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THE FINANCIAL IMPLICATIONS OF THE RESOURCE-BASED STRATEGY:
SPECIFICITY, OPACITY AND FINANCIAL STRUCTURE¹

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Abstract

In this work we develop an analytical framework to examine the effects of strategic investments on the financial policy of the firm. From the resource-based approach of the firm, non-tradeable and difficult-to-copy assets are the basis of a sustainable competitive advantage. However, imperfections in the resource markets can also be interpreted as sources of costs and/or restrictions from a financial point of view. Specificity and opacity are the features of strategic resources that enable us to identify the financial implications of the resource-based strategy. We have tested our theoretical framework using a sample of Spanish non-financial firms. Our results show that highly specific and opaque resources limit the borrowing capacity of the firm while other transparent strategic assets positively affect financial leverage. Our findings suggest two main implications for strategy formulation and implementation: (1) there are unobservable -financial- costs that must be considered for a correct evaluation of a sustainable competitive advantage based on strategic resources and (2) the financial policy of a "resource-driven" firm is partially determined by the features of its strategic resource bundle.

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INTRODUCTION

The resource-based view of the firm has been one of the most productive approaches for identifying the sources of a sustainable competitive advantage (Barney, 1986; Peteraf, 1993; Prahalad and Hamel, 1990; Wernerfelt, 1988). Under this perspective, non-imitable and difficult-to-copy assets and capabilities enhance the sustainability and appropriability of above-normal returns.

However, this optimistic view of 'resource-driven strategies' often ignores the cost of developing and implementing strategic resources and capabilities (Montgomery, 1995). Uncertainty, specificity and long run terms of maturation are features of strategic resources which impose unavoidable --and often unobservable-- costs and restrictions that should be considered for a correct evaluation of future resource rents. Actually, many of those assets characteristics that add value to the firm are, essentially, the same ones that limit its imitation or substitution by competitors.

The relevance of the financial aspects of resource-based strategies lies in two main issues regarding research in management sciences. First, imperfections in factor markets justify the link between the financial policy of the firm and its investments in strategic resources. Notwithstanding the differences between finance and strategic research, both approaches had reciprocally benefit from a closer look to market imperfections as a relevant context. This common concern has allowed a better understanding of the links between finance and strategy research. Actually, market imperfections are the core of the economic interpretation of strategic research as they are primary sources of heterogeneity in the firm's behavior and performance. But some of these market failures are also considered potential explanations able to contribute to complete a theory of the capital structure. In light of this, the examination of the financial implications of different organizational economic approaches such as agency theory and transaction cost economics (Kochhar, 1996) or the role of capital structure in assuring efficient governance structures (Hitt and Smart, 1994; Jensen, 1986; Williamson, 1988) have become frequent financial references within the conversation of strategic management.

Second, financial measures of corporate performance might be misinterpreted when firm assets are specific, idiosyncratic, co-specialized and imperfectly transferable. In this scenario, traditional measures computed from financial statements --ROE, ROA-- or market-based information --Tobin's q, market to book equity ratio-- are misleading because the asset pricing model on which they are based, does not apply (Robins, 1992). As Winter (1995) points out, financial measures can lose their meaning when markets are imperfect and this is precisely in the context of the resource-based view of

the firm. The conclusion is a 'valuation paradox' of the resource-based paradigm which can be stated in the following terms: imperfections in resource markets are the source rents but the value of such rents are imperfectly measurable when markets are imperfect.

Therefore, should we refuse the resource-based approach for analyzing the value of a competitive advantage? The answer, fortunately, is no. Imperfect markets do not exclude the possibility of asset evaluation. The problem arising from market imperfections is that asset price can be undetermined --multiple or no price can exist for every asset--, while the 'Arrow-Debreu scenario' of perfect, transparent and competitive markets assures the existence and unicity of price for any asset. Moreover, even if a feasible price for the firm's assets does not exist, market imperfections can be associated to observable effects of the firm's behavior, namely, its financial policy. This perspective is particularly useful for examining the value of competitive advantage in terms of financial risk and unobservable financial restrictions and constitutes the basis of our conceptual framework.

As Modigliani and Miller (1963; 1958) stated, perfect and transparent markets are sufficient conditions to assure the separation of investment and financial decisions. On the contrary, investment and financing activities might be interlinked when markets show some kinds of imperfections. This starting point suggests a clear relationship between the 'resource-driven strategy' of the firm and its financial policy. In other terms, the financial strategy of the firm can partially reveal the type of market imperfection which sustains a given 'resource-based' competitive advantage.

To the extent that we identify the 'strategic content' of an asset with several market imperfections --non-tradeable, specific and/or complementary productive factors-- we can conclude that some kinds of imperfections in resource markets can affect the financial policy of the firm. Our purpose in this paper is to analyze the interactions between the features of resources and capabilities that guarantee their value and the financial policy of the firm. We develop a theoretical framework founded on the recent research in corporate finance and strategy to explore the financial effects of a 'resource-driven strategy'. Finally, we test the resulting propositions using a sample of Spanish firms.

The remainder of the paper is organized as follows. The next two sections describe the specific and opaque dimension of the firm's resources as sources of value and explore the financial implications of specific and opaque resources. Then we examine the degree of internalization of strategic resources accumulation as an indirect but observable measure of specific and opaque assets. The characterization

of our sample and methodology corresponds to the next section. Finally, the two last sections present and discuss our results, respectively.

CREATING VALUE THROUGH STRATEGIC INVESTMENTS: SPECIFIC AND OPAQUE RESOURCES

Researchers in strategy have devoted much time and effort to defining and describing the features of assets capable of generating sustainable rents. Unique assets are the source of scarcity --or ricardian-- rents¹ (Mahoney and Pandian, 1992; Peteraf, 1993). But uniqueness is not a sufficient condition for a resource to be valuable --i.e. source of rents--. Scarce resources have higher productivity but also higher costs --competitive prices-- than non-scarce ones. Actually, given a fixed supply of certain productive inputs, perfect markets assure the inexistence of extraordinary profits to the extent that 'ex-ante' competition for acquiring such scarce resources might jeopardize potential resource rents. Thus, the resource ability to sustain above-normal profits --its strategic content-- should arise from other concurrent features of resources different from their scarcity².

In other cases, the assets considered as individual items do not justify their value inside the firm. Specific assets generate quasi-rents (Klein, Crawford and Alchian, 1978). Complementary and co-specialized assets enhance the value of the firm as a whole (Teece, 1986). Sometimes, the key to a sustainable competitive advantage is not a single resource but the way assets work together. Actually, this is the meaning of 'capability', defined as the efficient combination of resources to perform a given task (Prahalad and Hamel, 1990).

Despite the great number of definitions and classifications of resources and capabilities, we will focus on two main characteristics which are commonly regarded as defining strategic assets: specificity and opacity. This choice is not arbitrary. For the purpose of this work, most of the seemingly different concepts can be categorized into these two basic dimensions.

¹ We use 'scarce' to refer to resources with fixed or quasi-fixed supply (Peteraf, 1993).

² Ricardian rents resulting from a scarce resource are appropriated by their owner only if such resource became scarce *after* acquiring it. Thus, the ultimate source of extraordinary profits is the capacity to identify future scarce resources and exploit the resulting 'first mover' advantage.

The specific dimension of strategic resources

Firm-specific assets have been broadly recognised as a clear example of the straightforward connection between resources and competitive advantage. Specific resources are, in essence, source of 'quasi-rents' when the shadow price of an asset is substantially higher than its market price or the opportunity cost for its owner (Klein, Crawford, and Alchian, 1978). Although most of the references available in the literature interpret 'specificity' as 'firm-specificity', the former term admits an extended meaning. Actually, specificity can be considered a 'relational' concept. An asset is not specific by itself but in relation to 'something'. There may be 'firm-specific' or 'activity-specific' resources depending on whether their deployment inside a particular firm or applied to a distinctive activity, respectively, yield 'quasi-rents'³. Therefore, 'firm-specific' or 'activity-specific' assets are valuable as long as the firm survives, or as far as the activity is feasible, respectively. Otherwise, 'quasi-rents' dissipate and the asset loses its value. Thus, we can conclude that specificity is a characteristic of resources which enhances the value of the firm⁴. In light of this it is easy to find clear similarities between an extended definition of 'specific assets' and other strategic features which reflect gains of value when two or more assets are exploited together. Defining specificity as 'the loss of value of a firm asset when it is used by outsiders', we can consider 'complementary' or 'co-specialized' assets as synonymous with 'specific' assets to the extent that the former concepts reflect gains of value when assets are owned and deployed by a single and distinctive decision unit. This wider interpretation of specificity is particularly useful for achieving a deeper understanding of some of the financial implications of the resource-based strategy.

INSERT FIGURE 1 ABOUT HERE

Acquisition of highly specific and profitable assets requires a continuous stream of specific investment to achieve the 'critical mass' of a given strategic resource. In addition, these investments have a 'maturation period' or the interval ranging from the time in which the effective investment was made,

³ An investment can be considered specific when there is a significant difference between its current use and its 'second best' use (Klein, Crawford and Alchian, 1978). Such definition would correspond to the 'Activity-specific' concept. A slightly different term is 'firm-specificity', which reflects differences in the value of a given resource when used by different firms, even if exploited in similar activities. Both definitions are equivalent as long as it is assumed that the use of an 'activity-specific' asset *inside* a particular firm is imperfectly replicable by others.

⁴ Specificity is not a sufficient condition to guarantee 'above-normal' returns. If the resource is owned by a firm with no bargaining power at all, the whole amount of 'quasi-rents' will be appropriated by the other contracting party (worker, supplier, or partner firm). Therefore, we are assuming that the firm

until the strategic resource produces rents (Dierickx and Cool, 1989). During that period, the firm is exposed to higher financial risk compared to other firms with less specific investment projects. We can imagine a firm facing two hypothetical investment programs with different degrees of specificity with two possible outcomes depending on the success or failure of the investment program --figure 1--. In financial terms, the more specific the asset, the higher the spread between the possible outcomes and, consequently, the financial risk of the firm will be increased. A direct comparison between the programs outcome *in case of success* may lead to an overvaluation of high-specific assets which could support unrealistic conclusions about the 'strategic' content --i.e. sustainable long-term value-- of such assets. Actually, both investment programs in our example have equal expected values when success and failure are equally probable because the lower expected profit in case of success for the low-specific program is balanced by the lower loss when failure occurs.

The opaque dimension of strategic resources

The uniqueness of an asset bundle can be due to supply restrictions --for example, a particular location or innate human skills-- but also can arise from the absence of information to outsiders willing to exploit it to achieve their purposes. This is what we define as *opacity*. In more precise terms, an opaque asset is one that, *due to its nature or to the firm's actions, eludes its imitation by impeding the leakage of any related information to outsiders*. This related information might range from the expected value of exploitation of a given resource to the way of acquiring, accumulating or deploying a certain resource or capability. In this context, the competitive advantage of a 'resource-driven' firm is not based on specific or complementary resources but is the result of a 'transfer-barrier' which precludes strategic assets from imitation or substitution. The nature of these barriers can be institutional as in the case of patents and licenses. Nevertheless, the strategic content of certain 'knowledge-assets' (Winter, 1987) can be threatened if they are easy to identify, transparent, and have well-defined property rights, so they can be transferred in a competitive market.

As shown in figure 2, resources easy to identify, transparent and with well-defined property rights have limited ability to sustain a durable competitive advantage. Therefore, when a privileged competitive position of a firm is based on a given asset or resource bundle, we can conclude that any --or several-- of the above features do not apply for a given 'strategic' resource.

is the owner of the asset or has, to some extent, enough bargaining power to appropriate a significant

INSERT FIGURE 2 ABOUT HERE

It could happen that the resources are easy to identify but not transparent. Clear examples of such resources are trade secrets and data banks. These kinds of items are clearly defined and they can be valuable resources for competitors --thus, not specific-- and, due to their nature, they are hardly protectable once they have been disclosed⁵. In such cases, an obvious way to preserve the value of such 'knowledge assets' is to keep them away from competitors' sight. Actually, secrecy can be considered as an *artificial* opacity to the extent that the firm attempts to prevent undesired leakage of information about the key --strategic resources-- to its competitive advantage. In other words, artificial opacity arise when the firm knows clearly what its strategic resource bundle is and how it works, and, consequently, is able to replicate and transfer it to other organizations. The rent-earning potential of such 'resource-driven' firms results from the firm's *deliberate* effort to achieve and maintain the scarcity of its resource bundle. Evidently, the competitive advantage based on easy-to-identify but secret assets will be durable depending on two forces: (1) the effectiveness of the procedures assuring the secrecy and, (2) the willingness of competitors to acquire the critical information.

But opacity can arise from phenomena difficult to understand even for the firm, unable to identify the devices and resources that sustain its competitive position. The complexity of interaction among existing assets and the 'tacit knowledge' embedded in human resources create a situation of 'causal ambiguity' and 'uncertain imitability' (Lippman and Rumelt, 1982) which preserves the key of a competitive advantage from imitation because current and potential competitors cannot identify the sources of the competitive advantage and, hence, they are not able to erode it. Clear examples of such opaque resources are those arising from 'social complexity' and human resources deployment and configuration: networks, relationships, culture and values, 'social capital'. In the same vein, random and chaotic processes are often behind valuable resources and strategic capabilities such as search, adaptation and implementation of new ideas and procedures. These activities can only be partially controlled and imperfectly predicted by the firm's manager (Thiéart and Forgues, 1995; Koput, 1997). In our terms, this absence of systematic procedures for acquiring or substituting some of the strategic resources derives into a situation of *natural* opacity. Whatever the source and features of the opacity

portion of the 'quasi-rents'.

⁵ This fact is a major difference between the knowledge protection provided by patents and trade secrets. Patents are voluntary disclosure of knowledge in order to prevent the use of such knowledge without permission of its owner. Therefore, competitors cannot exploit the patented item, even though they had developed it by their own means. Conversely, other strategic resources (such as trade secrets and data banks) cannot be defended if the protected knowledge has been legally acquired by others.

are, the limited information about the strategic resource bundle will affect positively the appropriation of rents by the firm as it eliminates the 'externalities' of information as an strategic asset⁶. Unfortunately, this situation may also narrow the spectrum of financial possibilities when funds suppliers cannot observe any credible signal about the future use and outcomes of their investment.

THE RESOURCE-BASED STRATEGY AND THE FINANCIAL POLICY OF THE FIRM

So far we have examined how specific and opaque resources can be a source of above-normal returns. The firm's competitive advantage based on specific resources will be sustainable as long as the firm continues the activities in which these resources are valuable. Unfortunately, markets and technologies often evolve in unpredictable ways. This uncertainty makes specific investments riskier and, hence, more expensive to finance. The other strategic dimension of strategic resources, opacity, is an obvious barrier to imitation but also contributes to limiting the available funds when financial investors do not have access to the critical information of the future use of their funds. Therefore, the financial approach to imperfect markets provides a dual perspective partially ignored by strategy researchers. Imperfections in resource markets can be seen as source of sustainable earnings and long-term restrictions. Obviously, both must be taken into account to achieve an accurate evaluation of a firm's competitive advantage (Barney, 1986).

Financial implications of specific investments

Assets characteristics play an important role in the theory of capital structure because the costs of both financial distress and liquidation depend on the nature of a firm's assets. In case of financial distress, firm-specific assets will suffer large losses of value when the corporation is reorganized or liquidated. Thus, there is a direct relationship between the specific dimension of a firm's assets and its financial risk. Moreover, theory suggests that equity financing is optimal for assets whose value is sensitive to the financial condition of the firm (Myers, 1977; Williamson, 1988).

These results have two main implications in the strategic research field. First, traditional accounting measures of profitability --ROA, ROE-- do not discount the risk premium due to specific assets and, hence, are not accurate measures of resource rents (Montgomery and Wernerfelt, 1988). Second, from a financial perspective, highly specific assets have a limited capacity to insure lenders against

⁶ Information-based resources such as those resulting from R&D activities, have spillover effects as

bankruptcy. When facing firms with specific assets, debt holders will react by charging a risk premium to debt cost enforcing an inverse relationship between specific resources and financial leverage⁷. This conclusion can be summarized in the following proposition:

P1: The degree of asset specificity is negatively related to the financial leverage of the firm.

Examining the relation between asset characteristics and capital structures is, however, complicated by the fact that a firm's vulnerability to financial distress costs is unobservable. Researchers have dealt with this problem by using accounting variables such as fixed-to-total assets (Friend and Lang, 1988), R&D and advertising expenses (Bradley, Jarrell and Kim, 1984; Kale, Noe, and Ramírez, 1991; Opler and Titman, 1994), and the market-to-book assets ratio (Smith and Watts, 1992; Barclay and Smith, 1995a, 1995b) to proxy the value of growth options, which are assumed to have a high degree of exposure to the costs of both financial distress and liquidation --for a survey, see Harris and Raviv, (1991)--. Fixed assets are used in empirical corporate finance studies to proxy assets-in-place. Firms with high fixed assets are presumed by most financial researchers to have relatively few growth options and hence low liquidation costs. Intangible assets proxy for growth options of firm-specific assets and, thus, are presumed to have high liquidation costs. Advertising and R&D expenditures are believed to create growth options and/or firm-specific assets. High expenditures on these items are therefore associated with high liquidation costs.

Strategy literature generally agrees with the interpretation of intangible investments as valid proxies for 'firm-specific' resources, but its perspective is slightly different. Whilst corporate finance researchers interpret these investments as revealing higher costs --of liquidation--, strategy researchers tend to see investments in R&D, advertising and human resources practices as observable measures for the stock of strategic resources such as innovative capabilities, corporate reputation and human capital. All those resources and capabilities fulfill the conditions to be 'strategic' as they (i) are valuable --specific,opaque-- and (ii) have imperfect markets --if any--. Under such an 'optimistic bias', the positive and robust link between the above variables and accounting measures of performance is often viewed as an evidence of the higher rent-earning potential of the approximated strategic resources

they produce positive externalities over other firm's knowledge stock (Griliches, 1991).

⁷ These phenomena lead to an increase in the average cost of the firm's funds if we assume that debt financing is cheaper than equity financing. Tax effects (Modigliani and Miller, 1963) and agency costs (Jensen and Meckling, 1976) are potential explanations for higher costs of equity financing.

ignoring that such relationship may reflect a risk premium or higher shadow prices of investment due to financial restrictions.

Financial implications of opaque investments

One of the most productive areas of corporate finance research has dealt with asymmetries of information between firms and investors attempting to provide explanation to a wide range of phenomena: financial structure, ownership structure, mergers and acquisitions among others (Harris and Raviv, 1991).

In these theories, firm managers or insiders are assumed to possess private information about the characteristics of the firm's return stream or investment opportunities. In such situation, capital structure is designed to mitigate inefficiencies in the firm's investment decisions that are caused by the information asymmetry (Myers and Majluf, 1984; Myers, 1984). If firms are required to finance new projects by issuing equity, underpricing may be so severe that new investors capture more than the net preset value of the new project, resulting in a net loss to existing shareholders. In this case the project will be rejected even if its net present value is positive. This underinvestment can be avoided if the firm can finance the new project using a security that is not so severely undervalued by the market⁸. For example, internal funds and/or riskless debt involve no undervaluation, and, therefore, will be preferred to equity by firms in this situation. Myers (1984) refers to this as a 'pecking order' theory of financing, i.e., that capital structure will be driven by firm's desire to finance new investments, first internally, then with low-risk debt, and finally with equity only as a last resort.

As we have previously stated, non-specific and identifiable resources can be protected from imitation by obscuring any activity which could reveal critical information to outsiders --f.e. by means of integration--. Unfortunately, this behavior could affect negatively the access to external funds and, in the most extreme cases, the project should be financed only by internally generated funds as the access to low risk debt is limited when specific assets are a substantial proportion of a firm's resources⁹. Thus, we can conclude that,

⁸ The underinvestment phenomenon derived from informational asymmetries is a clear example of the dual perspective of financial and strategy research. Suboptimal investment is characterized by a positive difference between the marginal productivity of capital and its financial cost, which can be interpreted as above-normal rents when the 'shadow' cost due to financial restriction is not considered.

⁹ Several phenomena can reinforce the financial restrictions derived from the existing information asymmetries, i.e. the firm's restrictions for issuing low-risk debt --young or small size firms and projects indivisibility--.

P2: the degree of opacity (transparency) of firm's resources restricts (enhances) the access to external financing of the firm and, particularly, to debt financing.

If P1 and P2 are verified, investments in specific and opaque resources will be negatively related to the firm's debt ratio because of the higher cost of debt if the firm owns specific and riskier assets, and due to restrictions in borrowing capacity given the existing information asymmetry associated with the exploitation of opaque resources --figure 3--. Furthermore, this bidimensional approach is consistent with some previous evidence of positive effects of specific but transparent investments on financial leverage (Balakrishnan and Fox, 1993).

INSERT FIGURE 3 ABOUT HERE

Once propositions P1 and P2 are formulated there are no clear methods to measure the specific and opaque degree of a firm's resources. This situation is complicated by the fact that as a resource-view scheme states, firms are configured by unique resource bundles and a given resource may be specific to one firm but not to others. Moreover, as Williamson (1988) declares '*... the tangible/intangible breakdown is a very incomplete measure of asset specificity. Thus, although intangible investments in R&D and advertising have poor redeployability, this is true of many tangible assets*'. Actually, both features --specificity and opacity-- are unobservable and, thus, an indirect measure is needed to achieve testable propositions. In the following subsection, the *internalization* of processes leading to strategic resources accumulation is proposed to approximate the specific and opaque degree of firm's resources.

THE INTERNALIZATION OF STRATEGIC INVESTMENT AS A MEASURE OF SPECIFIC AND/OR OPAQUE RESOURCES

There is a wide range of reasons that lead economizing firms to choose to perform the activity in-house against alternative contract basis with another firm (Demsetz, 1988; Teece, 1988; Kogut and Zander, 1992). Although perhaps the most influential perspective on vertical integration is comparative contracting. This approach analyzes how various governance structures, which differ in the costs with which they achieve adaptation between contracting parties, match with the characteristics of transactions. Adaptation is important because boundedly rational agents cannot foresee all future

contingencies and contract against them. In this view, firms vertically integrate when transaction-specific assets are subject to opportunistic expropriation by a buyer or supplier (Williamson, 1975, 1985, 1991; Klein, Crawford and Alchian, 1978; Grossman and Hart, 1986). From the point of view of transaction cost economics, highly specific investments will be internally made to save the cost of an arm's length transaction. Because of its idiosyncratic application, a potential supplier of strategic resources --i.e. an independent lab or research organism, distributors, suppliers, employees, etc-- will be exposed to the opportunistic behavior of the buyer --the firm-- and therefore specific investment and further transaction will be not undertaken, even though such exchanges would be profitable to both parties. Thus, it is reasonable to infer that internal accumulation of strategic resources reflects higher levels of specific investment than subcontracted activities or external acquisition. Consequently,

P3^s: the internalization level of the accumulation process of strategic resources is positively related to the degree of specificity of such resources.

Other motivation of internalization processes consistently explained by comparative contracting is the firm's attempt to prevent the exposure of proprietary knowledge to competitors (Teece, 1986). A profit-seeking innovator, confronted by knowledge valuable for its competitors and weak intellectual property protection, is forced to expand its activities through integration if it is to prevail over imitators. Again, internalizing the sources of the 'key knowledge' can be a practice aimed at protecting 'knowledge-based resources' against undesired disclosure:

P3^o: The internalization level of the accumulation process of strategic resources is positively related to the degree of opacity of such resources.

Notice that this proposition holds for any kind of 'outsiders' --including buyers, employees, investors, subcontractors, etc-- and not only for suppliers. Any kind of firm-related information which could be valuable to its competitors must be kept away from outsiders. Otherwise the value of identifiable resources is threatened by potential arrangements between such external agents and competitors. Thus, the integration of activities related to the accumulation and deployment of strategic resources can be interpreted as a result of a decision process guided by the specific and opaque features of investments -
-Figure 4--.

INSERT FIGURE 4 ABOUT HERE

So far, we have described the advantages of internalization as a mechanism for dealing with the strategic dimensions of resources. Obviously, the development of new activities entails costs and restrictions that should be considered for a more comprehensive approach to the 'make-or-buy' decisions. An effective production of specific resources requires a 'critical mass' which is often resulting from a long and continuous stream of investments with highly uncertain results (Dierickx and Cool, 1989). Secrecy can only be a partial and temporary defense against competitors' efforts to be knowledgeable about the sources of higher returns. In addition, impeding information flows can be costly when internal agents --researchers, engineers or managers-- can behave opportunistically and, therefore, they must be incentivated by means of a higher remuneration or other non-pecuniary benefits. Furthermore, coordination, control and planning processes become more complex in an integrated firm. Finally, fully-integrated activities need large amounts of financing for acquiring equipment, training personnel and investing in complementary assets.

METHODOLOGY AND DATA

We have tested our resulting propositions using panel data techniques (Hsiao, 1988). This methodology provides consistent estimates of coefficients when unobservable individual effects exist. In such cases, cross sectional OLS estimates using pooled data are biased and panel methods including individual effects must be considered to achieve consistency. The individual effects can be considered fixed or random, and their specifications are as follows:

Fixed Effects Model, (FE)

$$y_{it} = \alpha_i + \beta x_{it} + u_{it}$$

Random Effects Model, (RE)

$$y_{it} = \theta_i + \beta x_{it} + u_{it}$$

where y_{it} and x_{it} are the dependent variable and independent variable, respectively. Individual effects are α_i fixed, and θ_i random and normally distributed. Finally, u_{it} is the random disturbance.

Whether to treat the effects as fixed or random is not an easy question to answer and depends on the nature of the sample and the research objectives. The fixed-effects model is viewed as one in which the researcher makes inferences on the effects that are in the sample. The random-effects model is viewed as one in which investigators make unconditional inferences with respect to a larger population.

Obviously, that question is important when the estimates differ widely between the two models. The significance of such a difference is testable through the Hausman χ^2 test.

The advantages of market-based measures over their accounting counterparts in approximating the real economic value of the firm has been extensively debated (Fisher and McGowan, 1983). Among the several reasons which justify the differences between the value of the firm reflected in stock market values and the historical value reported in accounting financial statements, a major one is that financial statements are limited to those items that meet the present-day recognition criteria employed by the accounting profession. Thus, potentially relevant items such as advertising and R&D are not reported on balance sheets because they do not meet the qualitative criterion of reliability. Indeed, in *Statement of Financial Accounting Standards No. 2*, the FASB took the position that practically all R&D should be expensed as incurred¹⁰. However, some authors justify the use of accounting measures with two basic reasons: (1) Financial statements are easier to access than market-based measures and their magnitudes are built under some homogeneous --accounting-- criteria and (2) the decisions of financial managers and investors are often based on information provided by book values. In order to provide more complete evidence, we have considered as an independent variable the financial leverage computed from accounting and market-based magnitudes.

The Spanish stock market --Bolsa de Madrid-- is characterized by an unequal distribution of firms by industries, where financial intermediaries --banking and insurance firms-- have a clear predominance. We excluded from our sample financial firms given the peculiarity of their activity. We started from 119 non-financial firms quoted in the Spanish stock market, from 1990 to 1994. The accounting data of sales, total assets, debt and equity in books were extracted from the annual reports sent to the 'Comisión Nacional del Mercado de Valores' --CNMV, analogous to the U.S. S.E.C.-- by the quoted firms. The market value of equity was computed from data collected in the annual 'Boletín de Cotizaciones'¹¹. Unfortunately, the information contained in the annual reports of quoted firms does not include data on R&D, advertising and human resources so we addressed a postal survey --with successive phone recalls-- to these 119 firms to gather additional data. The following raw data on expenses were requested: (1) total expenses per year of R&D internally developed, (2) total expenses per year of R&D externally bought or subcontracted, (3) total expenses in advertising per year, and (4) total expenses in personal training. We also asked data on the structure and qualification of the firm's

¹⁰ A similar solution is adopted by the Spanish accounting standards (rule num. 5 of the Spanish 'Plan General Contable' of 1990.).

¹¹ In English terms, Bulletin of Quotations.

human resources: (1) the classification of employees by functional areas --CEO members and top executives; clerical staff, professional and technical staff; sales force and sellers-- and (2) the educational level of human resources --bachelors, engineers and architects; medium-college degree; specialized and unspecialized blue collar workers--.

The above data were used to proxy the technological capabilities, reputational assets and specific human capital. These resources and capabilities have been traditionally considered as strategic due to their ability to generate above-normal rents and their imperfect imitability and/or substitutability as a result of the market imperfections involved.

We received a total number of 58 questionnaires and excluded those with one or more empty fields and those whose answers on assets, sales and number of employees differed more than 10% from the data reported to the CNMV. After considering the above criteria, the size of our final sample was 185 observations of 37 non-financial firms quoted in the Spanish stock market from 1990 to 1994.

The following variables were constructed using the raw data:

Financial leverage (LEVB; LEVM): We have considered two traditional measures of financial leverage. LEVB is the ratio of the book value of total debt with explicit cost --long-term and short-term debt-- to the book value of total debt plus the book value of total equity (Titman and Wessels, 1988). LEVM is the analogous ratio when using the market value of total equity (Balakrishnan and Fox, 1993).

Specific and/or opaque R&D intensity (IR&D): Previous works have used the ratio of R&D to net sales as proxy for intangible assets which are assumed to be more specific than tangible assets (Balakrishnan and Fox, 1993; Bradley, Jarrell and Kim, 1984; Titman and Wessels, 1988). The negative relationship between R&D intensity and the firm's debt position is a broadly accepted regularity (Baysinger and Hoskisson, 1989; Hoskisson, Johnson and Moesel, 1994). In order to test propositions P1 and P2, we have approximated the specificity and opacity level of R&D investment by the ratio of internally expended R&D to total sales. As we discussed above, technological knowledge acquired through internally developed activities is likely to be highly firm-specific and opaque. This interpretation would imply that IR&D will be robustly and negatively related to the firm's debt ratio.

Non-specific and/or transparent R&D intensity (ER&D): This ratio is analogous to ER&D when using external R&D expenditures. This category includes R&D acquired by contracting with other parties: firms, universities or research centers. According to our previous argument, such investments are less specific and/or more transparent due to outsiders' collaboration. Therefore, a more moderated effect on leverage is expected.

Advertising intensity (ADV):. The ratio of advertising expenses to net sales, as well as R&D intensity, has been used as a proxy for firm-specific assets (Titman and Wessels, 1988; Bradley, Jarrell and Kim, 1984). This interpretation justifies a negative effect of this variable on financial leverage but, as Balakrishnan and Fox (1993) point out, this investment may represent the reputational assets of the firm as its purpose consists of transmitting information about the firm and its products to current and potential customers. Hence, advertising expenses should be considered a transparent investment which could facilitate the firm's access to external funding. Therefore, the effect of the advertising ratio will depend on the dominant effect --specificity vs. transparency-- over the debt ratio.

Intangible assets ratio (INT) over total net assets: It is expected that most of the items included in the 'Intangible assets' account¹² suffer greater losses of value compared to tangible assets. In consequence, leverage should be negatively related to the proportion of intangible assets in books. Nevertheless, this measure has been largely criticized for its inability to capture both the accurate value of such assets as well as their specific component (Williamson, 1988).

Specific human resources (SHC): The financial structure cannot only be affected by specific dimension of assets owned by the firm. As Titman (1984) states, if a certain worker or supplier needs to make specific investments, her collaboration will be more sensitive to the firm's bankruptcy probability and, hence, the financial leverage will be negatively related to the specificity level of such a collaborator's investment. Among the several measures useful for proxying human specific capital, employee turnover and tenure have been often used. Tenure was discarded because we needed an aggregate measure of human capital per firm. We also assumed that the answer rate would be lowered if turnover was requested as it would force those surveyed spend time computing such measure from their raw data base. Hence, we considered a suitable alternative to request data easily available to the human resource managers and , then computing an aggregate measure of human specific capital by factor analysis techniques. The specific human capital proxy is represented by a factor positively

correlated with the proportion of personnel with college studies (COLL), technical staff (TECH), and training expenses per employee (TRE). This factor shows negative correlations with the proportion of clerical staff (CLER) and the proportion of temporary (TEMP) over total number of employees --table 1--.

INSERT TABLE 1 ABOUT HERE

Size and Industry (LSAL; SEC): Both control variables have been extensively used in the empirical analysis of the financial structure. A number of authors have suggested that leverage ratios may be related to firm size. Some evidence supports that direct bankruptcy costs appear to constitute a larger proportion of a firm's value as that value decreases (Warner, 1977; Ang, Chua and MacConnell, 1982). We use the natural logarithm of sales (LSAL) as the indicator of size. Previous literature indicates that firms within an industry are more similar than those in different industries --for a detailed discussion see Harris and Raviv, 1991--. We control the industry effects by their corresponding dummy variables (SE1-SE5)¹³.

RESULTS

To provide a reference point for subsequent estimates, we began by ignoring potential biases and estimating the equations by OLS. In addition, this specification allowed us to test the relevance of time, industry, and unobservable individual effects. These results are presented in the first two columns of Table 2.

As far as industry effects are concerned, the 'Electric Utilities' group shows a significantly higher leverage than the omitted sector --'Food'--. Conversely, the 'Machinery, Chemical and Mining' group is, on average, less leveraged. No significant time effects were detected. As the F-test shows --third and fourth columns--, the null hypothesis of equal intercepts across firms was rejected at 1% level. This result suggests potential biases in cross-sectional estimates and a more accurate estimation when using individual effects models.

¹² In Spanish terms, 'Inmovilizado inmaterial', reflects the part of expenditures in intangible assets that can be considered as an asset.

¹³ After aggregating those sectors including less than four firms, we obtained the following sectors: SEC1: Electric and Gas Utilities (SEC1), Machinery, Chemical and Mining (SEC2), Food (SEC3), Construction and Highways (SEC4), and Manufacturing (SEC5).

INSERT TABLE 2 ABOUT HERE

Regardless of the individual effect model considered --fixed or random--, internal R&D investments over sales (IR&D) showed negative and significant effects on financial leverage. This effect remained significant for both measures of financial leverage --LEVB and LEVM-- and support the empirical findings of previous works (Bradley, Jarrell and Kim, 1984; Baysinger and Hoskisson, 1989; Balakrishnan and Fox, 1993; Hoskisson, Johnson and Moesel, 1994) . In contrast, external R&D (ER&D) had no significant effect on the borrowing ratio. It is noteworthy that the robustness of this link is weakened when considering other proxies for strategic resources such as the advertising ratio (ADV) and the specific human capital index (SHCI). A potential explanation of such a fact is that the market value of debt ratio may overcome the shortcomings of accounting measures in approximating the economic value of equity. This would also justify the poorer performance --adjusted R^2 -- of those models including the book value of the debt ratio as a dependent variable.

The factor used as a proxy of specific human capital (SHCI) is negatively related to the financial leverage but only when market value of equity was considered. As we described above, this divergence of significance between the accounting and market-based measures of leverage may reflect that this factor increases the market value of the firm without affecting its book values. Positive and significant effects of advertising intensity were observed. This evidence corroborates previous findings (Balakrishnan and Fox, 1993) and supports the hypothesis that advertising intensity is a 'transparent' strategic resource as it convey valuable information about the firm and its products to current and potential customers as well as lenders and financial suppliers.

In those models with the market measure of leverage as dependent variable, significant differences between the estimates from the fixed and the random effects models --Hausman χ^2 test-- are also found. Although signs and significance are consistent in both models, the random effects specification provides more moderated effects of internal R&D and advertising on the financial leverage, while the specific human resources index (SHCI) shows a greater impact --although lower significance--. This can be due to the different nature and statistic properties of the specific capital human index and the remaining proxies for strategic resources. Actually the factor used to proxy the specific human resources shows lower cross-sectional and longitudinal variability than the IR&D and advertising ratios. This fact would justify a higher correlation between SHCI and the unobserved individual effects and, consequently, negative bias is expected in the model estimates (Huselid and Becker, 1996).

As we previously stated, the choice of fixed vs. random effects specification depends more on the underlying hypothesis and scope of the research rather than the information provided by the data. When the aim of the analysis is to make inferences about a population based on a smaller sample, the random effect model is more efficient than the fixed effects one and, thus, a better choice. Nevertheless, the random effects model assumes that the individual effects are not correlated to errors, otherwise estimates become biased. Under such consideration, the rejection of the null hypothesis of the Hausman test lends support to the fixed effects model against the random effects specification in those models including the market value of the financial leverage as dependent variable.

Other potential determinants are not significant in any estimation. These results indicate that the ratio of intangible to tangible fixed assets is not an accurate proxy for capturing the effects of specific fixed assets on financial leverage. The effect of size on capital structure is relatively weak and positive only in the random effects model --column 6-- .

To test the robustness of the above results we repeated the estimation considering a larger subsample which includes all firms with, at least, two valid data on each item requested and replacing the missing values by the longitudinal average of the valid data in each incomplete item --see table 3--. This procedure allowed us to enlarge our sample by 75 observations --15 firms, 5 years-- to achieve a total of 260 observations --52 firms, 5 years--.

INSERT TABLE 3 ABOUT HERE

The resulting estimates are shown in table 4 and provide some differences compared to table 2. First, the effects of strategic resources proxies over the market value of debt ratio not only remained the same but also became reinforced; second, the models including the book value of the borrowing ratio showed worse fit and significant negative effects of advertising intensity under the random effects model, although it was rejected against the fixed effects model by the Hausman test at 1% level. In essence this evidence supports the previous results obtained from the restricted subsample when of using the market value of the debt ratio as a dependent variable and backs up the critics of accounting measures as a limited representation of the economic value of equity and, consequently, the debt ratio computed from it.

INSERT TABLE 4 ABOUT HERE

DISCUSSION

Although the resource-view of the firm has contributed substantially to understanding the devices that maintain and enhance the competitive advantage, the underlying conceptual framework allows a more comprehensive interpretation of heterogeneity in firms' behavior and outcomes. It is argued that the absence of imperfections in resource markets can set up effective barriers to defend the erosion of the firm's competitive position. Obviously, all of these obstacles to obtaining imperfectly imitable and substitutable resources and capabilities are valuable for the firm to the extent that its competitors have few, if any opportunities to acquire and deploy them. Therefore, imperfections in resource markets can also be viewed as restrictions to the feasible set of strategies for those firms lacking strategic resources. This 'dual perspective' of the resource-approach has straightforward implications not much explored in strategy research. Moreover, phenomena that restrict, at least during a long time period, the acquisition of valuable and difficult-to-copy resources not only states 'ex-ante' limits but also 'ex-post' conditions to the feasible corporate and business strategies. As a result, from a resource-based perspective the evaluation of strategic choices requires a deeper analysis than that derived from comparing traditional performance measures.

In this research we have addressed this question by translating some kinds of market imperfections into terms of resource features. Specific assets entail sustainable rents as there exists a substantial difference between their productivity as a part of a particular firm and their market price or development cost. Opaque resources avoid imitation or substitution by competitors by assuming uncertain and complex processes or even by creating such uncertainty. Both dimensions add strategic content to resources and capabilities but also shape the financial policy of the firm and, in particular, its capital structure. Actually, the financial approach to these market imperfections prescribes higher risk and cost of financing and restricted availability of external funds when opaque resources are deployed.

The results of our empirical study show that traditional proxies for strategic resources such as reputational assets, technological capabilities and specific human capital affect the firm's debt ratio in different ways in spite of the fact that they are expected to have similar implications as intangible assets and non-debt tax shields. Actually, essentially specific and opaque resources such as internally

made R&D and specific human capital are inversely linked to financial leverage. Alternatively, reputational assets, although specific, reveal a positive and robust correlation with the borrowing ratio consistently explained by their informational purpose.

It is noteworthy that our theoretical scheme predicts that not only the nature and objective of investments but also their modes of acquisition can affect the capital structure of the firm. The evidence provided in this work confirms that financial structure is partially determined by 'make-or-buy' decisions related to R&D activities. When specificity is the basic motivation for internalizing technological investments, debt cost will include a risk premium due to the higher losses of value when financial distress occurs. If internal development of R&D attempts to preserve critical information, credit suppliers will restrict the volume of debt offered to the liquidation value of the firm's assets, in order to hedge their investment. As a result, internalization of R&D investments would be negatively related to the borrowing capacity of the firm. This hypothesis is supported by the resulting evidence of this research. The ratio of internal R&D investments to total net sales is significant and negatively correlated with the financial leverage, while external R&D intensity does not significantly affect the borrowing decision.

These findings suggest interesting implications. First, firms exploiting resources with a high strategic content --highly opaque and specific-- face more restrictive financial scenarios. To the extent that equity is more expensive than debt --due to agency costs and tax effects-- resource-driven strategies can increase the cost of the firm's financial structure. Second, young and small firms lacking a critical mass of strategic resources will face serious limitations to growth as their financial choices are fewer than those for large and mature companies. Third, the design and implementation of a 'resource-based' strategy must be compatible with the financial policy of the firm. This implication is specially interesting when analyzing financially distressed firms. Fourth, the different effects of external and internal R&D on leverage justify a more disaggregated treatment of R&D investments. Otherwise, biased estimated effects of R&D may lead to different interpretations and inconclusive findings. Such an argument is supported by the recent empirical research that detects no significant or even positive relationships between R&D and access to financial markets (Hundley et al., 1996). Finally, some conclusions from a dynamic point of view. A firm characterized by a resource-driven strategy must take into account that the features of its strategic resource bundle will determine its future financial policy. The proposed bidimensional approach of strategic resources allows us to understand the

matching between the managerial processes of selection and implementation of business strategies and the feasible and desirable path of financial decisions.

As concluding remarks we can anticipate some promising directions for future research derived from these results. From a theoretical point of view, opacity and specificity reduce borrowing capacity due to different causes. Opacity generates restrictions on the available amount of debt, while specificity increases the cost of debt financing. Unfortunately, our research design does not allow us to distinguish between these distinctive effects. Further work about the impacts of the nature and features of strategic resources on other financial instruments --equity, convertible debt, long-term and short-term debt-- could help to clarify this issue. Obviously, the bidimensional approach described above is not exhaustive and other market imperfections such as complementarities or different kinds of informational asymmetries should be examined to complete this elementary approach to comprehending a firm's success in assuring the compatibility of its financial needs-availability of funds and the features of its targeted strategic bundle.

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Table 1. Correlation matrix of the variables related to the human resources and the loading factor of the specific human capital index.

	COLL	TRE	TEMP	COM	TECH	CLER	SHCI^(a)
COLL	1	--	--	--	--	--	0.6453
TRE	0.449**	1	--	--	--	--	0.7221
TEMP	-0.030	-0.276**	1	--	--	--	-0.3728
COM	-0.281*	-0.144	0.0199	1	--	--	0.1132
TECH	0.573***	0.274**	-0.078	-0.293*	1	--	0.6154
CLER	0.119	0.075	0.051	-0.123	-0.103	1	-0.5342

Industry effects are eliminated by computing the correlation matrix over the differences of each variable and its industry mean.

* Significance at 10 % level.

** Significance at 5 % level

*** Significance at 1 % level

(a) Extracted factor after 'varimax' rotation of the correlation matrix. Cronbach's α is 0.62.

Table 2. Resulting Estimates from the subsample including the complete questionnaires (37). Total number of observations, 37 firms x 5 years = 185 obs.

	Pooled data		Fixed effects		Random effects	
	LEVMI	LEVBI	LEVMI	LEVBI	LEVMI	LEVBI
CONS.	0.38*** (5.37)	0.56*** (3.13)	--	--	--	--
SHCI	-11.17* (-1.69)	-16.51 (-0.93)	- 8.76** (-2.14)	-11.31 (-1.03)	-12.76* (-1.73)	-9.22 (-0.44)
ADV	0.188*** (3.27)	0.117* (1.71)	0.092*** (2.73)	0.036* (1.81)	0.083*** (3.26)	0.0794* (1.66)
IR+D	-0.155*** (-5.54)	-0.224*** (-6.62)	-0.152*** (-4.78)	-0.081*** (-5.76)	- 0.112*** (- 5.04)	-0.121*** (-5.87)
ER+D	-0.2371 (-0.84)	0.1162 (1.21)	0.083 (1.43)	0.1428 (1.21)	-0.1087 (-0.06)	-0.0935 (-0.54)
INM	0.1817 (0.78)	- 0.094 (-0.57)	0.1302 (0.61)	-0.0744 (- 0.23)	-0.0552 (-0.34)	0.0931 (0.97)
LSAL	0.0987 (1.26)	0.1103 (1.42)	0.0577 (1.33)	0.1024 (1.51)	0.0377 (0.95)	0.0802* (1.92)
SEC1	0.207* (1.71)	0.293** (2.31)	--	--	--	--
SEC2	-0.099* (-1.90)	-0.135 (-1.59)	--	--	--	--
SEC4	0.0877 (0.77)	0.1051 (0.81)	--	--	--	--
SEC5	0.0114 (0.26)	0.1373 (0.84)	--	--	--	--
D93	0.025 (1.08)	0.007 (0.64)	--	--	--	--
D92	0.002 (0.42)	0.004 (0.54)	--	--	--	--
D91	- 0.035 (-0.84)	-0.049 (-1.21)	--	--	--	--
D90	- 0.026 (-0.17)	-0.071 (-0.91)	--	--	--	--
adj. R ²	0.41	0.34	0.51	0.28	0.44	0.21
χ^2 -test	--	--	--	--	10.71**	6.02
F-test	13.27***	8.07***	(b)31.76***	(b)29.44***	--	--

p-value between parentheses

SHCI: Specific human capital index.

(b) F statistic of equal intercepts (null hypothesis: irrelevance of individual effects).

χ^2 : Hausman test (null hypothesis: equal coefficients between the fixed and the random effects model).

* Significance at 10 % level.

** Significance at 5 % level

*** Significance at 1 % level

Table 3. Number of complete, incomplete and rejected questionnaires.

Questionnaires with all data completed.....	37
Questionnaires with 3 or less missing values in	
advertising investments	3
R&D internally developed.....	4
R&D externally acquired	6
data on human resources structure.....	2
Questionnaires rejected	6

TOTAL	58

Table 4. Resulting Estimates from the subsample including the questionnaires with 3 or less missing values (52). Total number of observations, 52 firms x 5 years =185 obs.

	Pooled data		Fixed effects		Random effects	
	LEV M	LEV B	LEV M	LEV B	LEV M	LEV B
CONS.	0.28*** (6.31)	0.426*** (5.12)	--	--	--	--
SHCI	-13.49** (-1.82)	3.63 (0.08)	-13.44*** (-2.82)	-6.03 (-1.39)	-18.73* (-1.88)	1.19 (0.14)
ADV	0.113** (1.92)	0.143 (1.58)	0.132* (1.97)	0.098 (1.04)	0.143** (2.36)	-0.126* (-1.86)
IR+D	-0.414*** (-7.32)	-0.301** (-2.41)	-0.836*** (-5.21)	-0.502*** (-3.36)	-0.318*** (-5.44)	-0.630*** (-2.91)
ER+D	-0.537 (-0.86)	-0.922 (-0.37)	0.070 (0.64)	-0.479 (-0.94)	0.127 (0.81)	-0.362* (-0.07)
INM	-2.45 (-0.75)	0.758 (0.84)	-1.19 (-0.13)	0.815 (0.24)	-0.133 (-0.72)	-0.926 (-1.19)
LSAL	0.113 (1.01)	0.417* (1.86)	-0.054 (-0.71)	0.212* (1.80)	-0.912 (-0.43)	-0.136 (-1.45)
SEC1	0.384** (1.89)	0.536* (1.92)	--	--	--	--
SEC2	-0.107* (-1.69)	0.058 (0.42)	--	--	--	--
SEC4	1.75 (1.27)	-0.048 (-0.16)	--	--	--	--
SEC5	-0.204* (-1.78)	-0.362** (-1.94)	--	--	--	--
D93	0.082 (0.76)	0.113 (0.81)	--	--	--	--
D92	-0.044 (-0.31)	0.169 (0.74)	--	--	--	--
D91	0.226 (0.135)	-0.176 (-0.52)	--	--	--	--
D90	0.114 (0.79)	-0.585 (-1.31)	--	--	--	--
adj. R ²	0.38	0.25	0.57	0.33	0.47	0.16
χ^2	--	--	--	--	22.63***	18.78***
F stat.			(b)41.12***	(b)27.55***	--	--

p-value between parentheses

SHCI: Specific human capital index.

(b) F statistic of equal intercepts (null hypothesis: irrelevance of individual effects).

χ^2 : Hausman test (null hypothesis: equal coefficients between the fixed and the random effects model).

* Significance at 10 % level.

** Significance at 5 % level

*** Significance at 1 % level

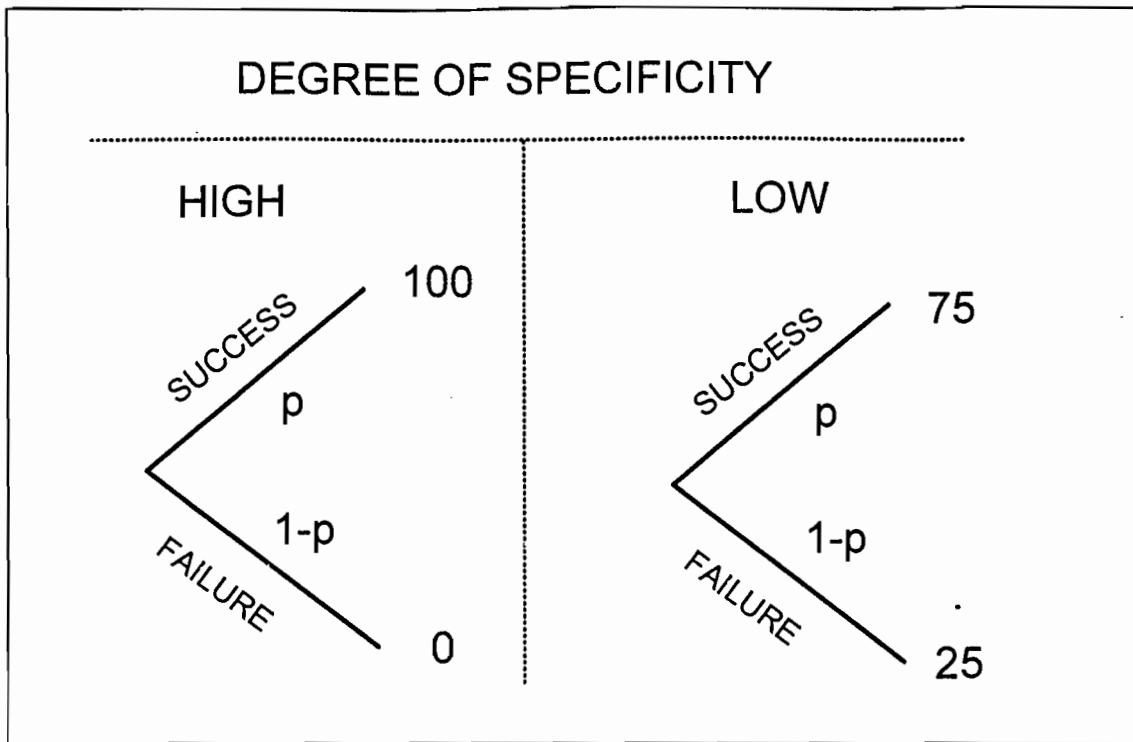


Figure 1. The specific dimension of an investment project and financial risk.

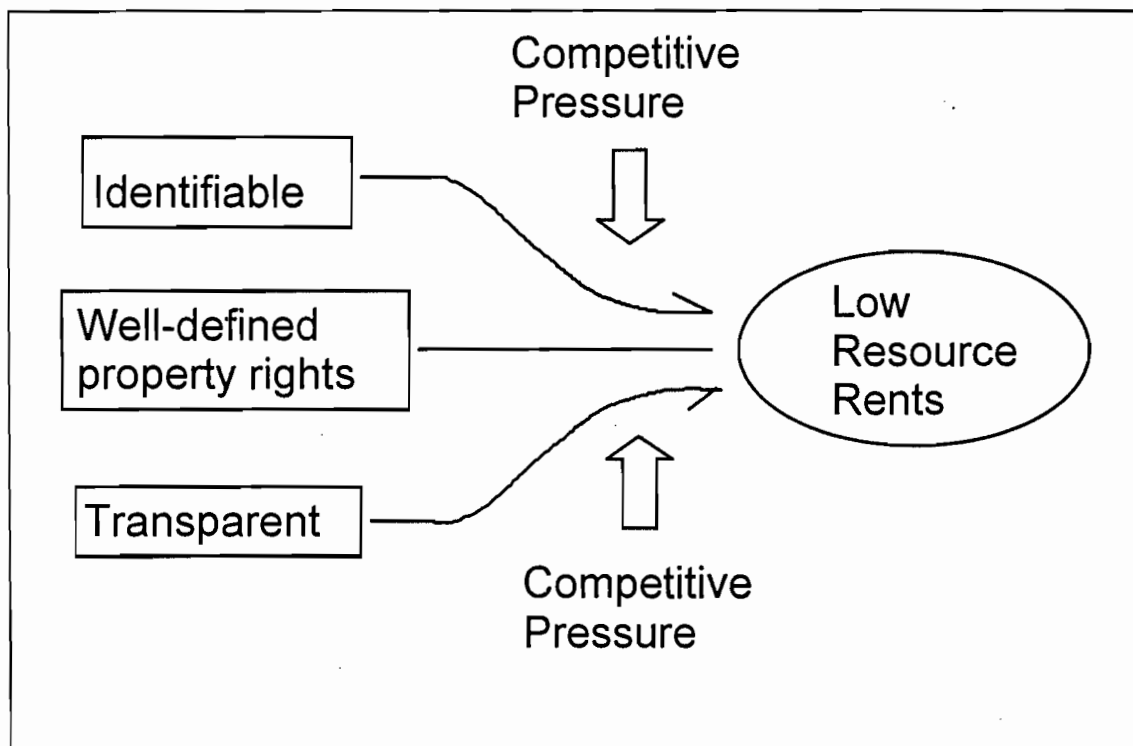


Figure 2. The limited ability of normal resources to generate and sustain rents.

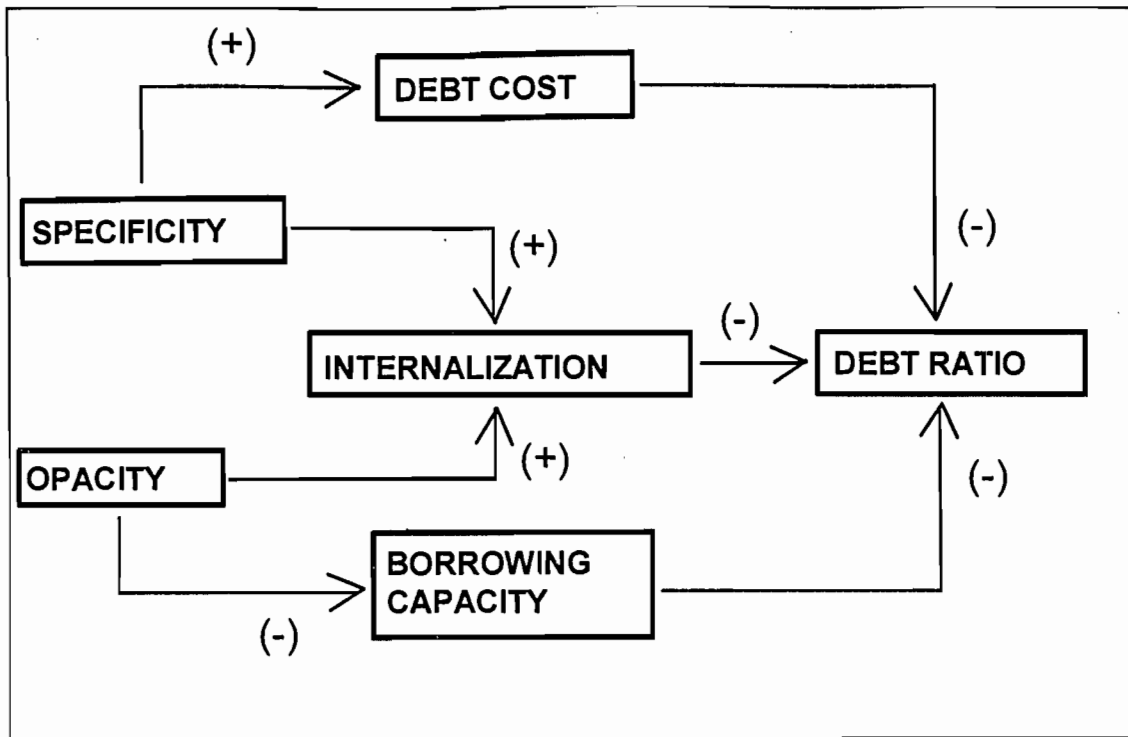


Figure 3. Interaction scheme of strategic features of resources and its financial implications.

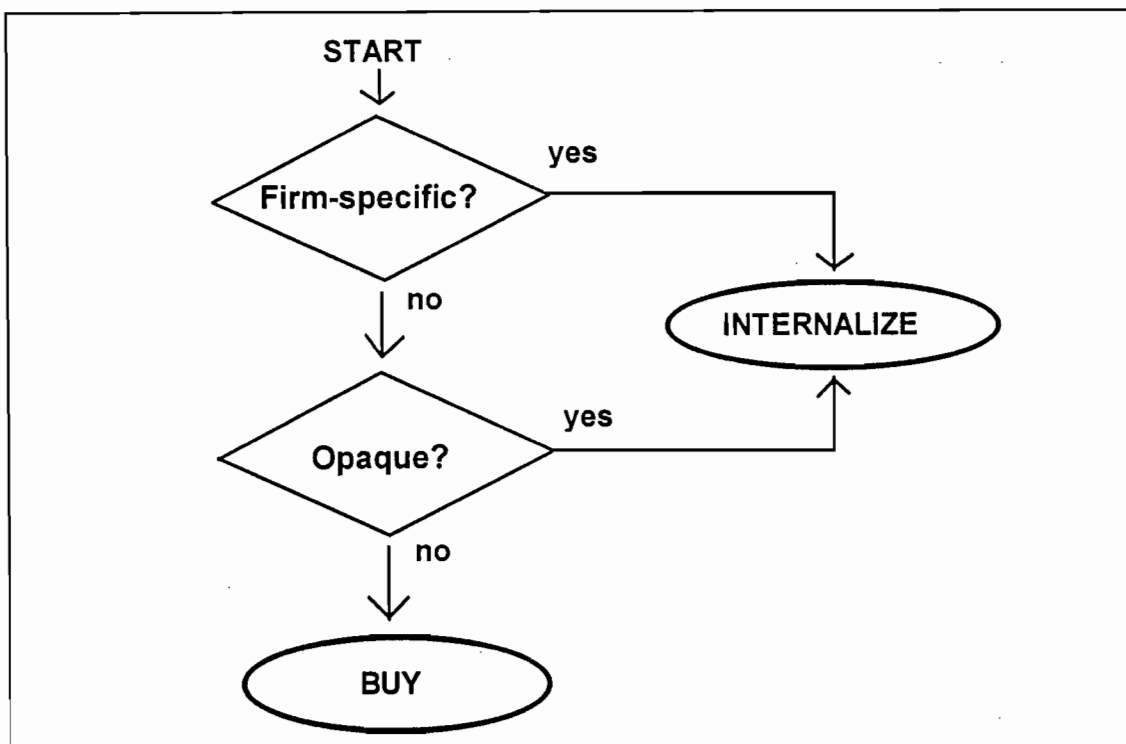


Figure 4. The specific and opaque dimension of resources and the 'make-or-buy' decision.

QUESTIONNAIRE

Company's name: ACEITES Y PROTEINAS, S.A.

The aggregate treatment of completed filled data assures their confidentiality. In order to facilitate the answers to the questionnaire, we provide some accounting information which will be useful for identifying the productive unit. This information has been obtained from the firm's annual reports addressed to the 'Comision Nacional del Mercado de Valores'. If there are any mistakes, write over the incorrect data and rewrite the correct data in the squares below.

	1994	1993	1992	1991	1990
Total net Sales (in mill. of pesetas)	48310	49716	40801	13712	18123

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Net Assets (in mill. of pesetas)	19308	24410	19700	14808	11495
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Average number of workers	354	332	375	162	217
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I. ADVERTISING EXPENDITURES

	1994	1993	1992	1991	1990
I.1 Did the firm carry out advertising activities in the years 1990-94? (yes/no)..					
I.2 Total advertising expenditures (account 627 of PGC) in mill. of ptas.....					

II. I+D EXPENDITURES

	1994	1993	1992	1991	1990
II.1 Did the firm make or contract R&D activities in the years 1990-94? (yes/no)					

II.2 Total expenditures in R&D in mill. of pesetas/ in percentage over net sales (write over what does not apply):

	1994	1993	1992	1991	1990
-made by the firm					
-contracted with other parties					

III. Structure and training of employees

III.1 Write the average permanent employees under the following classifications, number of average individuals / in percentage over total employees (write over what does not apply)

	1994	1993	1992	1991	1990
-Bachelor, Engineers and Architects					
-Medium undergraduate studies					
-Specialized workers					
-Unspecialized workers					
-Other					

	1994	1993	1992	1991	1990
-Top executives and CEOs					
-Professional and technical staff					
-Clerical staff					
-Sales force					
-Remaining permanent employees					

Temporary employees

III.2 Did the firm hire temporary personnel in the years 1990-1994? (answer yes or no)

	1994	1993	1992	1991	1990
-Number of temporary workers					
-Number of average weeks per worker					

Personnel training

III.3. Did the firm carry out training activities during the years 1990-94?(yes/no)

	1994	1993	1992	1991	1990
-developed by the firm					
-developed by other parties					

III.5. Total expenditures in training of employees. In millions of pesetas / in percentage over total salaries.

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