The Logic of Merger and Acquisition Pricing

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Abstract

The valuation of synergy is vital to the success of any merger, however, given current valuation methodologies and the complexity of the task; it is also the most challenging element of merger and acquisition pricing. Conventional valuation methods assume that sales figures and market share of the acquiring company are easily transferable within the new entity. Current synergy practices also assume amalgamating various corporate functions will produce significant cost reductions. The key component missing from current methodologies is the failure to analyze every corporation as a complex system containing various elements and relations. If such a delicate system is segmented due to a merger, the outcome measured in turnover and profit figures can not be accurately forecasted by simply aggregating key financial figures. The goal of this article is to go beyond the simplicity of current methods in order to develop a methodology better suited for evaluating synergy effects. This new approach integrates elements from both the framework of knowledge management and the sociological theory of systems and elements. The alternative methods proposed in this article will simultaneously deliver creative and innovative solutions to enhance the success of mergers and acquisitions. These new proposals also help to clarify the short comings plaguing traditional methods which inevitably lead to the destruction of shareholder wealth.

Contents

1 Introduction

Globalization and economies of scale effects fuel corporate merger activities in nearly every sector. Nevertheless empirical studies have shown that most mergers and acquisitions fail to be successful and destroy shareholders wealth. If the firm's management has a clear picture of the relationship between the take-over premium and the requested return of synergy in the future, some irrational decisions can be avoided.[1]

Hence this article has a twofold aim: First aim is to create a benchmark, which will allow success to be accurately measured in a merger. The second goal is to demonstrate that proper evaluation and accurate forecasts of synergy effects most extend beyond the simple aggregation of key financial figures. Therefore a new method is proposed for valuation of synergy which integrates elements from both the framework of knowledge management and the sociological theory.

2 Success of mergers

According to a common definition given in most finance textbooks a merger is successful, when the post merger value of the integrated firm is higher than the sum of the paid acquisition price for the acquired firm and the value of the acquiring firm prior to the merger.[2]
Therefore assuming that firm A would like to merge with firm B, success could be defined as follows:

$$V_C^0 \quad > \quad P_B^0 + V_A^0 \tag{1}$$

V^0_C = Value of the combined firm AB in period 0, P^0_B= Acquisition price for firm B in period 0, V^0_A = Value of firm A in period 0

Defining success in this way bears the advantage of applying well-known investment criteria such as net present value: Consequently, investments with a positive net present value of a future cash flow stream can be deemed a success. The sum of acquisition price and value of firm A could be interpreted as payout in period 0 and the value of the combined firm C could be seen as a future return on investment.

Only synergies, like economies of scale, for example could lead to such returns on investment to justify a merger or acquisition. Typically synergy is defined in such a way that the value of the combined firm C exceeds the collective values of the separate entities.[3] The total synergy value resulting from a merger equals the difference between the combined firm value and the sum of each individual firm value (equation 3).

$$V_C^0 \quad > \quad V_A^0 + V_B^0 \tag{2}$$

$$S_C^0 \quad = \quad V_C^0 - (V_A^0 + V_B^0) \tag{3}$$

[1] In the following, the expressions "merger" and "acquisition" are used as synonyms.

[2] For example Brealey, Myers, Allen, 2005, p. 826f.

[3] In general synergy effects are of central importance in nearly every scientific discipline. Expressions like mutualism, win-win situations, critical mass, co-evolution, threshold effects, and non-zerosumness are used as synonyms. Compare, Corning, 2003, p. 6.

V^0_C = Value of the combined firm AB in period 0, V^0_A = Value of firm A in period 0, V^0_B = Value of firm B in period 0, S^0_C= Value of synergy in total in period 0;

The acquisition price frequently exceeds the value of firm B, due to the additional premium paid to shareholders of firm B. Selecting the market capitalization of a company as a benchmark for corporate value, the acquisition price per share is in many cases 40-60 percent higher than the actual share price.[4] For many obvious reasons, shareholders of firm B will not sell or exchange their shares if they are unable to realize a higher price relative to the stock market. Therefore the premium given to shareholders can be seen as an incentive to part with their existing stock. The acquiring company is willing to pay this requested premium to shareholders as a much greater return on synergy is expected to result from the merger. Consequently, the premium payout to the seller could be interpreted as the seller's synergy premium (equation 4). The buyer's synergy premium is merely the difference between the total synergy and seller's premium (see equation 5).

$$P^0_B = V^0_B + S^0_{SP} \tag{4}$$

$$S^0_C - S^0_{SP} = S^0_{BP} \tag{5}$$

P^0_B = Acquisition price in period 0, V^0_B = Value of firm B in period 0, S^0_{SP} = Seller's synergy premium in period 0, S^0_{BP}= Buyer's synergy premium in period 0;

Success of any merger implies that the net present value of the buyer's synergy premium is at least slightly positive. Rewriting equation (1), success of a merger can be defined as follows:

$$V^0_C - (V^0_A + V^0_B) - S^0_{SP} > 0 \tag{6}$$

Even though a positive buyer's synergy premium signifies the criterion for a successful merger has been satisfied, the terms may not be equitable for both sides. As primary risk taker in the merger, share holder A should receive at least the equivalent synergy premium as share holder B. Taking such a fair value criteria into account the total synergy outcome from a merger for a given time period, should be twice as high as the premium paid for the acquisition of firm B. An interest rate to reflect the time value of money and the risk that the expected synergy would not crystallize in the future should also be applied to the total synergy premium.

$$S^T_C = [2 * (P^0_B - V^0_B)] * (1 + r)^T \tag{7}$$

The following considerations allow for the development of a benchmark which can accurately assess the success of a merger. The post merger value of the integrated firm has to be equal to or greater then the sum of the firm values A and B and the total synergy premium. The value of a merger can be measured either in the present or the future, as long as both figures are taken at the same point in time. Hence the benchmark of success could be formalized at the time when the merger happens like in equation (8) or at certain point in the Future like in equation (9).

$$V^0_C - (V^0_A + V^0_B) - [2 * (P^0_B - V^0_B)] \geq 0 \tag{8}$$

$$V^T_C - [(V^0_A + V^0_B) * (1 + r_f)^T] - [2 * (P^0_B - V^0_B) * (1 + r)^T] \geq 0 \tag{9}$$

[4]Moeller, Schlingemann, Stulz, 2005, p. 757.

V^0_C = Value of the combined firm in period 0, V^0_A = Value of firm B in period 0, V^0_B = Value of firm B in period 0 P^0_B = Acquisition price in period 0, r_f = risk-free interest rate, r = risk-adjusted interest rate, T = fixed point of time in Future;

3 Different elements - different pricing

The definition of success shows that any merger and acquisition pricing should contain three elements:

- Valuation of the acquired corporate system B and the acquiring corporate system A
- Valuation of the new corporate system C
- Division of synergy premium between seller and buyer

It is imperative that the new firm C be valued independently from the pricing process of the corporations A and B, as synergies will only arise if the two economic systems merge and form a new single unit. Consequently, throughout the pricing process, it is essential corporate C be treated as a new economic system. Given this logic, the precise value of C can not be determined by the sum of A and B plus some synergy.

System theory provides a holistic view of what transpires during the merger process, and may be used as a guideline. According to this approach, a corporation should be observed as a complex economic system of elements and relations which are dependent upon each other. A company is an open system, insofar as it exists in mutual relation (in- and output relations) to its environment. Every element in a firm is organically linked with one another in the firm's system of organization, corporate culture, organizational routines and activities.[5] Sales, turnover and profit are directly correlated to the regular interaction of interrelated groups of activities within a corporate system. Mergers disrupt this harmonic balance through the removal and addition of certain elements and corporate functions. As a direct result of this modification, the measurable output in the form of sales, revenue, and turnover will also vary significantly. The merger of two intricate systems leads to the creation of a new corporate system; firm C, with its own distinctive elements and relations. Any valuation of such a system, given its uniqueness and individuality, requires a separate pricing process.

Output categories such as sales, turnover, profit or EBIT are completely intertwined within corporate systems which frequently interact with one another. Relationships between variables can also be illustrated through the use of mathematical functions. Therefore profit is directly correlated to a corporate system function with its variables 'a', which symbolize corporate functions such as, the sales, production, finance etc. Subsequently the expected profit of the new entity C is the outcome of the corporate system function of C with its merged corporate functions of system A and system B. Relations between variables within the system function are not linked by value additivity.

[5] Gupta, Ross, 2001, p. 297.

$$Profit\ A \quad = \quad f(a_1, a_2, a_3, a_4....) \tag{10}$$

$$Profit\ C \quad = \quad f(a_1b_1, a_2b_2, a_3b_3, a_4b_4.....) \tag{11}$$

The following graphic visualizes this way of thinking in system categories.

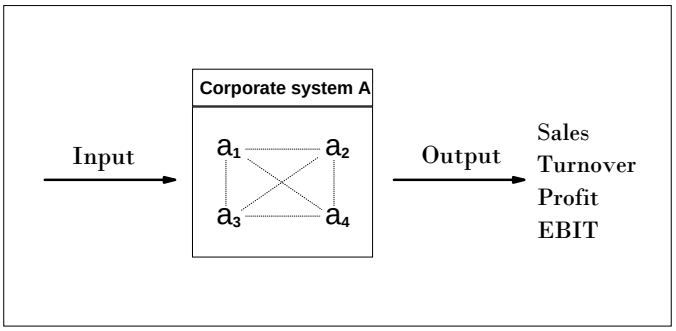

Figure 1: The corporate system

The valuation process of firms A and B differs significantly from the valuation process of firm C. Pricing firms A and B is made slightly easier given their existing systems and assuming the elements and relations within the systems will not be modified or split. With the process of performance unaltered, valuation of A and B can be found in various sources of codified and publicly available information, such as turnover, EBIT etc., located in balance sheets and business reports. No additional knowledge of the corporate system function is required for the valuation of A and B. Contrary to this, firm C constitutes a unique corporate system; hence its valuation requires additional internal information concerning the relations and elements within the system. Without an existing system in place, a performance projection of system C could only be derived from internal and system specific knowledge about elements and relations of system A and system B. Codified knowledge about the performance of firm C in the form of balance sheets or business reports seizes to exist. Codified knowledge pertaining to A and B is less resourceful due to an absence of value additivity. Therefore it is imperative that any pricing of firm C request system specific knowledge of A and B in order to develop a vision regarding the interaction of elements and relations in the new system C, as well as, all future performance processes.

This new approach to valuation of mergers refers to the theory of knowledge management, which distinguishes between two forms of knowledge: implicit and explicit

knowledge.[6] Applied to the merger problem, revenue, sales, turnover, earnings, profit are the outcomes of a system and could be interpreted as explicit information. Information concerning the relationships between the single elements within a corporate system could be called the tacit or implicit knowledge. Explicit and implicit elements of knowledge are complimentary to each other and are not considered mutually exclusive.[7] This principle of knowledge management, applied to the identification of synergy sources in a merger, can lead to a more holistic view of corporate value. Recognizing tacit knowledge contributes as well to the identification of synergy.

4 Valuation of the new corporate system C

In certain aspects the valuation process of synergies bears some analogy to corporate risk management: both focus on business processes analysis, are future oriented, deal with uncertainty and aggregate all information about risks and synergies into a single overall figure. Apparently the difference is that synergies are the chance or the positive result of an uncertain definite event. Synergy and operational risk could be seen as two sides of the same medal as the risk of a merger is that expected synergies fail to materialize. The task of corporate risk management is to identify the risks inherent in the different steps of a business process, selecting a set of variables, providing an estimate for the likelihood and severity of operational risk and designing a control mechanism. Adopting this general structure for the process of risk management allows the valuation process of synergies to be divided into the three phases: identification, documentation and integration planning and evaluation.

4.1 Identification of synergy

Identifying potential synergy effects requires a good understanding of the strengths and weaknesses of corporate systems A and B business processes, in order to develop a vision regarding the future performance of system C. Synergy is neither given by possession of resources nor inherent in tangible or intangible corporate assets. Synergy is the end result of amalgamating existing resources in a uniquely redesigned combination. The unification of resources to maximize value is a business process. Consequently identification of synergy has to observe a corporation in a new perspective as an organized system of business processes. The primary focus must be on business processes as a key indicator for the ability of an organization to deliver its products or services in a timely and efficient manner. Any business process contains three key dimensions:

1. *Human resources*; the most important intangible corporate asset. Due to specialization, only a few key personnel have specific knowledge regarding business processes and its interactions with other people and systems within the firm.

2. *Technology*; most broadly defined as the entities, both material and immaterial, created by the application of mental and physical effort in order to achieve some value. This definition includes tools and machines as well as business methods, software or techniques to solve specific problems.[8]

[6] Polanyi, 1967, p. 19.
[7] Nonaka, Takeuchi, 1997, p. 8.
[8] "technology", wikipedia, 2007.

3. *Organization*; corporate business processes are embedded in a peculiar corporate organization characterized by hierarchy levels, decision making lines, functions and culture.

Identification of synergy in a merger begins with comparing similar business processes of firms A and B. Subsequently, analyse the efficiency, strengths and weaknesses of each corporation and finally adopt the superior technology, the better organization or the better trained human resources.[9] Furthermore identification of synergy implies "Reengineering of business processes" as it combines and organizes given resources in a new way to realize an added value. The expression *Business Process Reengineering* first used 1990 by *Hammer*, is defined as "term process innovation, which encompasses the envisioning of new work strategies, the actual process activity, and the implementation of the change in all its complex technological, human, and organizational dimensions."(*Davenport*, 1993)

How could this identification process materialize? The optimal solution would be a web-based 3-D visualization of all business process of firm A and B on split screens. This visualization of corporate business processes on parallel computer screens would make it easy to discover points of overlap for comparison and to develop new business processes with existing resources. However, despite the tremendous progress made in interactive web-applications in recent years this kind of 3D-visualization of all corporate business processes is still wishful thinking. Nevertheless this ideal solution could lead to a potential breakthrough in the amount of information and documentation necessary to identify synergy effects. Central business processes that involve employees, suppliers and clients from both firms have to be documented in a kind of map. The data has to be edited with information about human resources, job descriptions and organization diagrams. Because "hidden" system specific information is not codified in documents, it is time-consuming to generate and requires the physical presence of analysts within the systems. The documentation phase is followed by an assessment of the organizations strengths and weaknesses which enables analysts to identify potential opportunities - especially technological and human resource openings. Performance targets and benchmark results involved in the merger contribute to the redesign of existing business processes. Afterwards a process vision is developed by selecting strategic relevant business processes for reengineering and the subsequent formulating of a prototype for the new business process design after the merger.

4.2 Integration planning for redesigned business processes

After the business processes of the new corporate system C are identified, designed and prototyped the planning phase for implementation of the new business concept starts. This step involves detailed planning for how to incorporate resources (technology, human resources and organization) from corporate systems A and B into operation within the new system C. Evaluation of the new system C requests that planning the post-merger integration starts prior to the closure of the merger, otherwise returns and integration are unable to be calculated. Synergies have to be clearly defined and transformed into measurable integration targets. Similar to project management, it includes

[9] Of course in the case of human resources adoption is not as easy; The analysis has to be more detailed concerning the reasons, why this employee in this specific type of business process performs much better than his colleague.

the definition of various targets measured in concrete figures, a breakdown in milestones and deadlines, work plans and target completion dates. Integration planning has to determine which corporate functions (marketing, treasury, IT etc.) are involved in reaching this target and which members will assume leadership throughout the integration process. Integration planning cannot be performed in a top-down approach because of the complexity involved and the minimal staff backing. Incorporating staff members into the planning process during the primary stages of integration should be the highest priority. Staff involvement, combined with transparent corporate communication are crucial for reaching strategic goals. The result of integration planning is a detailed roadmap laying out the accomplishments needed in each area of the company, individual responsibilities, and completion dates. [10]

Dumay criticizes this way of process thinking as a purely technocratic management perspective of organization which mainly ignores the central role of management within organizations. "In such a view, organizations are the means to accomplish the objectives of the organization's owners. These objectives are embedded within a corporate strategy that is realized by business processes."[11] To seize this criticism integration planning has to pay equal attention to non-technical organizational elements like social structure, rules of conduct, corporate culture, communication and participants in order to facilitate the restructuring of business performance processes. This is in line with the concept of "Human Due Diligence" supported by *Harding*, 2007, which gives priority to structural and cultural aspects of corporate organization. However as the implementation of a new corporate organization with the transformation of existing social structures, reporting lines and corporate cultures leads to an increase in costs it should be accounted for in the evaluation process.

4.3 Valuation of corporate system C

Following the identification of synergy effects and integration planning the new corporate system C is no longer a black box for evaluation. On the contrary, the box is filled with expert knowledge concerning the future system of business processes and its implementation given the existing resources of system A and B. In general, the value of an asset is derived by its capacity to generate cash flows. The preceding work of mapping and redesign of business processes visualizes the way to achieve value within a corporate system. The used investment appraisal method has to make use of this information pool

- By forecasting the net cash flows from projected single business processes,
- A risk assessment regarding the underlying uncertainty of key variables for cash flow forecast
- And a quantification of systemic risk as business processes within a corporate system are naturally correlated.

A simple discounted cash flow approach, like the Net Present Value method, is not capable of processing the risk and return information in an appropriate manner because the risk is solely incorporated in the discount factor. The discount factor contains a risk free interest rate which reflects the time value of money and a risk premium capital

[10] Bruner, 2004, p. 891.
[11] Dumay, 2004, p. 17.

that investors request as a return rate for investment opportunities with similar risk (opportunity costs). The risk premium has to be interpreted as a premium for systematic (or market) risk, not for unsystematic project risk. For example the often employed weighted average capital cost as a rate for discounting, uses explicitly the beta factor to express market risk. Therefore the specific risk of the investment project (unsystematic risk) should be represented by a modification of cash flow variables within the present value formula. Corporate finance textbooks propose three methods to figure in the underlying risk of cash flow forecasts in the present value formula: Sensitivity analysis, scenario analysis and Monte Carlo Simulation. The wealth of information generated by the analysis of existing corporate systems and the developed vision of the future system allows for the use of all three methods of risk return analysis, as each approach is able to deliver valuable information for the merger decision. The sensitivity analysis provides investors an idea of the major risk factors. Scenario analysis answers the questions, what happens if anything goes wrong or if everything works out to be optimal. Monte Carlo simulation provides a complete risk/return profile of all possible outcomes and utilizes all given information. Additional calculation costs for employing all three methods seems to be negligible relative to the added value of information.

Corporation C exists as a vision of projected operational processes combined with a plan for its implementation. Starting point for the evaluation is a cash flow forecast for each operational process involved with the value chain. Besides operational processes, the corporate system includes management processes and other supporting processes which govern and facilitate the general operation of the system. Because these processes are not directly involved in generating cash, their value has to be incorporated as variable or fixed costs in the cash flow forecast of operational processes. The cash flow forecast of modified or unchanged operational processes may utilize available information regarding revenues and costs of existing operational processes in systems A and B. Obviously cash flow forecasts for newly designed processes of system C are faced with a higher degree of uncertainty as revenues and costs have to be projected.

The cash flow forecast for each (operational) business process is performed in detail for three to five periods and concludes with the calculation of a terminal value, which is the discounted value of all future cash flow beyond a given date (figure 2). Assuming that after the projected horizon of three to five years, cash flows will continue to grow indefinitely at a constant rate, the cash flow stream is termed a growing perpetuity and may be calculated as a present value of an infinite geometric series. Results of integration planning determine the timeline for revenues and integration costs for each process. Finally net cash flow result of one business process 'n' is discounted for each period 't' and summed up for all business processes to one present value of all future net cash flows of corporate system C (equation 12).

$$V_C^0 = \sum_{n=1}^{N} \sum_{t=1}^{T} \frac{NCF_t^n}{(1+r)^t} \tag{12}$$

V^0_C = Value of the combined firm in period 0, NCF^n_t = net cash flow of business process n in period t, r = discount rate (WACC - Weighted Average Cost of Capital), n = number of business processes, t = period of time;

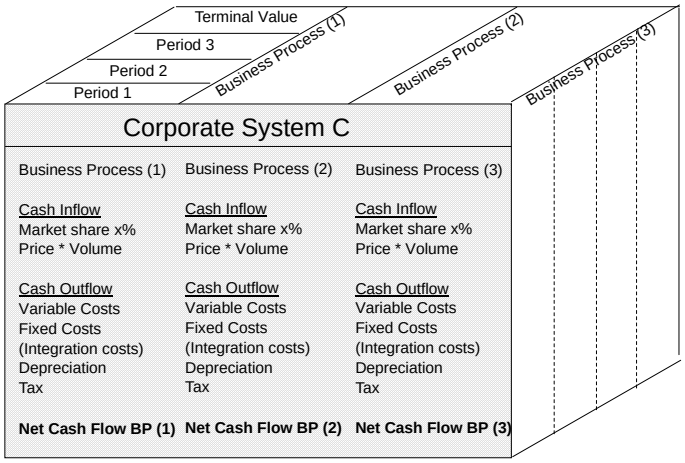

Figure 2: Evaluation of Corporate System C

However, outcomes of the evaluation process can't be expressed in a single present value figure as the assessment of future developments are characterized by uncertainty which has to be incorporated in the appraisal model. The information and transparency concerning the overall risk and its specific sources in a merger project is exceedingly valuable for any decision maker, despite the fact that the assumed risk environment is extremely subjective due to human involvement.[12] For example the assumed market share and the derived sales volume and sales prices for each period are risk variables as they are critical to the viability of the project. In such cases, a sales manager could be asked about the probability to reach a market share of x-percent within a given time period.[13] In general, based on the opinion of experts for every risk variable, a probability function can be defined. Afterwards the systemic risk has to be defined, which implies to fix correlations for interrelations between:

- risk variables of each business process in each period
- risk variables of each business process between observed periods
- variables between the business processes within the corporate system

The result of the risk analysis is a risk/return profile of the merger project, which can be shown through the use of a diagram. In the case of a scenario analysis, the risk return profile consists of a few points which signal the probability of worst, medium or best case scenarios. Monte Carlo Simulation provides the most thorough analysis by using a full picture display to show all possible risk and return combinations. A cumulative probability distribution, which implies arranging the present value results in ascending

[12] Distinction between "risk" and "uncertainty"

[13] Description of risk assessment process for example see: Vose, 2002, p. 6f.

order, eases to observe the degree of probability for an expected project result.[14] At this stage of evaluation the beforehand formalized definition of success could be used as a benchmark (see equation 8 and 9). The probability that firm C's present value exceeds the sum of present values of firm A and firm B and the defined total synergy premium should be in excess of 50 percent. However the ultimate decision for a merger is contingent upon the investor's appetite for risk. The risk/return profile merely provides transparency for the investors risk attitudes.[15]

4.4 External or internal evaluation teams?

Finally just one question remains for discussion, who should perform the extensive data and process mining in the identification phase of evaluation? In general there are four conceivable alternatives: An internal management team of the acquirer (firm A), an internal management team composed of firm A and B, an external private audit company or an external public audit institution. For selecting the most appropriate type of inquiring unit, four determinants have to be observed:

1. Naturally investigation teams must cope with a myriad of problems, ranging from asymmetric information; Evaluation processes have contrasting points of view; those based on system internal process information, which fail to take full advantage of information asymmetries, and others based on external output figures, which take a broader approach. Nevertheless any information deficiencies can be minimized by including management staff from firms A and B.

2. Clearly, each employee of firm A or B is directly affected by the merger. Fears and concerns regarding job security or redesigned functions often permeate into the merger process, culminating in the loss of highly skilled personnel to a competitive labour market. Merger situations are often characterized by individual uncertainties and a state of persistence, which burdens the overall company performance. Human resource involvement from both A and B early in the merger process can be interpreted as a pre-emptive move to create trust and credibility. However a personal deep involvement of investigators could block the view for restructuring of existing or the development of new business processes. For this purpose people have to take look from a distance. Investigation teams, irrespective of being in- or outsiders, requires a straightforward corporate communication of the overall vision for the merger, progress reports and the critical roles of employees within the integration process, in order to foster a trusting relationship between management and staff from both firms. Corporate communication is critical in determining the level of collaboration between corporate staff of both companies.

3. Under conventional due diligence the primary focus is restricted to the target acquired company. However information must also be requested from the acquiring company A in order to obtain more accurate and reliable synergy effects. Identification of synergy continuously entails the analysis of two business models of varying strengths and weaknesses, while a merger of companies implies the fusion of two complex systems with diverse elements and relations.

[14] Savvides, 1994, p. 16.

[15] The risk/return data could be edited by calculation of an expected value and several ratios like the expected loss ratio.

There could be some doubt if internal investigation teams have the needed extraordinary degree of reflexivity: knowing their company's own strengths and weaknesses, comparing them with those of the target company and developing a vision for the combined corporate system.

4. The targeted visualization and analysis of all important business processes unlocks the vault to the most valuable resource a company owns: the intellectual property. Comparable to the source code used to design software, it tells everyone how to combine resources to achieve value. Product piracy in the sense of illegal reproduction of products leads to considerable losses in sales and profit. Nevertheless pirates still must devise a way to replicate production. In the case of a merger, the acquiring company exposes all of its safeguarded business processes, similar to a chef's cooking recipes which detail each ingredient and the production processes involved. Therefore knowledge of business processes is the highest form of intellectual property a corporation possess and must be protected by the highest security measures possible. The identification and evaluation of synergies prepares the field for management's decision if a merger between companies makes economically sense. Taking this uncertainty concerning the final merger decision into account, no internal investigation team should be trusted with 100% control of data mining. External audit team's primary focus is to handle secure data; however system internal data has a different quality compared to external data such as balance sheets and business reports. Given this logic, it would be wise to allow a public audit institution, acting as a trust broker within a merger process, access to the security of intellectual property.

5 Impact on Management decision

The high failure rate of mergers provides a constant stimulus to reflect the common praxis of merger pricing and the underlying theoretical appraisal models. The preceding review of the merger problem was aimed at putting forth creative and unique solutions in order to increase the success rate of mergers.

New answers were proposed to the frequently asked questions, how much is too much? Or are merger premiums too high? Equipped with the preceding knowledge, one must interpret any premium paid, in addition to the market price of the target firm, as a seller's premium for future synergy effects. The acquiring firm's shareholders will invariably burden the risk when any payout occurs in $t=0$, while the shareholders of the target firm bear a diminutive risk. Consequently, the acquiring firm's shareholders request an equivalent synergy premium to that of the seller. Taking these aspects into account the message for managers becomes clearer: Premiums should only be paid out if there is a reasonable expectation that the total synergy effect to be realized in the future is at least twice as high as the premium plus risk-adjusted compound interest.

A merger constitutes a new corporate system C to be built up by the fusion of complex corporate systems A and B with diverse elements and relations. Codified knowledge taken out of balance sheets and business reports provides a sufficient data basis for evaluation if the performance processes of existing corporate system remain unchanged. However mergers are done with the intention of improving or modifying existing processes as well as installing new ones. Therefore investors have to open the "box" to

gain an inside view and to generate system internal information. Further complicating matters, system *"box C"* does not exist yet. Therefore it is imperative that any pricing of firm C requests system specific knowledge of A and B in order develop a vision regarding the future performance processes and interaction of elements and relations in the new system C. This different view on a merger process has several implications:

- Under conventional due diligence the primary focus is restricted to the acquired company. To identify synergy effects under the system based method, a two-way perspective is required to continuously analyze both business models strengths and weaknesses. Therefore, investors require an extraordinary degree of reflexivity: knowing their company's own strengths and weaknesses, comparing them with those of the target company and developing a vision for the combined corporate system.

- Due diligence teams require new actors with a diverse set of skills and should be comprised of individuals with a vast experience and solid understanding of each firm's core business. The investment appraisal is dependent on expert knowledge. Synergy assessments performed by risk managers may lead to further changes in the value because of the similarities that exist with corporate risk management.

- To generate system internal information, corporations must reveal its safely guarded business processes in order to conduct the necessary data mining. In this sense a merger process is always a collaborative contest waged by each firm involved. Hostile take-overs are synonymous with information asymmetry as uninformed investors acquire black boxes, without any substantial knowledge pertaining to the contents. Identification phase and integration planning will commence after each contract has been notarized, confirmation of payment and ownership transferred. In this case, payment should come in the form of stocks, as opposed to cash, as new shareholders share both the value and risk of the merger transaction.[16]

- A radical change is needed for the pricing process. Synergy effects crystallize through an innovative or superior combination of given corporate resources, therefore pricing begins with the identification of given processes, followed by a vision about future business processes and its integration planning. Expert knowledge of future business processes (system internal information) constructs the data basis for the cash flow forecast and any additional uncertainty (unsystematical risk) has to be explicitly incorporated into the pricing model.

[16] Rappaport, Sirower, 1999, p. 148

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