COATING	16322	18614	21103	21646	22160	21229	24511	23788	23875
MACROMOLECULAR CHEMISTRY	14368	17221	20328	22140	22693	21398	25631	24335	23848
CONTROL	14540	16163	18498	19180	19748	19746	24203	27381	29111
OTHER CONSUMER GOODS	15474	17620	20585	18987	18952	19537	23912	23850	24965
THERMAL PROCESSES AND APPARATUS	12274	13319	15933	16714	17979	18123	22451	24027	23663
ENVIRONMENTAL TECHNOLOGY	12710	14514	15915	17831	17584	19100	22116	21603	20985
FOOD CHEMISTRY	12589	14873	18764	21294	20951	18438	21254	15058	15193
IT METHODS FOR MANAGEMENT	7264	8305	10305	11565	11750	9555	12557	14528	15109
BASIC COMMUNICATION PROCESS	11022	11245	11721	11681	11192	10426	11249	11387	10801
ANALYSIS OF BIOLOGICAL MATERIALS	5505	5831	6131	6742	7130	8140	8517	8818	9140
UNKNOWN	804	3721	4403	4490	550	2809	4735	4169	389
MICRO-STRUCTURAL AND NANO-TECHNOLOGY	1382	1912	2130	2280	2837	3399	3660	3560	3052

Table 4

Industry Indexes Table

INDUSTRY SECTOR	TECHNOLOGY ASSOCIATED	INNOVATION LEVEL	CONCENTRATION LEVEL	CI/LI
ADVERTISING SERVICES	IT METHODS FOR MANAGEMENT	1	2	1
AEROSPACE AND AIRCRAFT	COMPUTER TECHNOLOGY	5	2	1

Industry	Technology			
AGRICULTURE, FORESTRY AND FISHING	ENVIRONMENTAL TECHNOLOGY	1	3	0
AIR TRANSPORTATION AND SHIPPING	TRANSPORT	3	1	1
AMUSEMENT AND RECREATION SERVICES	IT METHODS FOR MANAGEMENT	1	1	0
BUSINESS SERVICES	IT METHODS FOR MANAGEMENT	1	1	0
CHEMICAL AND ALLIED PRODUCTS	CHEMICAL ENGINEERING	2	1	1
COMMERCIAL BANKS, BANK HOLDING COMPANIES	IT METHODS FOR MANAGEMENT	1	1	0
COMMUNICATION EQUIPMENT	DIGITAL COMMUNICATION AND TELECOMMUNICATION	3	3	1
COMPUTER AND OFFICE EQUIPMENT	COMPUTER TECHNOLOGY	5	2	1
CONSTRUCTION FIRMS	CIVIL ENGINEERING	3	1	1
CREDIT INSTITUTIONS	IT METHODS FOR MANAGEMENT	1	1	0
DRUGS	PHARMACEUTICALS	2	1	1
EDUCATIONAL SERVICES	UNKNOWN	1	1	0
ELECTRIC, GAS AND WATER DISTRIBUTION	ELECTRICAL, MACHINERY, APPARATUS, ENERGY	5	1	1
ELECTRONIC AND ELECTRICAL EQUIPMENT	ELECTRICAL, MACHINERY, APPARATUS, ENERGY	5	2	1
FOOD AND KINDERD PRODUCTS	FOOD CHEMISTRY	1	1	1
HEALTH SERVICES	MEDICAL TECHNOLOGY	3	2	0
HOTELS AND CASINOS	IT METHODS FOR MANAGEMENT	1	2	0
INSURANCE	IT METHODS FOR MANAGEMENT	1	1	0
INVESTMENT & COMMODITY FIRMS, DEALERS, EXCHANGES	IT METHODS FOR MANAGEMENT	1	1	0
LEATHER AND LEATHER PRODUCTS	SURFACE TECHNOLOGY, COATING	2	3	0
MACHINERY	MACHINE TOOLS AND MECHANICAL ELEMENTS	2	1	1
MEASURING, MEDICAL, PHOTO EQUIPMENT AND CLOCKS	MEASUREMENT	3	1	1
METAL AND METAL PRODUCTIONS	MATERIALS, METALLURGY	2	1	1
MINING	ENGINES, PUMPS, TURBINES	2	1	1
MISCELLANEOUS MANUFACTURING	OTHER CONSUMER GOODS	2	2	1
MISCELLANEOUS RETAIL TRADE	IT METHODS FOR MANAGEMENT	1	1	0
MOTION PICTURE PRODUCTION AND DISTRIBUTION	AUDIO-VISUAL TECHNOLOGY	3	3	1
OIL AND GAS, PETROLEUM REFINING	ENGINES, PUMPS AND TURBINES	2	1	1
OTHER FINANCIAL	IT METHODS FOR MANAGEMENT	1	2	0
PAPER AND ALLIED PRODUCTS	TEXTILE AND PAPER MACHINES	2	1	1
PREPACKAGES SOFTWARE	COMPUTER TECHNOLOGY	5	2	0
PRINTING, PUBLISHING AND ALLIED SERVICES	TEXTILE AND PAPER MACHINES	2	1	1
RADIO AND TELEVISION BROADCASTING STATIONS	TELECOMMUNICATION	2	1	0
REAL ESTATE; MORTGAGE BANKERS AND BROKERS	IT METHODS FOR MANAGEMENT	1	1	1

RETAIL TRADE-EATING AND DRINKING PLACES	IT METHODS FOR MANAGEMENT	1	1	0
RETAIL TRADE-FOOD STORES	IT METHODS FOR MANAGEMENT	1	2	0
RETAIL TRADE-HOME FURNISHING	IT METHODS FOR MANAGEMENT	1	3	0
REATAIL TRADE-GENERAL MERCHANDISE AND APPAREL	IT METHODS FOR MANAGEMENT	1	3	0
RUBBER AND MICELLANEOUS PLASTIC PRODUCTS	BASIC MATERIALS CHEMISTRY	2	3	1
SANITARY SERVICES	FURNITURE, GAMES	2	3	1
SAVING AND LOANS, MUTUAL SAVING BANKS	IT METHODS FOR MANAGEMENT	1	1	0
SOAPS, COSMETICS AND PERSONAL CARE PRODUCTS	CHEMICAL ENGINEERING	2	2	0
STONE, CLAY, GLASS AND CONCRETE PRODUCTS	BASIC MATERIALS CHEMISTRY	2	3	1
TELECOMMUNICATIONS	TELECOMMUNICATION	2	1	1
TEXTILE AND APPAREL PRODUCTS	TEXTILE AND PAPER MACHINES	2	3	0
TOBACCO PRODUCTS	OTHER CONSUMER GOODS	2	3	0
TRANSPORTATION AND SHIPPING (EXCEPT AIR)	TRANSPORT	3	1	1
TRANSPORTATION EQUIPMENT	TRANSPORT	3	1	1
WHOLESALE TRADE-DURABLE GOODS	OTHER CONSUMER GOODS	2	1	0
WHOLESALE TRADE-NONDURABLE GOODS	OTHER CONSUMER GOODS	2	2	0
WOOD PRODUCTS, FURNITURE AND FIXTURES	FURNITURE, GAMES	2	2	0

Table 5

Cross industry vs within industry agreement frequency (per acquirer industry)

CROSS INDUSTRY

Acquirer Industry Sector			Frequency	Percentage	Valid Percentage	Cumulative Percentage
Advertising Services	Valid	0	130	39,6	39,6	39,6
		1	198	60,4	60,4	100,0
		Total	328	100,0	100,0	
Aerospace and Aircraft	Valid	0	49	35,5	35,5	35,5
		1	89	64,5	64,5	100,0
		Total	138	100,0	100,0	
Agriculture, Forestry, and Fishing	Valid	0	189	72,4	72,4	72,4
		1	72	27,6	27,6	100,0
		Total	261	100,0	100,0	
Air Transportation and Shipping	Valid	0	68	71,6	71,6	71,6
		1	27	28,4	28,4	100,0
		Total	95	100,0	100,0	
Amusement and Recreation Services	Valid	0	166	59,5	59,5	59,5
		1	113	40,5	40,5	100,0
		Total	279	100,0	100,0	
Business Services	Valid	0	3528	59,8	59,8	59,8
		1	2376	40,2	40,2	100,0
		Total	5904	100,0	100,0	
Chemicals and Allied Products	Valid	0	214	52,6	52,6	52,6
		1	193	47,4	47,4	100,0
		Total	407	100,0	100,0	

Commercial Banks, Bank Holding Companies	Valid	0	707	67,1	67,1	67,1
		1	346	32,9	32,9	100,0
		Total	1053	100,0	100,0	
Communications Equipment	Valid	0	25	22,3	22,3	22,3
		1	87	77,7	77,7	100,0
		Total	112	100,0	100,0	
Computer and Office Equipment	Valid	0	32	15,0	15,0	15,0
		1	182	85,0	85,0	100,0
		Total	214	100,0	100,0	
Construction Firms	Valid	0	394	58,8	58,8	58,8
		1	276	41,2	41,2	100,0
		Total	670	100,0	100,0	
Credit Institutions	Valid	0	207	54,0	54,0	54,0
		1	176	46,0	46,0	100,0
		Total	383	100,0	100,0	
Drugs	Valid	0	324	57,4	57,4	57,4
		1	240	42,6	42,6	100,0
		Total	564	100,0	100,0	
Educational Services	Valid	0	131	55,0	55,0	55,0
		1	107	45,0	45,0	100,0
		Total	238	100,0	100,0	
Electric, Gas, and Water Distribution	Valid	0	357	61,1	61,1	61,1
		1	227	38,9	38,9	100,0
		Total	584	100,0	100,0	
Electronic and Electrical Equipment	Valid	0	233	42,8	42,8	42,8
		1	312	57,2	57,2	100,0
		Total	545	100,0	100,0	
Food and Kindred Products	Valid	0	418	72,9	72,9	72,9
		1	155	27,1	27,1	100,0
		Total	573	100,0	100,0	
Health Services	Valid	0	1566	83,3	83,3	83,3
		1	313	16,7	16,7	100,0
		Total	1879	100,0	100,0	
Hotels and Casinos	Valid	0	214	82,0	82,0	82,0
		1	47	18,0	18,0	100,0
		Total	261	100,0	100,0	
Insurance	Valid	0	1439	78,8	78,8	78,8
		1	387	21,2	21,2	100,0
		Total	1826	100,0	100,0	
Investment & Commodity Firms, Dealers, Exchanges	Valid	0	1083	7,7	7,7	7,7
		1	12962	92,3	92,3	100,0
		Total	14045	100,0	100,0	
Leather and Leather Products	Valid	0	8	24,2	24,2	24,2
		1	25	75,8	75,8	100,0
		Total	33	100,0	100,0	
Machinery	Valid	0	235	43,1	43,1	43,1
		1	310	56,9	56,9	100,0
		Total	545	100,0	100,0	
Measuring, Medical, Photo Equipment; Clocks	Valid	0	332	45,8	45,8	45,8
		1	393	54,2	54,2	100,0
		Total	725	100,0	100,0	
Metal and Metal Products	Valid	0	215	44,2	44,2	44,2
		1	271	55,8	55,8	100,0
		Total	486	100,0	100,0	
Mining	Valid	0	77	57,5	57,5	57,5
		1	57	42,5	42,5	100,0
		Total	134	100,0	100,0	
Miscellaneous Manufacturing	Valid	0	79	42,2	42,2	42,2
		1	108	57,8	57,8	100,0
		Total	187	100,0	100,0	
Miscellaneous Retail Trade	Valid	0	347	51,4	51,4	51,4
		1	328	48,6	48,6	100,0
		Total	675	100,0	100,0	

Motion Picture Production and Distribution	Valid	0	58	40,6	40,6	40,6
		1	85	59,4	59,4	100,0
		Total	143	100,0	100,0	
Oil and Gas; Petroleum Refining	Valid	0	519	73,5	73,5	73,5
		1	187	26,5	26,5	100,0
		Total	706	100,0	100,0	
Other Financial	Valid	0	18	30,0	30,0	30,0
		1	42	70,0	70,0	100,0
		Total	60	100,0	100,0	
Paper and Allied Products	Valid	0	74	52,9	52,9	52,9
		1	66	47,1	47,1	100,0
		Total	140	100,0	100,0	
Prepackaged Software	Valid	0	1286	54,5	54,5	54,5
		1	1074	45,5	45,5	100,0
		Total	2360	100,0	100,0	
Printing, Publishing, and Allied Services	Valid	0	276	58,0	58,0	58,0
		1	200	42,0	42,0	100,0
		Total	476	100,0	100,0	
Radio and Television Broadcasting Stations	Valid	0	85	42,3	42,3	42,3
		1	116	57,7	57,7	100,0
		Total	201	100,0	100,0	
Real Estate; Mortgage Bankers and Brokers	Valid	0	1048	68,5	68,5	68,5
		1	482	31,5	31,5	100,0
		Total	1530	100,0	100,0	
Retail Trade-Eating and Drinking Places	Valid	0	184	80,0	80,0	80,0
		1	46	20,0	20,0	100,0
		Total	230	100,0	100,0	
Retail Trade-Food Stores	Valid	0	63	50,0	50,0	50,0
		1	63	50,0	50,0	100,0
		Total	126	100,0	100,0	
Retail Trade-General Merchandise and Apparel	Valid	0	24	35,3	35,3	35,3
		1	44	64,7	64,7	100,0
		Total	68	100,0	100,0	
Retail Trade-Home Furnishings	Valid	0	19	33,9	33,9	33,9
		1	37	66,1	66,1	100,0
		Total	56	100,0	100,0	
Rubber and Miscellaneous Plastic Products	Valid	0	110	42,1	42,1	42,1
		1	151	57,9	57,9	100,0
		Total	261	100,0	100,0	
Sanitary Services	Valid	0	124	68,9	68,9	68,9
		1	56	31,1	31,1	100,0
		Total	180	100,0	100,0	
Savings and Loans, Mutual Savings Banks	Valid	0	12	14,0	14,0	14,0
		1	74	86,0	86,0	100,0
		Total	86	100,0	100,0	
Soaps, Cosmetics, and Personal-Care Products	Valid	0	44	46,8	46,8	46,8
		1	50	53,2	53,2	100,0
		Total	94	100,0	100,0	
Stone, Clay, Glass, and Concrete Products	Valid	0	59	47,6	47,6	47,6
		1	65	52,4	52,4	100,0
		Total	124	100,0	100,0	
Telecommunications	Valid	0	112	31,6	31,6	31,6
		1	242	68,4	68,4	100,0
		Total	354	100,0	100,0	
Textile and Apparel Products	Valid	0	60	48,8	48,8	48,8
		1	63	51,2	51,2	100,0
		Total	123	100,0	100,0	
Tobacco Products	Valid	0	10	43,5	43,5	43,5
		1	13	56,5	56,5	100,0
		Total	23	100,0	100,0	
Transportation and Shipping (except air)	Valid	0	410	72,3	72,3	72,3
		1	157	27,7	27,7	100,0
		Total	567	100,0	100,0	

			Frequency	Percentage	Valid Percentage	Cumulative Percentage
Transportation Equipment	Valid	0	122	43,0	43,0	43,0
		1	162	57,0	57,0	100,0
		Total	284	100,0	100,0	
Wholesale Trade-Durable Goods	Valid	0	455	46,2	46,2	46,2
		1	529	53,8	53,8	100,0
		Total	984	100,0	100,0	
Wholesale Trade-Nondurable Goods	Valid	0	232	41,2	41,2	41,2
		1	331	58,8	58,8	100,0
		Total	563	100,0	100,0	
Wood Products, Furniture, and Fixtures	Valid	0	93	38,1	38,1	38,1
		1	151	61,9	61,9	100,0
		Total	244	100,0	100,0	

Table 6

Target industry frequencies for polarized acquirer industries

Target Industry Sector

Acquirer Industry Sector			Frequency	Percentage	Valid Percentage	Cumulative Percentage
Agriculture, Forestry, and Fishing	Valid	Agriculture, Forestry, and Fishing	189	72,4	72,4	72,4
		Amusement and Recreation Services	3	1,1	1,1	73,6
		Business Services	7	2,7	2,7	76,2
		Construction Firms	3	1,1	1,1	77,4
		Drugs	5	1,9	1,9	79,3
		Food and Kindred Products	17	6,5	6,5	85,8
		Health Services	1	,4	,4	86,2
		Leather and Leather Products	1	,4	,4	86,6
		Machinery	2	,8	,8	87,4
		Measuring, Medical, Photo Equipment; Clocks	1	,4	,4	87,7
		Mining	1	,4	,4	88,1
		Miscellaneous Manufacturing	1	,4	,4	88,5
		Miscellaneous Services	1	,4	,4	88,9
		Paper and Allied Products	1	,4	,4	89,3
		Prepackaged Software	2	,8	,8	90,0
		Printing, Publishing, and Allied Services	1	,4	,4	90,4
		Public Administration	1	,4	,4	90,8
		Real Estate; Mortgage Bankers and Brokers	4	1,5	1,5	92,3
		Retail Trade-Food Stores	1	,4	,4	92,7
		Sanitary Services	1	,4	,4	93,1
		Soaps, Cosmetics, and Personal-Care Products	1	,4	,4	93,5
		Textile and Apparel Products	1	,4	,4	93,9
		Transportation and Shipping (except air)	1	,4	,4	94,3
		Wholesale Trade-Durable Goods	1	,4	,4	94,6
		Wholesale Trade-Nondurable Goods	13	5,0	5,0	99,6
		Wood Products, Furniture, and Fixtures	1	,4	,4	100,0
		Total	261	100,0	100,0	
	Valid	Aerospace and Aircraft	6	6,3	6,3	6,3

Air Transportation and Shipping		Air Transportation and Shipping	68	71,6	71,6	77,9
		Business Services	6	6,3	6,3	84,2
		Chemicals and Allied Products	1	1,1	1,1	85,3
		Educational Services	2	2,1	2,1	87,4
		Health Services	2	2,1	2,1	89,5
		Measuring, Medical, Photo Equipment; Clocks	1	1,1	1,1	90,5
		Miscellaneous Manufacturing	1	1,1	1,1	91,6
		Repair Services	2	2,1	2,1	93,7
		Retail Trade-Eating and Drinking Places	1	1,1	1,1	94,7
		Transportation and Shipping (except air)	3	3,2	3,2	97,9
		Wholesale Trade-Durable Goods	2	2,1	2,1	100,0
		Total	95	100,0	100,0	
Communications Equipment	Valid	Aerospace and Aircraft	4	3,6	3,6	3,6
		Business Services	21	18,8	18,8	22,3
		Communications Equipment	25	22,3	22,3	44,6
		Computer and Office Equipment	1	,9	,9	45,5
		Construction Firms	1	,9	,9	46,4
		Electric, Gas, and Water Distribution	3	2,7	2,7	49,1
		Electronic and Electrical Equipment	9	8,0	8,0	57,1
		Food and Kindred Products	1	,9	,9	58,0
		Health Services	2	1,8	1,8	59,8
		Machinery	1	,9	,9	60,7
		Measuring, Medical, Photo Equipment; Clocks	5	4,5	4,5	65,2
		Metal and Metal Products	3	2,7	2,7	67,9
		Miscellaneous Manufacturing	1	,9	,9	68,8
		Prepackaged Software	18	16,1	16,1	84,8
		Public Administration	1	,9	,9	85,7
		Radio and Television Broadcasting Stations	1	,9	,9	86,6
		Rubber and Miscellaneous Plastic Products	3	2,7	2,7	89,3
		Social Services	1	,9	,9	90,2
		Telecommunications	7	6,3	6,3	96,4
		Wholesale Trade-Durable Goods	4	3,6	3,6	100,0
		Total	112	100,0	100,0	
Computer and Office Equipment	Valid	Aerospace and Aircraft	2	,9	,9	,9
		Business Services	57	26,6	26,6	27,6
		Chemicals and Allied Products	1	,5	,5	28,0
		Communications Equipment	3	1,4	1,4	29,4
		Computer and Office Equipment	32	15,0	15,0	44,4
		Construction Firms	2	,9	,9	45,3
		Credit Institutions	1	,5	,5	45,8
		Electric, Gas, and Water Distribution	1	,5	,5	46,3
		Electronic and Electrical Equipment	8	3,7	3,7	50,0

			Frequency	Percent	Valid Percent	Cumulative Percent
		Health Services	3	1,4	1,4	51,4
		Investment & Commodity Firms, Dealers, Exchanges	1	,5	,5	51,9
		Measuring, Medical, Photo Equipment; Clocks	4	1,9	1,9	53,7
		Metal and Metal Products	1	,5	,5	54,2
		Miscellaneous Retail Trade	1	,5	,5	54,7
		Other Financial	1	,5	,5	55,1
		Prepackaged Software	75	35,0	35,0	90,2
		Printing, Publishing, and Allied Services	3	1,4	1,4	91,6
		Radio and Television Broadcasting Stations	1	,5	,5	92,1
		Retail Trade-Home Furnishings	1	,5	,5	92,5
		Stone, Clay, Glass, and Concrete Products	1	,5	,5	93,0
		Telecommunications	2	,9	,9	93,9
		Transportation and Shipping (except air)	2	,9	,9	94,9
		Transportation Equipment	1	,5	,5	95,3
		Wholesale Trade-Durable Goods	9	4,2	4,2	99,5
		Wood Products, Furniture, and Fixtures	1	,5	,5	100,0
		Total	214	100,0	100,0	
Health Services	Valid	Advertising Services	1	,1	,1	,1
		Aerospace and Aircraft	3	,2	,2	,2
		Agriculture, Forestry, and Fishing	2	,1	,1	,3
		Amusement and Recreation Services	3	,2	,2	,5
		Business Services	85	4,5	4,5	5,0
		Communications Equipment	1	,1	,1	5,1
		Drugs	12	,6	,6	5,7
		Educational Services	2	,1	,1	5,8
		Health Services	1566	83,3	83,3	89,1
		Hotels and Casinos	3	,2	,2	89,3
		Insurance	20	1,1	1,1	90,4
		Investment & Commodity Firms, Dealers, Exchanges	4	,2	,2	90,6
		Measuring, Medical, Photo Equipment; Clocks	23	1,2	1,2	91,8
		Miscellaneous Retail Trade	19	1,0	1,0	92,8
		Miscellaneous Services	5	,3	,3	93,1
		Other Financial	2	,1	,1	93,2
		Personal Services	5	,3	,3	93,5
		Prepackaged Software	37	2,0	2,0	95,4
		Printing, Publishing, and Allied Services	1	,1	,1	95,5
		Public Administration	2	,1	,1	95,6
		Real Estate; Mortgage Bankers and Brokers	13	,7	,7	96,3
		Retail Trade-Eating and Drinking Places	1	,1	,1	96,3
		Social Services	52	2,8	2,8	99,1
		Transportation and Shipping (except air)	2	,1	,1	99,2

		Transportation Equipment	1	,1	,1	99,3
		Wholesale Trade-Durable Goods	13	,7	,7	99,9
		Wholesale Trade-Nondurable Goods	1	,1	,1	100,0
		Total	1879	100,0	100,0	
Hotels and Casinos	Valid	Amusement and Recreation Services	16	6,1	6,1	6,1
		Business Services	4	1,5	1,5	7,7
		Electronic and Electrical Equipment	1	,4	,4	8,0
		Health Services	1	,4	,4	8,4
		Hotels and Casinos	214	82,0	82,0	90,4
		Investment & Commodity Firms, Dealers, Exchanges	4	1,5	1,5	92,0
		Miscellaneous Retail Trade	1	,4	,4	92,3
		Real Estate; Mortgage Bankers and Brokers	13	5,0	5,0	97,3
		Retail Trade-Eating and Drinking Places	1	,4	,4	97,7
		Textile and Apparel Products	2	,8	,8	98,5
		Transportation and Shipping (except air)	4	1,5	1,5	100,0
		Total	261	100,0	100,0	
Insurance	Valid	Advertising Services	2	,1	,1	,1
		Aerospace and Aircraft	1	,1	,1	,2
		Agriculture, Forestry, and Fishing	1	,1	,1	,2
		Amusement and Recreation Services	2	,1	,1	,3
		Business Services	158	8,7	8,7	9,0
		Chemicals and Allied Products	1	,1	,1	9,0
		Commercial Banks, Bank Holding Companies	3	,2	,2	9,2
		Construction Firms	7	,4	,4	9,6
		Credit Institutions	3	,2	,2	9,7
		Drugs	2	,1	,1	9,9
		Educational Services	2	,1	,1	10,0
		Electric, Gas, and Water Distribution	3	,2	,2	10,1
		Health Services	43	2,4	2,4	12,5
		Insurance	1439	78,8	78,8	91,3
		Investment & Commodity Firms, Dealers, Exchanges	64	3,5	3,5	94,8
		Legal Services	1	,1	,1	94,9
		Machinery	1	,1	,1	94,9
		Measuring, Medical, Photo Equipment; Clocks	1	,1	,1	95,0
		Metal and Metal Products	2	,1	,1	95,1
		Miscellaneous Retail Trade	2	,1	,1	95,2
		Miscellaneous Services	4	,2	,2	95,4
		Oil and Gas; Petroleum Refining	2	,1	,1	95,5
		Other Financial	2	,1	,1	95,6
		Personal Services	1	,1	,1	95,7
		Prepackaged Software	24	1,3	1,3	97,0
		Public Administration	3	,2	,2	97,2

	Real Estate; Mortgage Bankers and Brokers	25	1,4	1,4	98,5
	Repair Services	4	,2	,2	98,7
	Retail Trade-Eating and Drinking Places	1	,1	,1	98,8
	Retail Trade-Food Stores	1	,1	,1	98,8
	Retail Trade-General Merchandise and Apparel	1	,1	,1	98,9
	Rubber and Miscellaneous Plastic Products	1	,1	,1	99,0
	Sanitary Services	1	,1	,1	99,0
	Social Services	7	,4	,4	99,4
	Transportation and Shipping (except air)	4	,2	,2	99,6
	Transportation Equipment	1	,1	,1	99,7
	Wholesale Trade-Durable Goods	3	,2	,2	99,8
	Wholesale Trade-Nondurable Goods	3	,2	,2	100,0
	Total	1826	100,0	100,0	
Investment & Commodity Firms, Dealers, Exchanges	Advertising Services	82	,6	,6	,6
Valid	Aerospace and Aircraft	44	,3	,3	,9
	Agriculture, Forestry, and Fishing	119	,8	,8	1,7
	Air Transportation and Shipping	44	,3	,3	2,1
	Amusement and Recreation Services	167	1,2	1,2	3,2
	Business Services	2057	14,6	14,6	17,9
	Chemicals and Allied Products	148	1,1	1,1	18,9
	Commercial Banks, Bank Holding Companies	63	,4	,4	19,4
	Communications Equipment	29	,2	,2	19,6
	Computer and Office Equipment	52	,4	,4	20,0
	Construction Firms	250	1,8	1,8	21,8
	Credit Institutions	153	1,1	1,1	22,8
	Drugs	227	1,6	1,6	24,5
	Educational Services	78	,6	,6	25,0
	Electric, Gas, and Water Distribution	180	1,3	1,3	26,3
	Electronic and Electrical Equipment	208	1,5	1,5	27,8
	Food and Kindred Products	254	1,8	1,8	29,6
	Health Services	673	4,8	4,8	34,4
	Hotels and Casinos	406	2,9	2,9	37,3
	Insurance	175	1,2	1,2	38,5
	Investment & Commodity Firms, Dealers, Exchanges	1083	7,7	7,7	46,2
	Leather and Leather Products	11	,1	,1	46,3
	Legal Services	15	,1	,1	46,4
	Machinery	223	1,6	1,6	48,0
	Measuring, Medical, Photo Equipment; Clocks	293	2,1	2,1	50,1
	Metal and Metal Products	224	1,6	1,6	51,7
	Mining	32	,2	,2	51,9
	Miscellaneous Manufacturing	88	,6	,6	52,5

	Miscellaneous Retail Trade	189	1,3	1,3	53,9
	Miscellaneous Services	25	,2	,2	54,1
	Motion Picture Production and Distribution	38	,3	,3	54,3
	Oil and Gas; Petroleum Refining	261	1,9	1,9	56,2
	Other Financial	44	,3	,3	56,5
	Paper and Allied Products	56	,4	,4	56,9
	Personal Services	51	,4	,4	57,3
	Prepackaged Software	1410	10,0	10,0	67,3
	Printing, Publishing, and Allied Services	135	1,0	1,0	68,3
	Public Administration	20	,1	,1	68,4
	Radio and Television Broadcasting Stations	20	,1	,1	68,5
	Real Estate; Mortgage Bankers and Brokers	2465	17,6	17,6	86,1
	Repair Services	92	,7	,7	86,7
	Retail Trade-Eating and Drinking Places	216	1,5	1,5	88,3
	Retail Trade-Food Stores	62	,4	,4	88,7
	Retail Trade-General Merchandise and Apparel	77	,5	,5	89,3
	Retail Trade-Home Furnishings	23	,2	,2	89,4
	Rubber and Miscellaneous Plastic Products	94	,7	,7	90,1
	Sanitary Services	51	,4	,4	90,5
	Savings and Loans, Mutual Savings Banks	6	,0	,0	90,5
	Soaps, Cosmetics, and Personal-Care Products	65	,5	,5	91,0
	Social Services	85	,6	,6	91,6
	Stone, Clay, Glass, and Concrete Products	35	,2	,2	91,8
	Telecommunications	98	,7	,7	92,5
	Textile and Apparel Products	81	,6	,6	93,1
	Tobacco Products	3	,0	,0	93,1
	Transportation and Shipping (except air)	309	2,2	2,2	95,3
	Transportation Equipment	83	,6	,6	95,9
	Wholesale Trade-Durable Goods	337	2,4	2,4	98,3
	Wholesale Trade-Nondurable Goods	148	1,1	1,1	99,4
	Wood Products, Furniture, and Fixtures	88	,6	,6	100,0
	Total	14045	100,0	100,0	
Leather and Valid Leather Products	Amusement and Recreation Services	2	6,1	6,1	6,1
	Business Services	3	9,1	9,1	15,2
	Educational Services	1	3,0	3,0	18,2
	Leather and Leather Products	8	24,2	24,2	42,4
	Measuring, Medical, Photo Equipment; Clocks	1	3,0	3,0	45,5
	Miscellaneous Manufacturing	4	12,1	12,1	57,6
	Miscellaneous Retail Trade	1	3,0	3,0	60,6

	Prepackaged Software	3	9,1	9,1	69,7
	Printing, Publishing, and Allied Services	1	3,0	3,0	72,7
	Retail Trade-General Merchandise and Apparel	2	6,1	6,1	78,8
	Rubber and Miscellaneous Plastic Products	1	3,0	3,0	81,8
	Textile and Apparel Products	2	6,1	6,1	87,9
	Wholesale Trade-Durable Goods	3	9,1	9,1	97,0
	Wholesale Trade-Nondurable Goods	1	3,0	3,0	100,0
	Total	33	100,0	100,0	
Oil and Gas; Valid Petroleum Refining	Agriculture, Forestry, and Fishing	3	,4	,4	,4
	Business Services	21	3,0	3,0	3,4
	Chemicals and Allied Products	17	2,4	2,4	5,8
	Construction Firms	13	1,8	1,8	7,6
	Drugs	2	,3	,3	7,9
	Educational Services	1	,1	,1	8,1
	Electric, Gas, and Water Distribution	43	6,1	6,1	14,2
	Electronic and Electrical Equipment	1	,1	,1	14,3
	Food and Kindred Products	1	,1	,1	14,4
	Hotels and Casinos	2	,3	,3	14,7
	Insurance	1	,1	,1	14,9
	Investment & Commodity Firms, Dealers, Exchanges	10	1,4	1,4	16,3
	Machinery	12	1,7	1,7	18,0
	Measuring, Medical, Photo Equipment; Clocks	1	,1	,1	18,1
	Metal and Metal Products	5	,7	,7	18,8
	Mining	4	,6	,6	19,4
	Miscellaneous Retail Trade	6	,8	,8	20,3
	Oil and Gas; Petroleum Refining	519	73,5	73,5	93,8
	Personal Services	1	,1	,1	93,9
	Prepackaged Software	2	,3	,3	94,2
	Printing, Publishing, and Allied Services	1	,1	,1	94,3
	Real Estate; Mortgage Bankers and Brokers	2	,3	,3	94,6
	Repair Services	4	,6	,6	95,2
	Retail Trade-Eating and Drinking Places	1	,1	,1	95,3
	Retail Trade-Food Stores	3	,4	,4	95,8
	Retail Trade-General Merchandise and Apparel	1	,1	,1	95,9
	Sanitary Services	1	,1	,1	96,0
	Stone, Clay, Glass, and Concrete Products	2	,3	,3	96,3
	Transportation and Shipping (except air)	9	1,3	1,3	97,6
	Transportation Equipment	1	,1	,1	97,7
	Wholesale Trade-Nondurable Goods	16	2,3	2,3	100,0
	Total	706	100,0	100,0	

Other Financial	Valid	Business Services	12	20,0	20,0	20,0
		Computer and Office Equipment	1	1,7	1,7	21,7
		Credit Institutions	2	3,3	3,3	25,0
		Drugs	1	1,7	1,7	26,7
		Insurance	1	1,7	1,7	28,3
		Investment & Commodity Firms, Dealers, Exchanges	5	8,3	8,3	36,7
		Miscellaneous Retail Trade	1	1,7	1,7	38,3
		Other Financial	18	30,0	30,0	68,3
		Prepackaged Software	15	25,0	25,0	93,3
		Printing, Publishing, and Allied Services	2	3,3	3,3	96,7
		Retail Trade-Eating and Drinking Places	1	1,7	1,7	98,3
		Wholesale Trade-Durable Goods	1	1,7	1,7	100,0
		Total	60	100,0	100,0	
Retail Trade-Eating and Drinking Places	Valid	Advertising Services	1	,4	,4	,4
		Agriculture, Forestry, and Fishing	2	,9	,9	1,3
		Amusement and Recreation Services	3	1,3	1,3	2,6
		Business Services	2	,9	,9	3,5
		Electronic and Electrical Equipment	1	,4	,4	3,9
		Food and Kindred Products	7	3,0	3,0	7,0
		Investment & Commodity Firms, Dealers, Exchanges	1	,4	,4	7,4
		Machinery	1	,4	,4	7,8
		Mining	1	,4	,4	8,3
		Miscellaneous Retail Trade	4	1,7	1,7	10,0
		Personal Services	3	1,3	1,3	11,3
		Real Estate; Mortgage Bankers and Brokers	4	1,7	1,7	13,0
		Retail Trade-Eating and Drinking Places	184	80,0	80,0	93,0
		Retail Trade-Food Stores	5	2,2	2,2	95,2
		Textile and Apparel Products	1	,4	,4	95,7
		Transportation and Shipping (except air)	3	1,3	1,3	97,0
		Transportation Equipment	1	,4	,4	97,4
		Wholesale Trade-Nondurable Goods	6	2,6	2,6	100,0
		Total	230	100,0	100,0	
Savings and Loans, Mutual Savings Banks	Valid	Business Services	1	1,2	1,2	1,2
		Commercial Banks, Bank Holding Companies	46	53,5	53,5	54,7
		Credit Institutions	9	10,5	10,5	65,1
		Insurance	5	5,8	5,8	70,9
		Investment & Commodity Firms, Dealers, Exchanges	7	8,1	8,1	79,1
		Real Estate; Mortgage Bankers and Brokers	5	5,8	5,8	84,9
		Retail Trade-Food Stores	1	1,2	1,2	86,0
		Savings and Loans, Mutual Savings Banks	12	14,0	14,0	100,0

			Frequency	Percent	Valid Percent	Cumulative Percent
		Total	86	100,0	100,0	
Transportation and Shipping (except air)	Valid	Advertising Services	1	,2	,2	,2
		Agriculture, Forestry, and Fishing	1	,2	,2	,4
		Air Transportation and Shipping	2	,4	,4	,7
		Amusement and Recreation Services	2	,4	,4	1,1
		Business Services	38	6,7	6,7	7,8
		Chemicals and Allied Products	1	,2	,2	7,9
		Computer and Office Equipment	2	,4	,4	8,3
		Construction Firms	2	,4	,4	8,6
		Credit Institutions	1	,2	,2	8,8
		Educational Services	3	,5	,5	9,3
		Electric, Gas, and Water Distribution	2	,4	,4	9,7
		Food and Kindred Products	3	,5	,5	10,2
		Health Services	5	,9	,9	11,1
		Hotels and Casinos	1	,2	,2	11,3
		Insurance	3	,5	,5	11,8
		Investment & Commodity Firms, Dealers, Exchanges	6	1,1	1,1	12,9
		Leather and Leather Products	1	,2	,2	13,1
		Miscellaneous Retail Trade	4	,7	,7	13,8
		Oil and Gas; Petroleum Refining	8	1,4	1,4	15,2
		Paper and Allied Products	3	,5	,5	15,7
		Personal Services	1	,2	,2	15,9
		Prepackaged Software	24	4,2	4,2	20,1
		Real Estate; Mortgage Bankers and Brokers	16	2,8	2,8	22,9
		Repair Services	3	,5	,5	23,5
		Retail Trade-Eating and Drinking Places	2	,4	,4	23,8
		Retail Trade-General Merchandise and Apparel	1	,2	,2	24,0
		Retail Trade-Home Furnishings	1	,2	,2	24,2
		Rubber and Miscellaneous Plastic Products	1	,2	,2	24,3
		Sanitary Services	2	,4	,4	24,7
		Social Services	1	,2	,2	24,9
		Textile and Apparel Products	1	,2	,2	25,0
		Transportation and Shipping (except air)	410	72,3	72,3	97,4
		Transportation Equipment	7	1,2	1,2	98,6
		Wholesale Trade-Durable Goods	3	,5	,5	99,1
		Wholesale Trade-Nondurable Goods	5	,9	,9	100,0
		Total	567	100,0	100,0	
Food and Kindred Products	Valido	Advertising Services	3	,5	,5	,5
		Agriculture, Forestry, and Fishing	26	4,5	4,5	5,1
		Business Services	9	1,6	1,6	6,6
		Chemicals and Allied Products	7	1,2	1,2	7,9

Drugs	7	1,2	1,2	9,1
Electric, Gas, and Water Distribution	1	,2	,2	9,2
Food and Kindred Products	418	72,9	72,9	82,2
Health Services	2	,3	,3	82,5
Investment & Commodity Firms,Dealers,Exchanges	2	,3	,3	82,9
Leather and Leather Products	1	,2	,2	83,1
Machinery	2	,3	,3	83,4
Miscellaneous Retail Trade	12	2,1	2,1	85,5
Miscellaneous Services	1	,2	,2	85,7
Oil and Gas; Petroleum Refining	1	,2	,2	85,9
Prepackaged Software	4	,7	,7	86,6
Retail Trade-Eating and Drinking Places	11	1,9	1,9	88,5
Retail Trade-Food Stores	19	3,3	3,3	91,8
Soaps, Cosmetics, and Personal-Care Products	1	,2	,2	92,0
Stone, Clay, Glass, and Concrete Products	1	,2	,2	92,1
Transportation and Shipping (except air)	4	,7	,7	92,8
Wholesale Trade-Durable Goods	3	,5	,5	93,4
Wholesale Trade-Nondurable Goods	38	6,6	6,6	100,0
Totale	573	100,0	100,0	

Table 7
Categorical Variable Classification

Coding categorical variables

			Parameter Codification		
		Frequency	(1)	(2)	(3)
INNOVATION LEVEL	1	31362	,000	,000	,000
	2	8264	1,000	,000	,000
	3	6083	,000	1,000	,000
	5	5242	,000	,000	1,000
HHI INDEX	1	40214	,000	,000	
	2	9545	1,000	,000	
	3	1192	,000	1,000	
CI/LI	0	38442	,000		
	1	12509	1,000		

Table 8
Null Classification Table

Classification Table[a,b]

	Predicted	
Observed	MA/SA	Hit Rate

			0	1		
Step 0	M&A/SA	0	0	7825	,0	
		1	0	43126	100,0	
	Global percentage				84,6	

a. The constant is included in the model
b. The cutoff value is at .500

Table 9

Null Logit Model

Variables not in the equation[a]

			Punteggio	df	Sign.
Step 0	Variables	INNOVATION LEVEL	1102,970	3	,000
		INNOVATION LEVEL(1)	30,552	1	,000
		INNOVATION LEVEL(2)	244,690	1	,000
		INNOVATION LEVEL(3)	582,903	1	,000
		CI/LI(1)	191,034	1	,000
		HHI INDEX	1204,808	2	,000
		HHI INDEX(1)	1159,093	1	,000
		HHI INDEX(2)	85,980	1	,000
		market share total	1021,656	1	,000
		MARKET VOLATILITY	1495,575	1	,000
		CI/LI * INNOVATION LEVEL	55,446	3	,000
		CI/LI(1) by INNOVATION LEVEL(1)	37,784	1	,000
		CI/LI(1) by INNOVATION LEVEL(2)	11,927	1	,001
		CI/LI(1) by INNOVATION LEVEL(3)	,532	1	,466
		CI/LI * HHI INDEX	151,028	2	,000
		CI/LI(1) by HHI INDEX(1)	103,245	1	,000
		CI/LI(1) by HHI INDEX(2)	51,432	1	,000
		HHI INDEX * INNOVATION LEVEL	1486,754	5	,000
		HHI INDEX(1) by INNOVATION LEVEL(1)	15,941	1	,000
		HHI INDEX(1) by INNOVATION LEVEL(2)	628,249	1	,000
		HHI INDEX(1) by INNOVATION LEVEL(3)	643,867	1	,000
		HHI INDEX(2) by INNOVATION LEVEL(1)	104,238	1	,000
		HHI INDEX(2) by INNOVATION LEVEL(2)	,055	1	,815
		CI/LI * HHI INDEX * INNOVATION LEVEL	591,824	4	,000
		CI/LI(1) by HHI INDEX(1) by INNOVATION LEVEL(1)	512,282	1	,000
		CI/LI(1) by HHI INDEX(1) by INNOVATION LEVEL(3)	2,809	1	,094
		CI/LI(1) by HHI INDEX(2) by INNOVATION LEVEL(1)	81,053	1	,000
		CI/LI(1) by HHI INDEX(2) by INNOVATION LEVEL(2)	,055	1	,815

Table 10

Full Logistic Model

		B	S.E.	Wald	df	Sign.	Exp(B)
Step 1ᵃ	INNOVATION LEVEL			438,563	3	,000	
	INNOVATION LEVEL(1)	-,822	,054	235,612	1	,000	,439
	INNOVATION LEVEL(2)	-,019	,139	,019	1	,889	,981
	INNOVATION LEVEL(3)	-3,860	,279	191,123	1	,000	,021
	CI/LI(1)	2,233	,127	309,615	1	,000	9,324
	HHI INDEX			82,979	2	,000	
	HHI INDEX(1)	1,229	,160	58,776	1	,000	3,418
	HHI INDEX(2)	2,348	,461	25,925	1	,000	10,460
	market share total	,000	,000	95,301	1	,000	1,000
	MARKET VOLATILITY	,335	,016	460,193	1	,000	1,398
	CI/LI * INNOVATION LEVEL			135,673	3	,000	
	CI/LI(1) by INNOVATION LEVEL(1)	-,989	,148	44,700	1	,000	,372
	CI/LI(1) by INNOVATION LEVEL(2)	-1,787	,195	83,711	1	,000	,168
	CI/LI(1) by INNOVATION LEVEL(3)	1,611	,229	49,549	1	,000	5,010
	CI/LI * HHI INDEX			185,336	2	,000	
	CI/LI(1) by HHI INDEX(1)	-3,289	,245	180,462	1	,000	,037
	CI/LI(1) by HHI INDEX(2)	-1,233	,551	5,001	1	,025	,291
	HHI INDEX * INNOVATION LEVEL			283,754	5	,000	
	HHI INDEX(1) by INNOVATION LEVEL(1)	1,455	,253	33,072	1	,000	4,286
	HHI INDEX(1) by INNOVATION LEVEL(2)	-1,765	,214	67,896	1	,000	,171
	HHI INDEX(1) by INNOVATION LEVEL(3)	1,891	,229	68,383	1	,000	6,628
	HHI INDEX(2) by INNOVATION LEVEL(1)	,655	,649	1,016	1	,313	1,925
	HHI INDEX(2) by INNOVATION LEVEL(2)	-1,170	,738	2,515	1	,113	,310
	CI/LI * HHI INDEX * INNOVATION LEVEL			13,542	1	,000	
	CI/LI(1) by HHI INDEX(1) by INNOVATION LEVEL(1)	-1,232	,335	13,542	1	,000	,292
	Constant	-3,158	,216	213,361	1	,000	,042

a. Variables inserted in step fase 1: INNOVATION LEVEL, CI/LI, HHI INDEX, market share total, MARKET VOLATILITY, CI/LI * INNOVATION LEVEL , CI/LI * HHI INDEX , HHI INDEX * INNOVATION LEVEL , CI/LI * HHI INDEX * INNOVATION LEVEL .

Table 11

Significance of the model

Model coefficients omnibus test

		Chi-squared	df	Sign.
Step 1	Step	4290,092	19	,000
	Block	4290,092	19	,000
	Model	4290,092	19	,000

Table 12

M&A vs Strategic alliance frequencies

Acquiror Industry Sector			Frequency	Percentage	Valid Percentage	Cumulative Percentage
Advertising Services	Valid	0	69	17,4	17,4	17,4
		1	328	82,6	82,6	100,0
		Total	397	100,0	100,0	
Aerospace and Aircraft	Valid	0	4	2,8	2,8	2,8
		1	138	97,2	97,2	100,0
		Total	142	100,0	100,0	
Agriculture, Forestry, and Fishing	Valid	0	67	20,4	20,4	20,4
		1	261	79,6	79,6	100,0
		Total	328	100,0	100,0	
Air Transportation and Shipping	Valid	0	49	34,0	34,0	34,0
		1	95	66,0	66,0	100,0
		Total	144	100,0	100,0	
Amusement and Recreation Services	Valid	0	85	23,4	23,4	23,4
		1	279	76,6	76,6	100,0
		Total	364	100,0	100,0	
Business Services	Valid	0	2014	25,4	25,4	25,4
		1	5904	74,6	74,6	100,0
		Total	7918	100,0	100,0	
Chemicals and Allied Products	Valid	0	12	2,9	2,9	2,9
		1	407	97,1	97,1	100,0
		Total	419	100,0	100,0	
Commercial Banks, Bank Holding Companies	Valid	0	65	5,8	5,8	5,8
		1	1053	94,2	94,2	100,0
		Total	1118	100,0	100,0	
Communications Equipment	Valid	0	4	3,4	3,4	3,4
		1	112	96,6	96,6	100,0
		Total	116	100,0	100,0	
Computer and Office Equipment	Valid	0	111	34,2	34,2	34,2
		1	214	65,8	65,8	100,0
		Total	325	100,0	100,0	
Construction Firms	Valid	0	171	20,3	20,3	20,3
		1	670	79,7	79,7	100,0
		Total	841	100,0	100,0	
Credit Institutions	Valid	0	20	5,0	5,0	5,0
		1	383	95,0	95,0	100,0
		Total	403	100,0	100,0	
Drugs	Valid	0	68	10,8	10,8	10,8
		1	564	89,2	89,2	100,0
		Total	632	100,0	100,0	
Educational Services	Valid	0	58	19,6	19,6	19,6
		1	238	80,4	80,4	100,0
		Total	296	100,0	100,0	
Electric, Gas, and Water Distribution	Valid	0	116	16,6	16,6	16,6
		1	584	83,4	83,4	100,0
		Total	700	100,0	100,0	
Electronic and Electrical Equipment	Valid	0	25	4,4	4,4	4,4
		1	545	95,6	95,6	100,0
		Total	570	100,0	100,0	
Food and Kindred Products	Valid	0	19	3,2	3,2	3,2
		1	573	96,8	96,8	100,0
		Total	592	100,0	100,0	
Health Services	Valid	0	887	32,1	32,1	32,1
		1	1879	67,9	67,9	100,0
		Total	2766	100,0	100,0	
Hotels and Casinos	Valid	0	39	13,0	13,0	13,0
		1	261	87,0	87,0	100,0
		Total	300	100,0	100,0	
Insurance	Valid	0	86	4,5	4,5	4,5
		1	1826	95,5	95,5	100,0
		Total	1912	100,0	100,0	

Investment & Commodity Valid Firms,Dealers,Exchanges	0	1049	6,9	6,9	6,9
	1	14045	93,1	93,1	100,0
	Total	15094	100,0	100,0	
Leather and Leather Valid Products	0	3	8,3	8,3	8,3
	1	33	91,7	91,7	100,0
	Total	36	100,0	100,0	
Machinery Valid	0	8	1,4	1,4	1,4
	1	545	98,6	98,6	100,0
	Total	553	100,0	100,0	
Measuring, Medical, Valid Photo Equipment; Clocks	0	28	3,7	3,7	3,7
	1	725	96,3	96,3	100,0
	Total	753	100,0	100,0	
Metal and Metal Products Valid	0	10	2,0	2,0	2,0
	1	486	98,0	98,0	100,0
	Total	496	100,0	100,0	
Mining Valid	0	41	23,6	23,6	23,6
	1	133	76,4	76,4	100,0
	Total	174	100,0	100,0	
Miscellaneous Valid Manufacturing	0	230	55,2	55,2	55,2
	1	187	44,8	44,8	100,0
	Total	417	100,0	100,0	
Miscellaneous Retail Valid Trade	0	14	2,0	2,0	2,0
	1	675	98,0	98,0	100,0
	Total	689	100,0	100,0	
Motion Picture Production Valid and Distribution	0	44	23,5	23,5	23,5
	1	143	76,5	76,5	100,0
	Total	187	100,0	100,0	
Oil and Gas; Petroleum Valid Refining	0	97	12,1	12,1	12,1
	1	707	87,9	87,9	100,0
	Total	804	100,0	100,0	
Other Financial Valido	0	4	6,3	6,3	6,3
	1	60	93,8	93,8	100,0
	Totale	64	100,0	100,0	
Paper and Allied Products Valid	1	140	100,0	100,0	100,0
Prepackaged Software Valid	0	1146	32,7	32,7	32,7
	1	2359	67,3	67,3	100,0
	Total	3505	100,0	100,0	
Printing, Publishing, and Valid Allied Services	0	20	4,0	4,0	4,0
	1	476	96,0	96,0	100,0
	Total	496	100,0	100,0	
Radio and Television Valid Broadcasting Stations	0	40	16,6	16,6	16,6
	1	201	83,4	83,4	100,0
	Total	241	100,0	100,0	
Real Estate; Mortgage Valid Bankers and Brokers	0	51	3,2	3,2	3,2
	1	1530	96,8	96,8	100,0
	Total	1581	100,0	100,0	
Retail Trade-Eating and Valid Drinking Places	0	60	20,7	20,7	20,7
	1	230	79,3	79,3	100,0
	Total	290	100,0	100,0	
Retail Trade-Food Stores Valid	0	3	2,3	2,3	2,3
	1	126	97,7	97,7	100,0
	Total	129	100,0	100,0	
Retail Trade-General Valid Merchandise and Apparel	0	5	6,8	6,8	6,8
	1	68	93,2	93,2	100,0
	Total	73	100,0	100,0	
Retail Trade-Home Valid Furnishings	1	56	100,0	100,0	100,0
Rubber and Miscellaneous Valid Plastic Products	0	2	,8	,8	,8
	1	261	99,2	99,2	100,0
	Total	263	100,0	100,0	
Sanitary Services Valid	0	9	4,8	4,8	4,8
	1	180	95,2	95,2	100,0
	Total	189	100,0	100,0	

Savings and Loans, Mutual Savings Banks	Valid	1	86	100,0	100,0	100,0
Soaps, Cosmetics, and Personal-Care Products	Valid	1	94	100,0	100,0	100,0
Stone, Clay, Glass, and Concrete Products	Valid	1	124	100,0	100,0	100,0
Telecommunications	Valid	0	152	30,0	30,0	30,0
		1	354	70,0	70,0	100,0
		Total	506	100,0	100,0	
Textile and Apparel Products	Valid	0	2	1,6	1,6	1,6
		1	123	98,4	98,4	100,0
		Total	125	100,0	100,0	
Tobacco Products	Valid	1	23	100,0	100,0	100,0
Transportation and Shipping (except air)	Valid	0	96	14,5	14,5	14,5
		1	567	85,5	85,5	100,0
		Total	663	100,0	100,0	
Transportation Equipment	Valid	0	1	,4	,4	,4
		1	284	99,6	99,6	100,0
		Total	285	100,0	100,0	
Wholesale Trade-Durable Goods	Valid	0	712	42,0	42,0	42,0
		1	984	58,0	58,0	100,0
		Total	1696	100,0	100,0	
Wholesale Trade-Nondurable Goods	Valid	0	29	4,9	4,9	4,9
		1	563	95,1	95,1	100,0
		Total	592	100,0	100,0	
Wood Products, Furniture, and Fixtures	Valid	1	244	100,0	100,0	100,0

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