



## DETERMINING KNOWLEDGE-INTENSIVE COMPANIES ACQUISITION VALUE FOR M&A PURPOSES: AN INTELLECTUAL CAPITAL APPROACH

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### Abstract

The acquisition price of knowledge-intensive companies in an M&A deal depends largely on the resultant operating synergies, i.e. the potential value knowledge companies can bring to the acquirer's existing businesses through the combination of both firms' assets. The value of knowledge companies basically resides in their innovation potential and human capital competencies. These intangibles are part of knowledge companies' intellectual capital, which is generally seen by market-established firms as the least resource- and time-consuming route to innovation. In this paper the author provides an alternative approach to valuation in order to assess the purchase price of a knowledge company in a merger or acquisition context. In particular, he analyzes the additional value a knowledge-intensive company can bring to the acquiring firm and how much of that value should be retained by the acquirer.

**Key Words:** intellectual capital, valuation, operating synergies, intangibles.

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### INTRODUCTION

The major value of knowledge companies lies in their innovation potential and creative ideas. In recent years, we have witnessed a huge movement towards the acquisition of small knowledge firms in order to explore their innovation capabilities and human capital competencies. Market-established firms in many industries, particularly in the technology-intensive sectors, have been desperately looking for access to new and creative ideas as a way to grasp new market opportunities and expand their businesses. The takeover of knowledge-intensive companies is usually seen by these firms as the least resource- and time-consuming route to innovation. Those firms are seeking the operating synergies that result

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from the combination of knowledge companies' intellectual capital with their organizational structure and market power.

Although there is a vast array of references on mergers and acquisitions, M&A definitions do not vary significantly among authors. For the purposes of this paper, we have taken Damodaran's definition on M&A (Damodaran, 2001: 835). A merger is an acquisition process where the boards of directors of two firms agree to combine the firms' assets through stockholders' approval. The target firm may cease to exist and become part of the acquiring firm or a new firm is created where both the acquiring firm's and target firm's stockholders receive new firm's stock.

A firm's acquisition can also be realized through the purchase of assets as one firm acquires the assets of another at a negotiated price, or by a tender offer, where the bidding firm offers to buy the outstanding stock of the target firm at a specific price, communicating this offer in advertisements to stockholders.

Skype's takeover deal illustrates the importance of operating synergies to competitive advantage in the internet business. EBay, a giant communications company, bought Skype, the fast-growing provider of voice calls over the internet, for USD 2.6 billion with an upside room of USD 1.5 billion linked to business performance targets. The deal aimed to add new complementary communications capabilities to EBay's e-commerce operations. By integrating Skype's VoIP technology into its businesses, EBay intended to lower the "friction" in online transactions and charge fees to merchants for generating sales leads, internet's fastest-growing business which is currently dominated by Google and Yahoo (Financial Times, 09/12/2005). The innovative potential of Skype's human capital as well as its knowledge over VoIP technology were certainly intangibles of enormous value to EBay's competitive strategy.

Assessing the value of operating synergies is at the core of an effective M&A strategy. To set the acquisition price of a knowledge company, it is critical to understand how its assets will add value to the existing businesses and how much its intangibles do worth. As value is relative, valuing one company for acquisition by another is very different from valuing a company as a going concern. In the former case, the firm's value rests more on what it can add to the acquirer than on its long-term cash flow generation capability.

The difficulty in valuing knowledge-intensive companies for merger or acquisition is that there is not yet a generally accepted set of methods for valuing intangibles. EBay executives assessed Skype's acquisition price based on a number of factors, such as its expected future earnings, the valuation of other internet acquisitions and the growing number of Skype users, but operating synergies certainly accounted for the greatest stake in the acquisition price.

The aim of this paper is to provide an alternative method to assess the acquisition price of a knowledge company in an M&A context. Its main focus is

to determine the additional value a knowledge-intensive company brings to the acquiring firm and how much of that value should be retained by the acquirer in the negotiation process. The method is underpinned by Sullivan's Intellectual Capital Model (1998) and David Teece's concept of complementary business assets (1986), as well as the classic concepts of operating synergy and valuation.

The structure of this paper is presented as follows. First we introduce the difference between intangible factors and assets and Sullivan's definition for intellectual capital. We then explain how knowledge-intensive companies add value to the acquirer firm under an M&A strategy, emphasizing the role of complementary business assets. Finally, we develop a framework for the determination of the acquisition price of a knowledge firm based on the concepts of operating synergy and intellectual capital and describe the contexts in which operating synergies appropriation can be damaged.

## INTANGIBLE FACTORS AND ASSETS

There are numerous definitions of the term *intangible assets*. Depending on the purpose of the definition and on the observer's perspective, the meaning of *intangible assets* varies. To define intangible assets properly, we must set our perspective along with a working purpose and clear objective. As this study envisages an economic analysis and the valuation of intangible assets for M&A purposes, we shall adopt an economic perspective for a proper definition.

Underlying the economic approach it is the concept of value. The economic value of an item is a measure of the usefulness of proprietor's ownership. In the economic perspective, the utility of the item consists of a stream of benefits, stretching into the future, seen as the rent the proprietor receives from owning that item. This stream of benefits can be represented in dollar terms as a stream of income. Through the discount and sum of this future stream of income, we can determine the net present value of the stream of benefits associated with ownership of the item.

Value is relative. The economic value or usefulness of a specific intangible asset may be assessed differently by a potential seller or buyer, by a licensor or licensee, or even by an insurer or government agency. It depends on the specific needs of the owner and on the economic results that the subject intangible could bring.

The value of an intangible asset flows from the property rights associated with the ownership of the intangible asset. By contrast, the value of tangible assets flows from their physical features and is entirely dependent upon them (Reilly and Schweih, 1999: 10). The value of intangible assets does not come from their tangible evidence, like the piece of paper that it is printed on, but from

the bundle of legal rights associated with its property. As Lev (2001: 5) poses: "An intangible asset is a claim to future benefits that does not have a physical or financial embodiment".

Lev's definition does not mean that intangible assets can not be embedded into tangible assets at all. Although intangible assets do have value separate from tangible assets, intangibles may require the use of tangible assets in order to fully realize their value. Intangible assets, although possessing value by themselves, usually enhance the value of the related tangible assets. A computer has little value without the appropriate software; however, software and hardware can be sold separately. The commercialization of a drug patent needs suitable production facilities and efficient distribution channels to succeed. It is important to understand that the intangible asset owner can realize the full value of the subject intangible through the use of tangible assets without owning them. A software copyright proprietor can license the software for a certain period of time to a software industry in exchange for a royalty income. The software copyright owner does not need to own any of the related tangible assets to realize its full value. Furthermore, through the combination of tangible and intangible assets, the tangible assets' owner can create and develop new intangible assets, like a stronger brand, new customer contracts and goodwill.

Intangible assets often enhance the value of related tangible assets. Similarly, tangible assets do enhance the value of intangibles. Still, tangible and intangible assets have their own distinct value. The incremental value accrued by intangible assets to associated tangible assets is generally called the going-concern value or the in-use value of the tangible assets' full value. Thus, the difference between the going-concern value and the market value of tangible assets can be considered as the value accrued by intangibles.

Reilly and Schweih's (1999) assert that there are some economic factors that do not qualify as intangible assets as they do not have the characteristics to distinguish themselves as intangible assets. These factors or conditions may contribute significantly to the economic existence and value of identified intangible assets, but they are not intangible assets. Therefore, the economic value of these intangible factors or influences, if it exists, accrues to the associated particular property (tangible or intangible).

In order to identify the economic factors that do qualify as intangible assets, we need to describe the attributes or characteristics that are specific to intangible assets. These characteristics underpin the legal existence of intangible assets as property rights. In other words, there should be a bundle of legal rights associated with the existence of any intangible asset.

For any intangible factor to be subject to property rights, it has to be identified and concretely described. If an intangible can not be objectively described, it does not qualify as an intangible asset. It also should possess the legal rights of

property. The intangible owner should have the right to claim ownership rights and to protect those rights in a court of law. Therefore, the proprietor of an intangible asset is subject in law to the same obligations as any tangible asset owner.

An important attribute of an intangible asset is its transferability. To have economic existence, the intangible should be subject to private ownership and should be transferable to a new owner. This does not mean that an intangible property has to be sold. But it should be possible for it to be transferred. Some intangible assets can not be transferred separately from other properties as they are embedded in some tangible properties or assembled with other intangible assets. This condition is not an impediment for the legal ownership of the intangible asset being transferred.

Although the economic value of intangibles does not come from their physical features, there should be some tangible evidence of their existence for them to be qualified as assets. The tangible evidence of intangibles is necessary for them to have economic existence, legal protection and transferability. There should be a computer file, a customer list, a trademark, a contract, a license, a document, a drawing, or anything that proves the existence of the intangible asset.

Finally, we should bear in mind that an intangible asset loses its value, partially or completely, at a particular moment in time. Like tangible assets, intangible properties are subject to depreciation and demise. The intangible asset owner may not know when it will demise, but there are a number of ways it could happen particular to each intangible asset. It could be the result of the expiration of a patent or trademark registration, the replacement by a newer intangible or even the outcome of a government or court decision. Besides, the analysis of intangibles' remaining useful life is necessary to determine its depreciation rate and economic value. It has a direct impact on the stream of income generated by the bundle of rights associated with intangible assets' ownership.

An intangible factor can qualify as an asset yet not have economic value. In order for an intangible asset to have economic value, it should bring some economic benefit to its owner. This economic benefit may come in the form of an income increment or a cost reduction. The economic value of an intangible asset can be assessed by simply comparing the economic income generated by the use of the intangible with the amount of income available to the owner if the intangible did not exist.

Another necessary condition for an intangible asset to have economic value is to leverage the value of associated tangible or intangible properties. The intangible asset should contribute positively to associated assets, enhancing their market value. The economic existence of an intangible asset does not imply its economic value. A patent can be registered and yet not be commercially or strategically used by its owner. The intangible asset (the patent) exists, but does not

have economic value until it is licensed, sold, used in a production process or as a defensive strategic measure.

## **INTELLECTUAL PROPERTIES**

According to Reilly and Schweihs (1999), intellectual properties are intangible assets that are subject to legal recognition and protection. They are a specially recognized subset of intangible assets. This special status is the result of particular laws or of judicial precedent.

The legal recognition of particular intangible assets bears on the necessary creativity involved in their creation and in innovators' economic stimulus. Legal protection provides motivation for innovators and the possibility for intellectual property owners to realize its full economic value. As innovators spend a lot of time, effort and resources to develop new products, processes and ideas, intellectual property rights permit property owners to commercialize their innovations in a monopoly economic environment for a specific period of time.

## **INTANGIBLE ASSETS AND INTELLECTUAL CAPITAL**

Lev (2001), states that the expressions intangibles and intellectual capital have the same meaning. Their use depends on the observer's perspective and motivation. But intangibles are not intangible assets. It is easier to understand this assertion if we look at Sullivan's intellectual capital definition.

According to Sullivan (1998: 4), intellectual capital "...is the sum of a firm's ideas, inventions, technologies, general knowledge, computer programs, design, data skills, processes, creativity, and publications". Sullivan divides firm's intangibles into two major elements: human capital and intellectual assets.

Human capital is the company stock of tacit knowledge, which resides in employees' skills, abilities, knowledge and know-how. Human capital does not qualify as an intangible asset as it lacks some of the economic attributes described before. Human capital cannot be subject to a firm's private ownership and it does not provide any tangible evidence to be qualified as an asset.

Intellectual assets are created through the codification of a firm's tacit knowledge. They are the company's stock of codified knowledge and they do qualify as intangible assets as they have all the necessary economic attributes. Intellectual assets are subject to private ownership, they can be transferred to another party, they have tangible evidence and they lose value as time passes.

We can deduce by Sullivan's definition that intellectual capital consists of all kinds of intangibles. They are all economic factors that do not have a physical or

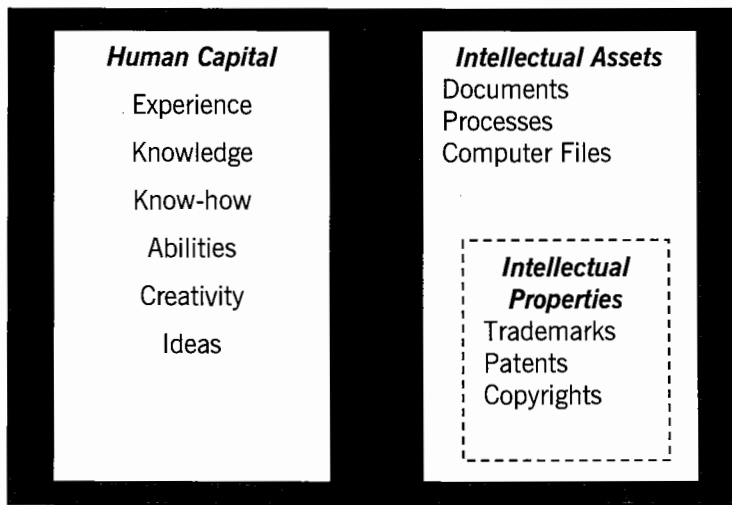
financial embodiment. Intangible or intellectual assets consist of a certain group of intangibles. These economic factors do qualify as assets.

Sullivan's intellectual capital model shown in Exhibit 1 is a crucial component of the intangible asset valuation and economic analysis framework for M&A purposes developed in this paper.

EXHIBIT 1

**Intellectual Capital Model (Sullivan, 1998)**

**Intellectual Capital**



**KNOWLEDGE FIRMS' ADDED VALUE**

Given that intangibles today are responsible for a significant part of firms' future streams of income, the analysis of their added value to the acquirer firm in an M&A context is critical to determine the new business' value. Knowledge companies, whose profits come primarily from the commercialization of their ideas and innovations, have two different sources of value: their intellectual capital and their complementary business assets (Alves, 2005). Although all companies, intangible-intensive or not, rest upon their structural capital to leverage the value added by knowledge and innovation, the value of knowledge companies (mostly intangible-intensive) depends less on their tangible stock of assets (structural capital).

Innovations are the result of applied knowledge to marketable products and services. A firms' structural capital is necessary for human capital development

and for the enhancement of its stock of intellectual assets, critical to innovations flourishing. Businesses' structural capital provides the necessary conditions for employees to create and leverage organizational knowledge. Examples of structural capital are computers, furniture, telephones, machinery, intranet, software, property, electricity and others.

There are a number of ways companies can convert their innovations into profits. They can license or sell their intellectual properties, joint-venture to obtain and use critical complementary business assets or even turn to a strategic alliance to exploit new markets and technologies (Sullivan, 1998). We argue that combining specific unique complementary assets with a firm's innovations through the right conversion mechanisms is the way to maximize new businesses value and profits under an M&A strategy.

### **THE ROLE OF COMPLEMENTARY BUSINESS ASSETS**

An innovation consists of specific technical knowledge about how to do things better than the market is used to (Teece, 1986). Generally, the value of an innovation rests on its combination with other capabilities or assets, owned or not by the innovator. Tangible assets like production facilities, warehouses and machinery may be critical to capture the profits generated by an innovation. Similarly, intangibles such as after-sales support, trademarks and market reputation can leverage the value of innovation to its owner. For example, the successful commercialization of new computer hardware may require compatibility with the commonly used software, or a new drug release may have to be combined with efficient distribution channels, a strong brand and a well-trained sales force.

Teece (1986) argues that complementary assets can be generic or specialized. Generic complementary assets are those that can be easily obtained in the market place at competitive prices. They are usually tangible assets and do not need to be tailored to the innovation. Production facilities for Nike's running shoes are generic complementary assets as they can be developed or acquired in any part of the world at competitive prices, but they have to be combined with Nike's innovations in design and technology to generate profits. Specialized complementary assets are those that are dependent on the innovation to some degree. They sometimes have to be tailored to the related innovation and are mostly intangible assets and competences.

A good example of a specialized complementary business asset in the computer games industry is processor technology. As long as the capacity of processors stays the same, new and better games can not be marketed. The opposite is also true: better processors will only be useful if computer games and software require more processing capacity. Intel processor technology and all others are



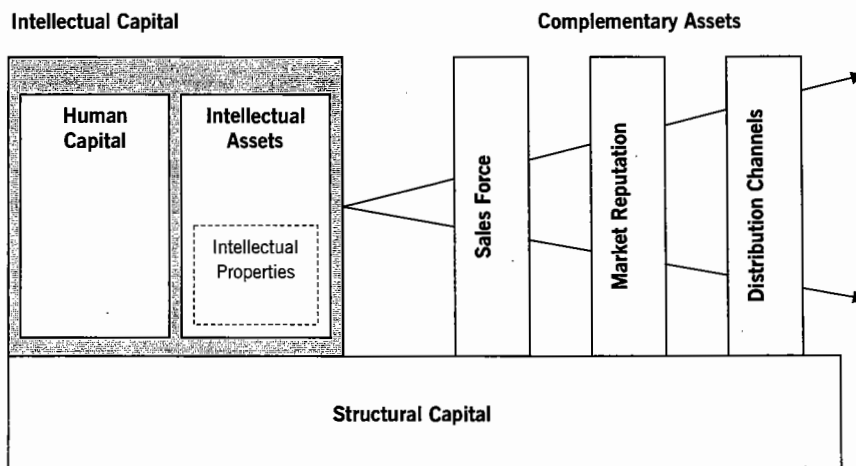
patented and can not be obtained in the market place at competitive prices: firms that see it as an important complementary asset need to pursue a contract strategy through licensing, joint-venture or strategic alliances, because developing it by themselves (integration strategy) would be prohibitively expensive and time-consuming.

Complementary business assets are a source of additional value to the value generated by innovations and knowledge. When the complementary assets used to commercialize the innovation are specialized, firms can demand a premium price for the associated products and services. As firms control the complementary assets specific to an innovation, they can control the underlying intellectual assets, as well as their market value (Alves, 2005: 92).

Having introduced the concepts of structural capital and complementary business assets, we now have a new perspective for knowledge companies' asset base (Exhibit 2).

**EXHIBIT 2**

**ICM Model (Sullivan, 1998)**



**M&A VALUATION FRAMEWORK FOR KNOWLEDGE FIRMS**

Firms are acquired or merge for a number of reasons. M&A strategy can pursue the difference between firms' market and purchase prices through the acquisition of undervalued companies. The acquirer can also be looking to reduce firm-specific risk through business diversification. Furthermore, M&A strategy can be used to create operating or financial synergy. This paper focuses on the benefits of operating synergies in the form of either higher growth or lower costs for the acquiring company.

Synergy is the potential value added by the combination of two different firms (Damodaran, 2001: 840). Operating synergies allow firms to increase their future cash-flows and income growth, thus leveraging the value of the companies involved in the merger or acquisition. In this study we are particularly interested in the value added by the combination of two different organizational competencies: innovations potential and complementary business assets.

As Damodaran (2001) claims, if synergy is perceived to exist in an M&A context, the potential value of the new firm (AB) should be greater than the value resulting from the acquiring (A) and target (B) firms, operating independently:

$$VALUE (AB) > VALUE (A) + VALUE (B)$$

The difference between the acquisition price and the market price of the independent target firm is the acquisition premium ( $p$ ), which is usually based on negotiations between the bidding and target firms. The new firm's price ( $P$ ) is set between the potential value of the combined firm ( $VALUE (AB)$ ) and the value resulting from both firms operating separately:

$$VALUE (AB) \geq P > (VALUE (A) + VALUE (B)) \quad (0)$$

if:

$$P = p + VALUE (A) + VALUE (B) \quad (1)$$

As we are centered on the valuation of knowledge companies for M&A purposes, it is important to notice that the price set for acquisition of a knowledge company ( $P (B)$ ) can be significantly higher than its book value ( $BOOK (B)$ ). This difference will generally be recorded on the new firm's accounting books as goodwill ( $G(B)$ ) and consists of the knowledge firm's acquisition premium plus intangibles not recognized as assets on the knowledge company's balance sheet (*intangibles (B)*) (the economic benefits related to intangibles are already represented in the Knowledge Company's future cash-flows; they are part of knowledge firm's book value). The acquiring firm's market value ( $VALUE (A)$ ) can also be significantly higher than its book value, but as we are focused on determining a fair price for the knowledge firm and its contribution to the new company's value, the acquiring firm's goodwill is not relevant at this moment.

We can now extend equation (1) to detach the knowledge company's goodwill in the new firm's price:

$$P = VALUE (A) + BOOK (B) + G (B) \quad (2)$$

where:

$$G (B) = p + intangibles (B) \quad (3)$$

The acquisition price of the knowledge company ( $P(B)$ ) can now be separated into three component parts:

$$P(B) = p + \text{BOOK}(B) + \text{intangibles}(B)$$

In an M&A strategy that aims to grasp operating synergies through the combination of the firm's competencies, the interest of the bidding company (A) lies in some particular portion of the target company's (B) intellectual capital. The acquiring firm is interested in combining specific intellectual assets from the target firm with its complementary assets to produce higher profits and/or income growth. In addition, the purchasing company may see additional value in combining their intellectual capital with the target firm's complementary assets. All other intellectual capital and complementary assets from the knowledge firm should not be of much interest to the acquirer, except for the cash available through a sell-off of unwanted assets.

Oversimplifying, the market value of a going-concern company is equal to the sum of the value of the company's tangible assets ( $T(B)$ ) and its discounted future cash flows ( $CF(B)$ ). For the purpose of determining the knowledge company's (B) market value, we have:

$$\text{VALUE}(B) = T(B) + CF(B) \quad (4)$$

Combining equations (1), (2) and (3), we obtain:

$$\text{VALUE}(B) = \text{BOOK}(B) + \text{intangibles}(B) \quad (5)$$

### VALUING OPERATING SYNERGIES

The potential value of the new firm resulting from the merger or acquisition should be greater than the value of both firms operating separately. As we have seen, this difference in value comes from the operating synergies perceived by the acquirer ( $\text{VALUE}(OS)$ ). We can now determine the new firm's potential value for the acquirer ( $\text{VALUE}(AB)$ ) as a function of the perceived operating synergies:

$$\text{VALUE}(AB) = \text{VALUE}(A) + \text{VALUE}(B) + \text{VALUE}(OS) \quad (6)$$

The new firm's operating synergies result from the combination of companies' innovation potential (intellectual capital) and complementary business assets. Their associated economic benefits will be embedded in the new firm's future cash flows and can be detached from the operating synergies value in

equation (6) as a function of the companies' intellectual capital and complementary business assets:

$$VALUE (OS) = VALUE [f(IC_A, CA_B)] + VALUE [f(IC_B, CA_A)] \quad (7)$$

Where:

$IC_A$  – Bidding firm's intellectual capital

$IC_B$  – Target firm's intellectual capital

$CA_A$  – Bidding firm's complementary business assets

$CA_B$  – Target firm's complementary business assets

The most important term for the determination of the new firm's potential value is the incremental value realized by combining the knowledge firm's intellectual capital with the acquirer's complementary assets ( $VALUE [f(IC_B, CA_A)]$ ) (Sullivan, 1999). This is the added value that the bidding company pursues under an M&A strategy that aims to create operating synergies. Although the acquiring firm generally does not look to grasp any additional value from the combination of its intellectual capital with the target firm's complementary assets ( $VALUE [f(IC_A, CA_B)]$ ), the resultant operation can be explored as a new business unit. The knowledge company's complementary assets can also be sold to raise cash if they are not aligned with the new firm's competitive strategy.

To assess the contribution of acquired assets to the new business, the acquiring company must determine how these assets will be used. The acquirer must know if those assets will leverage their complementary assets or intellectual capital, if they are going to help gain access to new technologies and markets or if they will be a bridge to new strategic alliances and joint-ventures. The acquirer's ability to successfully determine how to combine each piece of the knowledge company's intellectual capital with its business operations is critical in order to grasp the perceived value of operating synergies.

NetSolve's takeover by Cisco Systems in late 2004 is a clear example of the value perceived in operating synergies. NetSolve was a leading provider of remote network and IT infrastructure management services for businesses. The purchase of NetSolve enabled Cisco and its channel partners to offer customers real-time monitoring of Cisco products and helped to ensure the continuous, secure operation of advanced IP services such as IP telephony and security (NEWS@CISCO: 2004).

The value perceived by Cisco in the operating synergies described was at least USD 128 million, the value set for the acquisition. NetSolve's remote management technology (an intellectual asset) and applied solutions to businesses remote network and IT infrastructures (human capital) were the assets pursued by Cisco. By combining them with its products and channel partners' services

(complementary assets), Cisco was looking to improve customer satisfaction and reduce channel partners' operating costs.

### ASSESSING THE ACQUISITION PREMIUM

As we have already determined, the difference between the new firm's price ( $P$ ) and the market price of both firms operating separately is the acquisition premium ( $p$ ). From equation (1), we have:

$$p = P - (\text{VALUE (A)} + \text{VALUE (B)}) \quad (8)$$

Combining equations (8) and (6), we have:

$$p = P - (\text{VALUE (AB)} - \text{VALUE (OS)})$$

Thus,

$$p = (P - \text{VALUE (AB)}) + \text{VALUE (OS)} \quad (9)$$

Equation (9) offers us an interesting insight: its first term ranges from zero to  $-\text{VALUE (OS)}$ , as evidenced by equations (0) and (6); thus:

$$\text{VALUE (OS)} \geq p > 0 \quad (10)$$

The acquisition premium ( $p$ ) depends on the perceived value of operating synergies for both firms. Its definition requires that both parties understand how the assets of the target company will bring value to the acquirer business. Here, information asymmetries play an important role: as the value of operating synergies can be assessed much more accurately by the acquirer company, its position in the negotiation process is favored. The target firm's assessment of its intellectual capital potential value for the acquirer is limited. Thus, the acquisition premium paid in the merger or acquisition tends to be smaller when information is not symmetric.

### CALCULATING THE ACQUISITION PRICE

Now we are able to determine the new firm's price ( $P$ ) as a function of the companies' intellectual capital and complementary assets. Combining equations (1) and (5), we have:

$$P = p + \text{VALUE (A)} + \text{BOOK (B)} + \text{intangibles (B)} \quad (11)$$

From equation (10), we obtain:

$$p = \text{VALUE (OS)} \times (1 - nf) \quad (12)$$

where:

$$1 \geq nf > 0$$

The negotiation factor ( $nf$ ) is an adjustment variable for the acquisition premium negotiation results. It represents the amount of value of operating synergies retained by the target company. Thus, applying equation (12) to (11):

$$P = \text{VALUE (OS)} \times (1 - nf) + \text{VALUE (A)} + \text{BOOK (B)} + \text{intangibles (B)} \quad (13)$$

We can now extend equation (13) to detach the operating synergies value in the new firm's price:

$$P = (\text{VALUE [f (IC}_A, \text{CA}_A)] + \text{VALUE [f (IC}_B, \text{CA}_A)]) \times (1 - nf) + \text{VALUE (A)} + \text{BOOK (B)} + \text{intangibles (B)}$$

We also know that the knowledge firm's intellectual capital comprises all intangible assets and factors that have economic value ( $IC_B$ ) and that the additional value provided by the combination of the knowledge firm's complementary assets and the acquirer's intellectual capital is poor, thus:

$$P = \text{VALUE [f (IC}_B, \text{CA}_A)] \times (1 - nf) + \text{VALUE (A)} + \text{BOOK (B)} + IC_B \quad (14)$$

Replicating equation (5) for the bidding company's going-concern market value ( $\text{VALUE (A)}$ ) and combining equation (5) with (14), we finally have the new firm's price:

$$P = \text{VALUE [f (IC}_B, \text{CA}_A)] \times (1 - nf) + (T (A) + IC_A) + (T (B) + IC_B) \quad (16)$$

Where:

$\text{VALUE [f (IC}_B, \text{CA}_A)]$  – Acquiring firm's perceived value of operating synergy

$T (B)$  – Value of Knowledge Company's tangibles

$T (A)$  – Value of Acquiring Company's tangibles

$IC_B$  – Economic value of Knowledge Company's intangibles

$IC_A$  – Economic value of Acquiring Company's intangibles

$nf$  – Acquisition premium's negotiation factor

The knowledge company's acquisition price ( $P(B)$ ) can be extracted from equation (16) by combining it with equations (2), (3) and (5):

$$P(B) = \text{VALUE} [f(IC_B, CA_A)] \times (1 - nf) + T(B) + IC_B$$

### Considerations on Operating Synergies Value Appropriation

The ongoing value of a going concern business depends on the acquirer's ability to continue the target firm's business functions after the merger or acquisition takes place. In a knowledge company, the value of the going concern rests largely on its intellectual capital, particularly on the tacit knowledge of the workforce responsible for business operational functions (human capital). The acquirer's capacity to retain and leverage the knowledge firm's stock of tacit knowledge directly affects M&A acquisition premium magnitude.

Knowledge firms that are able to convert a significant part of their stock of tacit knowledge into codified knowledge (intellectual assets) usually have a greater market value than those that do not (Sullivan, 2000: 91). Generally, intellectual assets can be legally protected against unauthorized use and replication by others and are recognized as organizational assets. Furthermore, codified knowledge can be shared and diffused much more easily throughout the organization and can generate large economies of reutilization, which are benefits from the utilization of the same piece of codified knowledge by many users at the same time.

The firm's control (its ability to exclude from others the economic benefits of owning the intangible) over strategic portions of organizational knowledge is critical for its business success and sustainability. It is clear that tacit knowledge can walk out of the door anytime after the merger or acquisition takes place and that the new firm's control over employee's knowledge is scarce. Here resides the importance of knowledge codification. The risk of losing an important part of the target company's intellectual capital must be reflected in the acquisition premium, as it directly impacts the potential value of operating synergies.

EBay's decision to link an additional payment of USD 1.5 billion to performance targets on Skype's takeover was probably a hedge to the risk of losing part of the intellectual capital necessary to realize the potential value of operating synergies.

As the value of intangibles lies in the present worth of future economic income expected to be derived from the ownership or use of intangibles, their remaining useful life expectation is also critical to set a knowledge company's acquisition price (Reilly and Schweih, 1999: 209).

Intellectual capital is subject to retirement, expiration and depreciation. Human capital and intellectual assets retire or expire when they are removed from useful service or operation by their owner or by forces beyond his control. For

example, the value of an intellectual asset may decline rapidly if a new technological development emerges: this was the case for CD musical recordings as opposed to vinyl records and CD-ROMs, which supplanted vinyl records and diskettes respectively. As Reilly and Schweihs (1999) argue, changes in operating policies and procedures can also cause the early retirement of intangibles. A reduction in the expiration period of a drug patent due to changes in regulatory requirements is a clear example.

Employee's tacit knowledge can also be rendered obsolete and lose value as time passes. Technical knowledge and know-how depreciate as new and deeper knowledge emerges and becomes a standard in the related businesses. Continued investment in tacit knowledge replacement is critical to the competitive advantage of intangible-intensive firms. The assessment of the remaining useful life of intellectual capital is a major issue in determining a knowledge company's acquisition value under an M&A strategy.

## CONCLUSION

The takeover of knowledge-intensive companies has recently become the main strategy for large firms to access innovation and creativity as a way to grasp new market opportunities and generate business expansion. To the extent that knowledge firm's value under an M&A strategy relies mostly on the resultant operating synergies to the acquirer rather than on its long-term cash flow generation capability, alternative methods to assess the fair acquisition price of knowledge companies must be developed.

As the value of a knowledge-intensive firms rely on their innovation potential and human capital competencies, an intellectual capital approach to valuation was developed in this paper in order to determine the perceived value of the knowledge firm for the acquiring company. We argue that the value of operating synergies is mainly a function of the combination between the knowledge firm's intellectual capital and the acquirer's complementary business assets. The acquisition premium, negotiated between both parties, determines the amount of value of operating synergies retained by the acquirer, ultimately what it takes from the merger or acquisition deal.

As we have established the market value of each firm as the sum of its book value and non-recognized intangibles' value, we managed to set a knowledge company's acquisition price in terms of those variables and the amount of value of the operating synergies retained by the acquiring company. We finally argue that the appropriation of operating synergies value depends on the acquirer's ability to retain and leverage the target company's intellectual capital, as well as on its capacity to access the useful life of intellectual capital and continuously invest in organizational knowledge replacement.



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**Resumo**

Este trabalho analisa a importância do controlo de gestão sobre os intangíveis considerando a sua contribuição para a criação de valor na entidade. São discutidos alguns dos modelos e metodologias de avaliação de intangíveis, tendo em consideração a sua utilidade e é apresentada uma sugestão de metodologia, que considera os objectivos do controlo de gestão, bem como a sua aplicabilidade.

**Palavras Chave:** Controlo de Intangíveis; Controlo de Capital Intelectual; Gestão de Intangíveis.

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