

**An Analysis of Structure and Process of Corporate Alliance
Development Using System Architecture Frameworks**

by

Gwang Gyu Kim

Ph.D. Chemical Engineering, Seoul National University (1999)

M.S. Chemical Engineering, Seoul National University (1995)

B.S. Chemical Engineering, Seoul National University (1993)

Submitted to the System Design & Management Program
in Partial Fulfillment of the Requirements for the Degree of

Master of Science in Engineering & Management

at the

Massachusetts Institute of Technology


[February 2007]
December 2006

2006 Gwang Gyu Kim


©All Rights Reserved

The author hereby grants to MIT permission to reproduce and to distribute publicly and
electronic copies of thesis document in whole or in part.

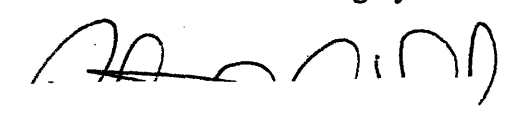
Signature of Author _____

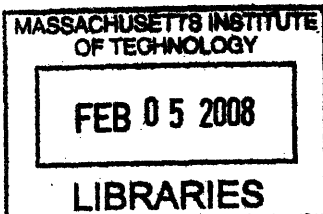

Gwang Gyu Kim
System Design and Management Program
December 2006

Certified by _____


Edward Crawley
Thesis Supervisor
Aero/Astro & Eng Systems

Accepted by _____


Patrick Hale
Director
System Design and Management Program



ARCHIVES

Abstract

A strategic alliance has been one of the core methods for expanding the business of many corporations in terms of geographic presence, business domain, and technological scope. The strategic alliance includes many different types of partnerships, including licensing in and out, joint product development, minority equity investments, joint ventures, and mergers and acquisitions. These alliances involve many distinctive participants inside and outside a corporation and for this reason, the alliance-forging process and management tend to be quite complicated for systematic analysis. Therefore in this thesis I employ system architecture frameworks to analyze strategic alliances in a systematic way from a holistic viewpoint.

I apply an object process methodology (OPM) to understand interactions among different participants during the process of forging alliances, analyze the upstream and downstream influences, and finally adopt a holistic framework to illustrate detailed interactions during the process. The alliance process basically consists of four distinctive phases: formulation, partner selection, negotiation, and management. Comparing the results with the DuPont case, I realized that the alliance management phase should be augmented for more comprehensive management. Strategic alliances and mergers and acquisitions are discussed in the corporate-level context. They have many driving forces in common at the level of corporate context, but in mergers and acquisitions the economic conditions are more critical components than others during a strategy-formulation phase.

Acknowledgments

First and foremost, I would like to acknowledge the support and guidance of my thesis advisor, Professor Edward Crawley. He provided me with the system architecture framework which is a very instrumental tool for analyzing the strategic alliances. Many meetings with him, during which we discussed the frameworks and their applications to my thesis, stretched my mind and helped me to develop a more holistic approach and viewpoint towards a complex system. I also would like to acknowledge the support from System Design and Management (SDM) administrators. Everyone in SDM helped me to achieve my goal not only in my studies at MIT but also in my career after graduation. Finally, I also would like to express my gratitude for the friendship that my classmates shared with me. The interactions with them always nourished and refreshed my mind and helped me to get through the rigor of this program.

Table of Contents

Abstract	i
Acknowledgments	ii
Table of Contents	iii
List of Figures	v
List of Tables	vii
I. Introduction	
1. New Product and Business Development via Alliance.....	1
2. Alliance Characteristics	6
2.1. Alliance Process	13
II. Overview of Alliance Intent and Strategy	
1. Alliance Types and Intents	16
2. Alliance Strategies and Characteristics for New Product and Business Development	23
III. Understanding of Strategic Alliances in System Architecture Context	
1. Bilateral Alliances	
1.1. Stakeholder Complexity	28
1.2. Object Process Methodology (OPM)	31
1.3. OPM Architecture for Bilateral Alliances	33
1.4. Multiple Alliances	35
1.4.1. Multiple Alliances-Iridium Project Case	37
1.5. Cross-Border Alliances	39

1.6. Upstream and Downstream Influences	40
1.6.1. Influences in Bilateral Alliances	42
1.7. Holistic Framework	
1.7.1. Bilateral Alliance Development	44
2. Product and Business Development via Alliances	
2.1. DuPont Case	51
3. Management Issues in Strategic Alliances	63
IV. Mergers and Acquisitions	
1. Overview of Merger and Acquisition Types and Intent	66
2. Merger and Acquisition Types and Intent	68
3. Merger and Acquisition Tactics and Characteristics	71
4. Merger and Acquisition Process	76
4.1. Due Diligence	78
4.2. Valuation	80
5. The Case of General Electric.....	83
6. Mergers and Acquisitions in the Corporate Context	85
7. Corporate Governance Issues in Mergers and Acquisitions	89
V. Summary and Conclusions	
1. Strategic Alliances in System Architecture Context	91
2. Mergers and Acquisitions in a System Architecture Context	93
References	95

List of Figures

Figure 1. Internal and external methods of developing new products and businesses	1
Figure 2. Five key structuring elements for DuPont BIP.	3
Figure 3. Types of strategic alliances.	7
Figure 4. Elements of Fujitsu’s alliances.	9
Figure 5. A likely evolution of an alliance web.	10
Figure 6. A Generic alliance process.	13
Figure 7. Alliance process.	15
Figure 8. The Familiarity matrix.	25
Figure 9. Examples of object process links and relational structural links.	32
Figure 10. OPM architecture for bilateral alliances.	34
Figure 11. Various forms of alliance networks.	35
Figure 12. Framework for downstream influences.	41
Figure 13. Holistic framework for alliances.	44
Figure 14. Holistic framework for bilateral alliances.	48
Figure 15. Alliances in a corporate context.	50
Figure 16. The DuPont business initiative process.	51
Figure 17. The DuPont gap analysis.	53
Figure 18. DuPont’s business initiative process roadmap.	54
Figure 19. DuPont’s “alliance landscape”.	56
Figure 20. DuPont’s “Option Evaluation Sheet”.	57

Figure 21. Tender offers, 1980 – 2000.	71
Figure 22. Number of contested proxy solicitations, 1981 – 2000.	75
Figure 23. Mergers and acquisitions in a corporate context.	87
Figure 24. Equity restructuring.	88

List of Tables

Table 1. History of internal ventures at DuPont	2
Table 2. Goals and outcomes of strategic and operational alliances	19
Table 3. Cisco's minority equity investments	20
Table 4. Cisco's acquisitions	21
Table 5. History of acquisitions by a major partner	22
Table 6. New business entry strategies	24
Table 7. Various stakeholders in alliances and partnerships	30
Table 8. Stakeholders in the Iridium project	38
Table 9. Upstream and downstream influences of alliance architecture	43
Table 10. Holistic framework for bilateral alliances	46
Table 11. The ten biggest mergers of 1985 in billions of dollars	67
Table 12. The eight-factor test for tender offers	73
Table 13. Usage of investment decision methods	81

I. Introduction

1. New Product and Business Development via Strategic Alliances

New product and business development has been considered a key growth mechanism that helps a corporation to grow beyond its existing capabilities, so in almost all corporations this function becomes a key element of corporate strategy. Hamel and Prahalad describe the importance of capturing future opportunities as “competition for the future is competition to create and dominate emerging opportunities” [1]. The strategic goal of a corporation is typically to improve its shareholder values in diverse ways, but taking valuable products and services out to the market earlier at a lower price by leveraging on core competences has been both a major and the strongest way to accomplish this goal. In order to bring in new products and business development capabilities, a corporation usually relies on two methods: internal R&D and venturing, and strategic alliance and partnership. (See Figure 1.)

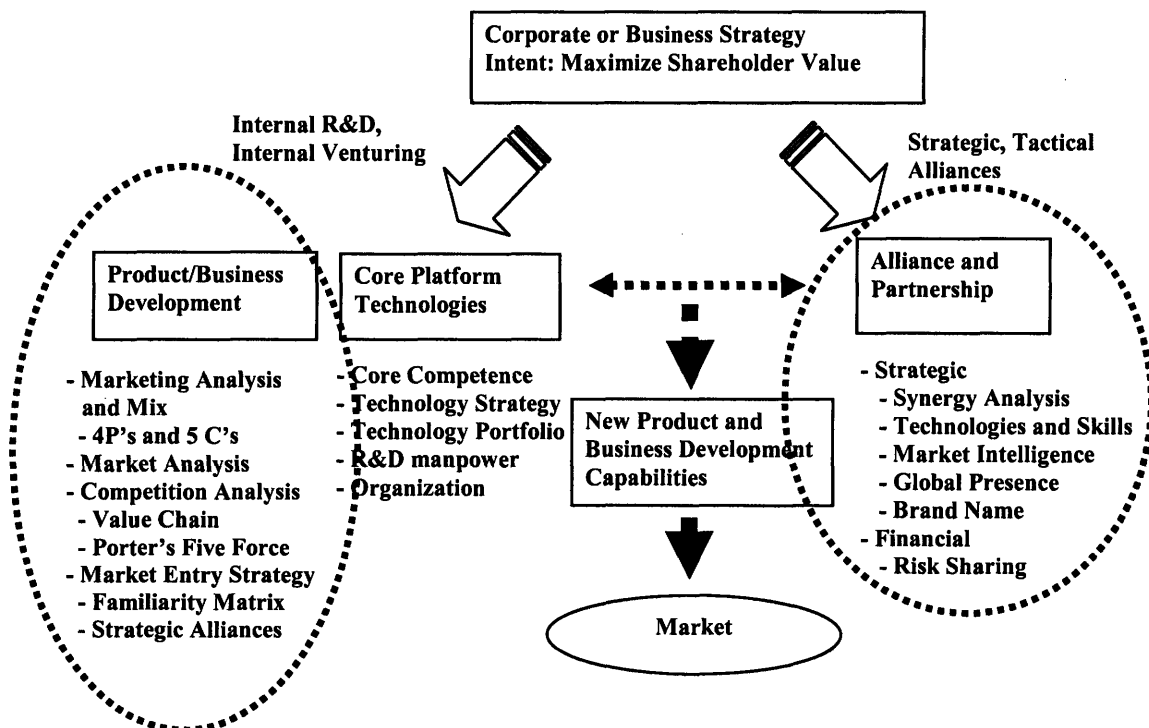


Figure 1. Internal and external methods of developing new products and businesses.

First, the internal R&D method as a way of developing new products and businesses has been the most safe and reliable in slow-moving traditional industries, especially when the company has adequate resources. As far as a company has familiarity in both the market and technology, it can successfully position itself with compelling value propositions, avoiding time-to-market pressure and the risk of heavy capital investment. In many cases its strategy is to acquire necessary core platform technologies in order to fill a technology gap that the company has to have to complement and expand its product offerings. But this traditional method of developing new products and businesses has suffered, especially when applied to such complicated and fast-moving industries as healthcare, information, and electronics, where the technology and market are relatively new to many companies and a more entrepreneurial environment is needed to motivate creativity and risk-taking attitudes. As a result, internal venturing has been adopted to overcome the bureaucratic corporate culture.

Table 1. History of internal ventures at DuPont [2]

Time	
1960-1964	Venture Capital (~11 investments)
1964-1969	Internal Ventures: R&D (\$40 million) aimed at forward integration into systems businesses; 2 new products developed – nylon window shutters and Teflon heat exchangers
1970-1972	Venture Analysis Group, focused on external market opportunities and potential acquisitions (8 proposals to DuPont Executive Committee)
1973-1978	Internal Ventures: “off the shelf” exploitation; close to 20 pilot business operations
Corporate venturing essentially terminated at this point	

Source: Edward Robert, “Corporate Entrepreneurship: Strategies for Technology-Based New Business Development,” Lecture Note, MIT Sloan School of Management, Fall 2005.

Often the internal R&D and ventures are quite limited methods in the sense that new product and business development requires a wide range of assets; usually no one

company has a whole set on hand, so relying on a strategic or tactical alliance to secure these complementary assets becomes inevitable. DuPont, for example, incorporated the strategic alliance management into its “Business Initiative Process” (BIP) while framing the process for new business development [3, 4]. This initiative consists of a five-stage business case process: evaluation and planning, detailed development and preliminary negotiations, scale-up and definitive agreements, and implementation and commercialization and this process is conducted by five fundamental structural elements of a program approval committee (PAC), a core team, a structured business initiative process guideline manual, phase reviews, and a business initiative process manager in order to avoid any potential mistakes [3, 4].

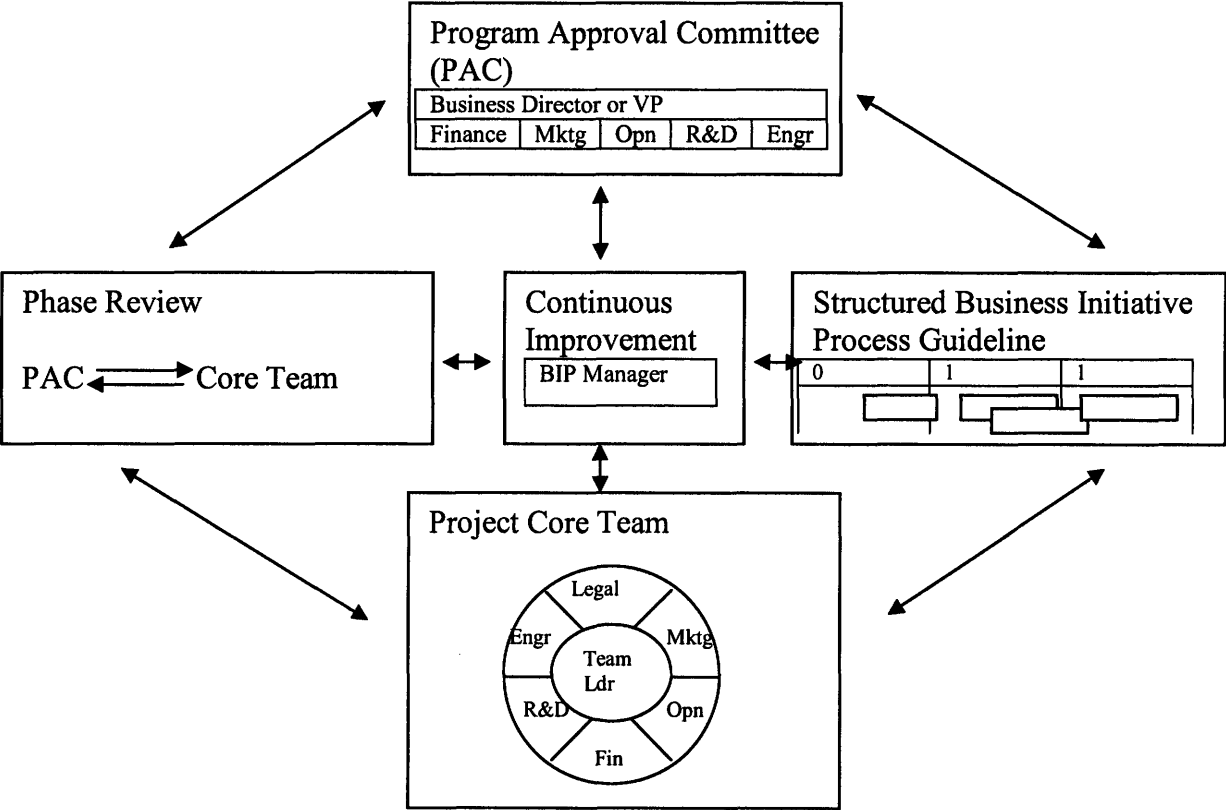


Figure 2. Five key structuring elements for DuPont BIP. [3, 4]
 Source: Robin A. Karol, Ross C. Loeser and Richard H. Tait, “Better New Business Development at DuPont – I, Research Technology Management, 24, 2002.

It is notable that in BIP of DuPont the alliance management has been a core element for new business development efforts and that BIP is suggested as an alliance toolkit with a series of best practices. This toolkit includes the following elements [3, 4]:

1. Partner evaluation and selection frameworks
2. Negotiation team guidelines
3. Due diligence checklists
4. Transition planning and implementation processes
5. DuPont joint venture seminar

The partner evaluation and selection frameworks might be most important steps in forging an alliance, and DuPont used strategic gap analysis consisting of market presence, processes, and technology. Market presence measures how close a company is to the potential customers and suggests how to fill this gap through a partnership. Technology gap analysis is used to find technologies to complement the products and operations. Finally, process gap analysis touches on operational aspects of product development: how to optimize the development, production, and distribution. Alliance strategies are evaluated, ranked, and selected using this gap alliance. Negotiating team guidelines is a framework for staffing, organizing, and managing the negotiation process. Due diligence checklists list key elements that should be executed during a due diligence process. The transition planning and implementation processes deal with ways to integrate the new alliance with the system for internal product and business development. DuPont's roadmap of the business initiative process highlights the importance of incorporating the alliance element with the structure and process of product and business development. But DuPont's model tends to simplify the complexities of the alliance model, so the following

section will expand this model. Therefore in this thesis, after analyzing a number of different alliance models using a system architecture framework touching on process, organizational structure, interface, and intents of strategic alliance, I will compare this analysis with real strategic alliance cases, the DuPont case and GE case.

2. Alliance Characteristics

The inter-firm alliance can be basically categorized as two types of arrangements, contractual agreements and equity arrangements [5]. The contractual agreements that do not involve any transaction of equity of firms include licensing and cross-licensing as traditional contracts and joint R&D, joint manufacturing, joint marketing, and research consortia as nontraditional contracts. On the other side, equity arrangement types of alliances can be classified in three distinctive ways, depending on whether they engage creation of new entities, dissolution of an existing entity, or creation of no new entity. Such alliances as joint ventures and mergers and acquisitions usually involve some transaction of equity of the firms. As a result, these types of alliances are generally considered more complex, so assessment and evaluation in line with synergies, financial valuation, deal structure, forging process, and organizational structure become critical issues to investigate in detail.

The term “strategic alliance” has been used in a slightly confusing way and clustering the alliance types listed in the Figure 2 into strategic alliances or tactical alliances is not generally agreed upon, but Yoshino and Rangan suggest necessary and sufficient characteristics of strategic alliances as follows [5]:

- (1). “The two or more firms that unite to pursue a set of agreed upon goals remain independent subsequent to the formation of the alliance.
- (2). The partner firms share the benefits of the alliance and control over the performance of assigned tasks, perhaps the most distinctive characteristic of alliances and the one that makes them so difficult to manage.”

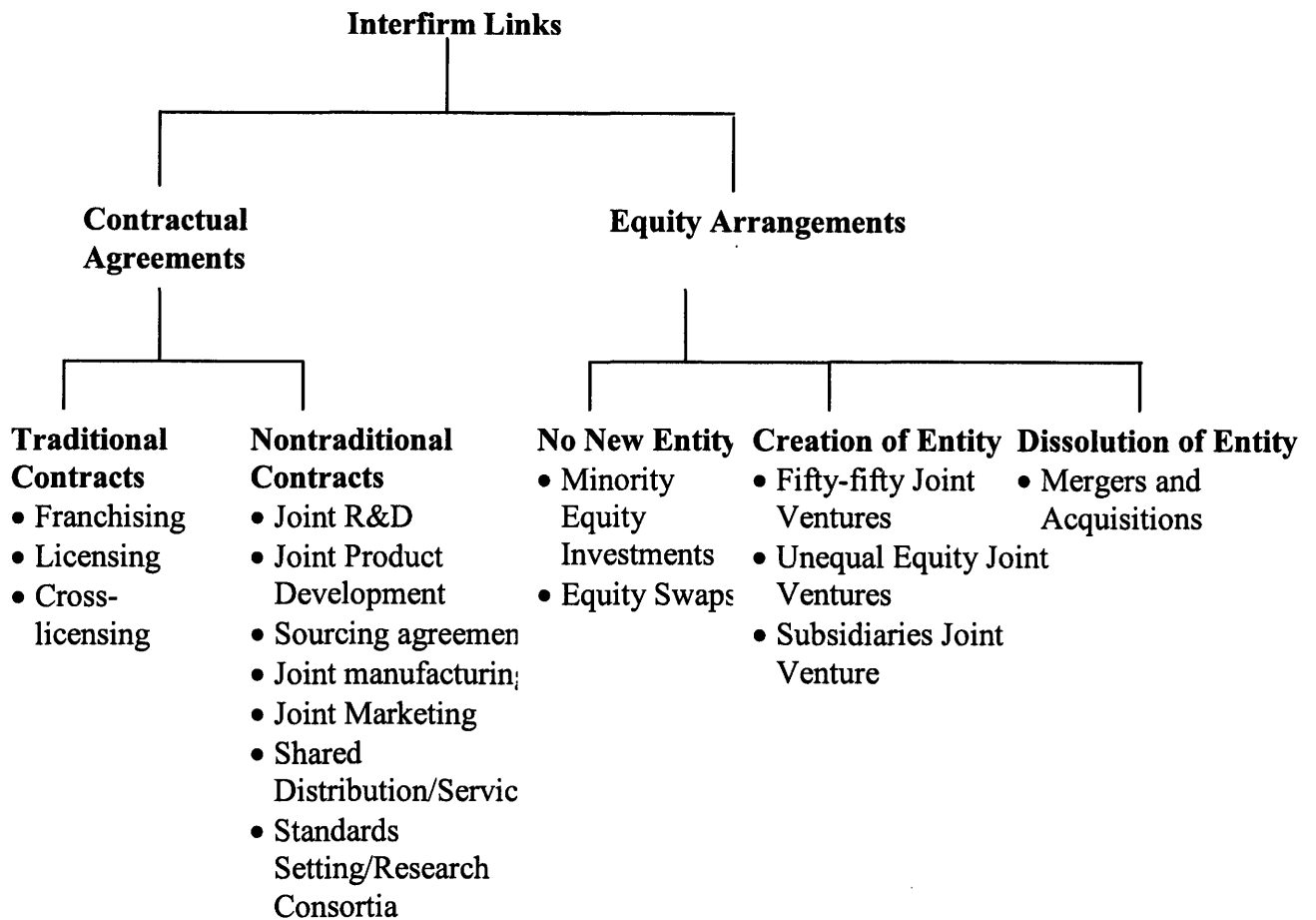


Figure 3. Types of strategic alliances. [5]

Source: Michael Y. Yoshino, "Strategic Alliances," Harvard Business School Press, 1995.

(3). The partner firms contribute on a continuing basis in one or more key strategic areas, technology, products, and so forth.

In light of these criteria of strategic alliances, the author argues that the licensing and franchising agreements are not a strategic alliance; he classifies them as a tactical alliance because they do not involve any continuous transfer of technology, products, and skills between partners. So Japan's Fuji-Xerox fifty-fifty joint venture is not a strategic alliance under his definition because Fuji just played a role in supporting Xerox's global product design and development activities without any significant contribution to the

other party. The strategic alliances satisfying this definition then include nontraditional contracts, minority equity investments, and joint ventures.

In this thesis I concentrate on analyzing strategic types of alliance using system architectural frameworks but also investigate mergers and acquisitions in detail because of the close linkage between the two, as will be discussed a more in the following section. For example, many joint-venture type alliances end up with a weaker partner being acquired by stronger partner, meaning the strategic alliance results in a non- strategic alliance as time goes on. The complexity of an alliance is discussed in terms of its complicated participants, process, intents, objectives, and the time-dependent characteristics of these elements.

Strategic alliance in many cases is quite complex because a company is partnering with multiple partners with different types of approach [6], and while it forms an alliance, a variety of external participants could be engaged in the event, including investment banks, venture capital firms, financial auditing firms, law firms, courts, and the US Securities and Exchange Commission (SEC).

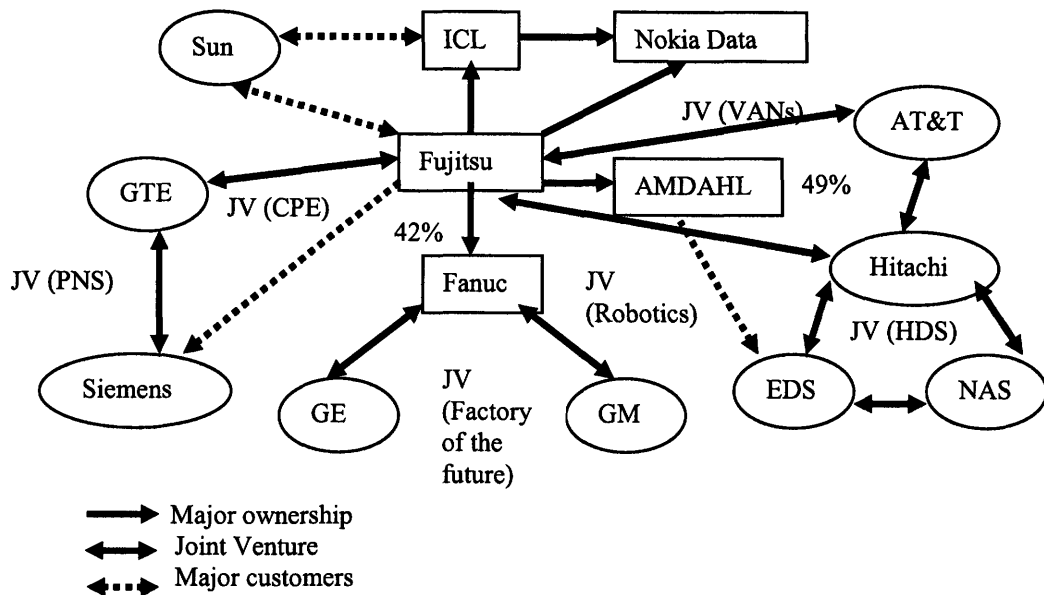


Figure 4. Elements of Fujitsu’s alliances.

Source: Yves L. Doz, Gary Hamel, “Alliance Advantage – The Art of Creating Value through Partnering,” Harvard Business School Press, 1998.

The dynamic aspect of an alliance is also an important element. The likelihood of the evolution of strategic alliances is depicted in Figure 7 [6]. The initial independent competitors start partnering with multiple partners with different agreements. These multilateral alliances end with competitive coalitions and this type of evolution was observed in the automobile industry, the mainframe segment of the computer industry, and the microelectronics industry [6].

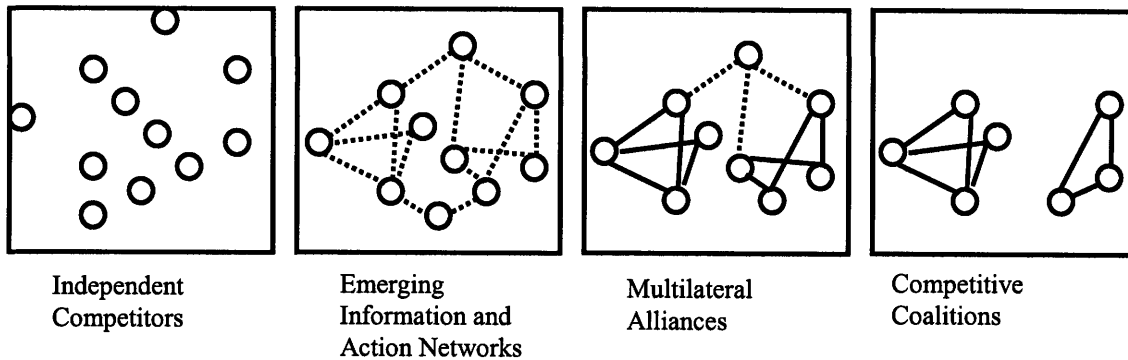


Figure 5. A likely evolution of an alliance web.

Source: Yves L. Doz and Gary Hamel, *“Alliance Advantage – The Art of Creating Value through Partnering,”* Harvard Business School Press, 1998.

The competitive coalitions in many cases end up with mergers and acquisitions by the stronger partner. The strategic reasons behind this phenomenon have been described as either strategic reasons financial reasons, or conglomeration reasons. The strategic mergers and acquisitions are pursuing synergies between the firms, which means each company is looking for complementary assets of a potential partner company. The financial reason is to optimize financial gains by integrating companies performing poorly in the financial sense. This optimization can lead to increased shareholder value by means of a stock price increase, tax-shield benefit, or restructuring of finance structure. The mergers and acquisitions come in a number of different shapes, depending on their strategic objectives [7].

(1). The Overcapacity type

This type of M&A often occurs in mature industries such as the automotive, petrochemical, and computer industries. The reason behind this activity is to gain market control by acquiring excessive market capacity in the same industry and therefore gaining market share, creating a more efficient operation, and achieving economies of scale. The

typical example is Daimler-Benz's acquisition of Chrysler. Because the huge size of transactions, a major concern is how to harmonize the assets of two different companies.

(2). The Product or Market Extension type

This type is a quite typical and safer way to extend the company's product line or its international presence. Based on its core competencies, a company integrates the product and market of acquired companies. The example of this type of M&A is Quaker Oats' acquisition of Snapple.

(3). The Industry Convergence type

As interfaces along the value chain are eroding, each company operating in different segment of value chain in the same industry tries to integrate the companies in the adjacent business area in order to be more profitable. The typical examples are Viacom's purchase of Paramount and Blockbuster and AT&T's purchase of NCD, McCaw, and TCI. Because the likelihood of this acquisition is monopoly of the market, the major concern of this event is to avoid the violation of the antitrust rule.

(4). The R&D type

Many technology-oriented companies use this type of acquisition to expand their R&D capabilities and to build a market position quickly. Cisco's several tens of acquisitions of technology companies is a typical example. The major concern is how to retain the key talents in the company being acquired.

(5). The Geographic Roll-up type

The objective of this type of acquisition is for the company to expand its geographical presence while operating units remain local. The example of this is Banc One's acquisition of a number of local banks.

We may use the other criteria to classify the M&As depending on their objectives or using the value-chain concept. Depending on the reasons behind the acquisitions, we can classify them as strategic, operational, financial, or conglomeration. If we use a value-chain concept, we can classify them as vertical, horizontal, or conglomeration types of mergers and acquisitions. In this classification, the overcapacity type and product-extension types can be categorized as horizontal integration because it is integration in the same segment of the value chain. On the other hand, industry convergence type is a typical vertical-integration type of M&A.

2.1 Alliance Process

Figure 6 illustrates a generic process for forging an alliance. It starts from a firm's level strategy, where high-level objectives of alliance are set up. Based on this strategy, strategic logic and a road map of alliance follow, where crafting, structuring, and evaluating scheme are deployed. This forging step is followed by the steps of managing the alliance and servicing the alliance network. Each step of this strategy process is not only linked to the previous step but also closely correlated with the whole series of alliance steps.

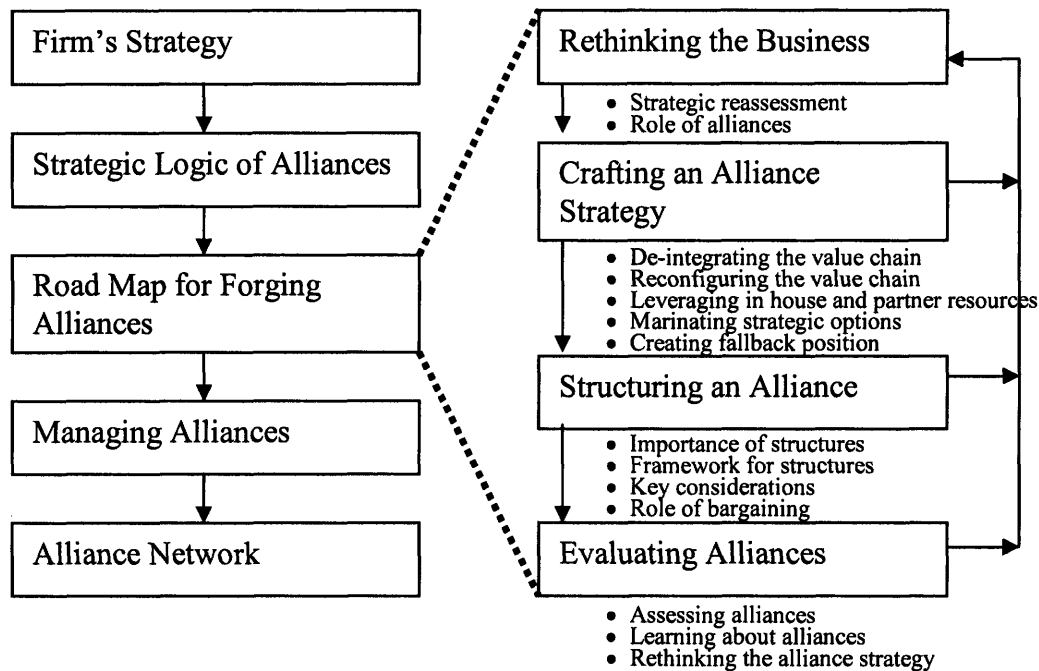


Figure 6. Generic alliance process.

Source: Michael Y. Yoshino, "Strategic Alliances," Harvard Business School Press, 1995.

This generic alliance-forging process including internal development can be understood in the following way. In this case the alliance would look like the following figure. This process consists of the four major components of strategy formulation, partner selection, negotiation, and management. During strategy option selection, we can

review all alliance options, such as licensing in and out, joint product development, joint venture, mergers and acquisitions, and minority equity investment using the familiarity matrix. the partner-selection process is one of the most critical components of the whole alliance process, whereby a number of different evaluation frameworks can be adopted. We may be able to evaluate the partner by devising generic evaluation criteria depending on the level of importance to the company. Typically strategic fit, market potential, synergistic effect, technology impact, time-to-market, time urgency, resource availability, internal capability, and competition are the criteria used to evaluate the importance of partners. Depending on the level of importance of each criterion, a weight factor might be used for final evaluation. After we narrow down the choices to prospect partners, more detailed partner analysis will follow, in which SWOT analysis, NABCD, or another business analysis framework can be employed. On the one hand, SWOT analysis investigates the strengths, weaknesses, opportunities, and threats of the alliance. On the other hand, NABCD analysis uses criteria based on needs, approaches, benefits, competitions, and deliverables. Or components of general business plan may be altered for this specific purpose. Generally any combination of frameworks could be adopted, but the critical issues to be addressed would include market environment; competitions; synergy analysis including market synergy, technology synergy, and financial synergy; threats to the alliance; pro forma financial projections; and any latent issues such as legal regulation and societal pressure.

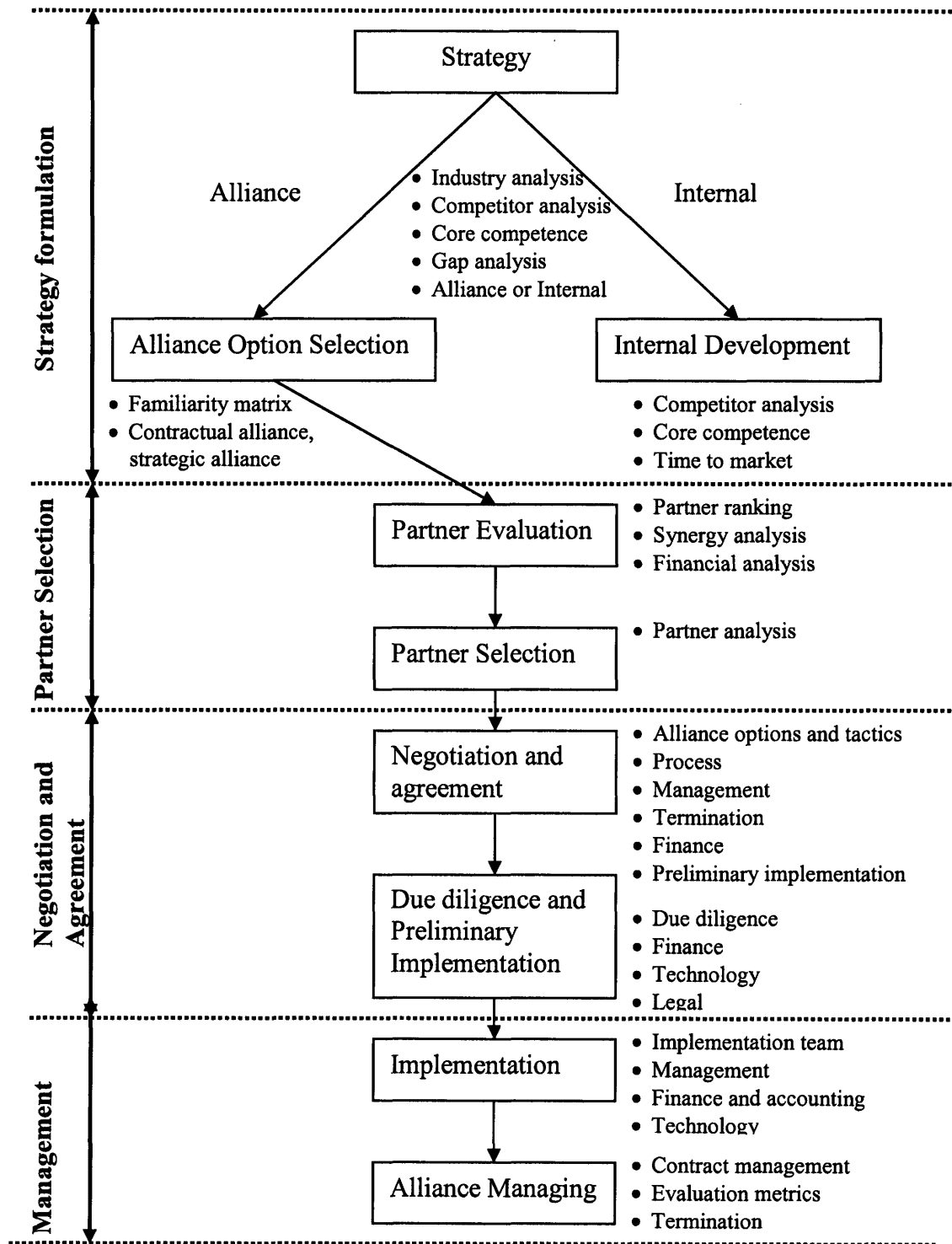


Figure 7. Alliance process.

II. Overview of Alliance Intent and Strategy

1. Alliance Types and Intents

The ultimate goal of any strategic alliance is to maximize its shareholders' value by bringing in the complementary capacity in technology, manufacturing and operation, marketing and sales, and brand name. This strategic alliance can be formed among several companies or built on a one-on-one basis. The one-on-one case of alliance can be competitive or noncompetitive [5]. "Precompetitive alliances" are formed between different industries to develop new products, technologies, and services. Because neither partner has a whole set of resources to achieve business goals alone, this relationship is likely to be quite complementary and the scope of interaction tends to be well defined but limited to research activities. An example in this category is DuPont and Sony's alliance, in which they were trying to develop memory storage products. "Procompetitive alliances" are relationships between companies in different segments of a value chain, such as General Motors with Hitachi. In this case, the task is likely to be well defined but the interaction tends to be limited due to the nature of collaboration. The company in this relationship places a higher priority on flexibility, and learning and maximizing the value of the alliance than in protecting secrecy, tacit knowledge, and core information. Many companies in this category form more than one partnership to maintain flexibility and preempt future opportunities. In contrast, "noncompetitive alliances" are likely to happen in the same industry but between non-competing companies, such as General Motors and Isuzu. Because the core competence and strategic objectives of the companies in this category are different and separated, that is to say because these companies do not compete, they place lower priority on protecting core information but collaborate with

high levels of interaction in multiple operations of the businesses. In contrast, “competitive alliances” are formed between companies that compete directly in some part of the value chain. Typical examples are alliances between General Motors and Toyota, Sony and Samsung, Motorola and Toshiba, and Siemens and Philips. The alliance can be also categorized by the types and intents of the partner participating: “collisions between competitors,” “alliances of the work,” “disguised sales,” “bootstrap alliances,” “evolution to a sale,” and “alliances of complementary equals” [8].

(1). “Alliances of Complementary Equals”

This type of alliance occurs between strong partners with complementary assets. The objective of this type of alliance is to make use of the complementary capability of a partner, but unlike the case of “collision between competitors,” this partnership involves strong companies with a kind of complementary capabilities so it tends to last a longer period of time.

(2). “Evolution to a Sale”

This alliance also occurs between strong partners, but the final outcome will be the acquisition of one partner. The two partners maintain a mutually beneficial relationship, as in “alliances of complementary equals,” but as the competitive tensions arise and bargaining power shifts, one of the partners is acquired by the other. After the initial alliance goal is achieved during an average life span of seven years, the relationship ends up with mergers and acquisitions.

(3). “Collision between Competitors”

This alliance is between strong partners, but unlike the “alliances of complementary equals” or “evolution to a sale,” the relationship is likely to be unstable due to its

competitive nature. Because of this competitive nature, the joint efforts tend to fail to achieve the original strategic goals but end up with mergers and acquisitions of one partner. Even with the high likelihood of failure, they form this relationship in an attempt to reduce the risk of uncertainty and sometimes to preempt unveiled opportunities by building a high entry barrier.

(4). “Bootstrap Alliances”

In this case of alliance, a weak company is attempting to capitalize on the complementary resources of strong partner. In only a few cases, the partnership turns into an “alliance of equals” or the companies separate after achieving their initial strategic goals. In many cases though, the weak company remains weak or is acquired by the partner.

(5). “Disguised Sales”

This relationship exists between strong and weak partners. The weak company is trying to improve its capabilities by allying with a strong company, but this alliance tends to be short-lived and the weaker player remains weak or is acquired by the strong player.

(6). “Alliances of the Weak”

This is an alliance between weak companies to improve their capabilities by using the resources of the partner. But neither group of complementary assets is competitive with a third stronger players, so the partner in this alliance usually grows weaker and the alliance fails, followed quickly by mergers and acquisitions by a third party.

Depending on the scope of alliance intent such an alliance can be broken down into either strategic or operational [2]. Strategic alliance involves company’s core competence or business, influencing the whole business environment. This alliance deals with such issues as entry into a new industry and the growing or diversifying of the core

business. Therefore, its outcomes are also huge even though the success rate tends to be low. On the other hand, the operational type alliance is targeted at the incremental improvement of business by either filling a product or technology gap or by expanding a company's geographic presence. Because of the extension of its core resources, companies using operational alliances have failure rates lower than that of strategic alliances, but the outcomes tend to be marginal as well, compared to strategic alliances.

Table 2. Goals and outcomes of strategic and operational alliances

Strategic	Goals	Outcomes
	Entry into new industry Significant growth and/or diversification Survival of primary business	High failure rate The potential for a big win
Operational	Improve performance of current business - filling out product line - closing technology gap - opening new incremental geographic market	Low failure rate Successes contribute to strengthening present business, sometimes significantly

Source: Edward Robert, "Corporate Entrepreneurship: Strategies for Technology-Based New Business Development," Lecture Note, MIT Sloan School of Management, Fall 2005.

It is also meaningful to notice that a company's tendency to use various types of alliance changes over time and its alliance intent also migrates to other categories during its life span. Take Cisco Systems for example; from its infant phase to its mature phase, its alliance intent and portfolio changed significantly [9]. During its initial stage in order to build a brand name, it pursued a strategy to improve its marketing and sales rather than alliances and acquisitions. As the industry was growing rapidly, however, Cisco started to look to alliances and acquisitions to support its expansion as well as maintain its leadership in the market. Cisco made a number of agreements with established computer manufacturers to solidify its marketing and sales position but also made a number of minority equity investments in technology startups to diversify its product offerings and

to bring in new technologies [10]. Naturally, Cisco made many acquisitions at this phase. As the competition intensified, Cisco relied more on joint ventures, joint research and development, and strategic alliances in order to maintain its leadership position in hardware, software, and network management services, purchasing more than 40 companies during the late 1990's.

Table 3. Cisco's minority equity investments

Date	Company	Description	
93	Cascade Communications	Telecommunications technology	
95	International network service	Provider of network integration, management, and consulting services	
	Netsys technologies	Developer of problem solving, modeling, and simulation software for network managers	
	CyberCash	Developer of software and service solution for secure financial transaction over internet	
	Objective systems integrators	Developer of network management software for service providers	
	96	Terayon	Cable based digital communications
96	Databeam	Provider of communication and application protocols and services	
	Precept software	Developer of networking software	
	Visigenic software	Provider of database connectivity and distributed object messaging	
	VeriSign	Provider of digital authentication products	
	Interlink Computer Science	Supplier of high-performance solutions for enterprise network systems management	
	Openconnect systems	Provider of internetworking software, systems, and development tools	
	97	Vxtreme	Provider of streaming video for the internet and corporate network
	97	Software.com	Provider of server-based messaging solution
RadioLan		Developer of low-cost wireless Lan	
TIBCO software		Provider of publish/subscribe software and push technologies	
Globalinternet.com		Provider of window NT network security	
KPMG		Provider of consulting, assurance, tax, and process management services	
98		Persistence software	Developer of real-time event notification system
98		Belle systems	Develop billing software
	99	Portal software	Provider of customer software management and billing software
	Akamai	Global internet content delivery service	

Source: Cisco Systems, Official Press Releases, <http://www.cisco.com>.

Table 4. Cisco's acquisitions

Date	Company	Description
93	Crescendo communications	High-performance networking products
94	Newport systems solutions	Provider of software-based routers for remote network sites
	Kalpana	Manufacture of LAN-switching products
	Lightstream	Enterprise ATM switching
95	Combinet	Maker of ISDN remote-access networking products
	Internet junction	Developer of internet gateway software connecting desktop users with the internet
	Grand junction networks	Supplier of fast Ethernet and Ethernet desktop switching products
	Network translation	Maker of low-maintenance network address translation and internet firewall hardware and software
96	TGV software	Supplier of internet software products for connecting disparate computer system
	Stratacom	Provider of network-switching equipment
	Noshoba network	Provider of switching products
	MICA technologies	High-density digital modem technology
97	Telesend	Provider of wide-area network access products
	Skystone systems	High-speed synchronous optical networking/digital hierarchy technology
	Global internet software	Pioneer in Window NT network security technology
	Ardent communication	Innovator in designing combined communication support for compressed voice, Lan, and data and video traffic
	Dagaz	Broadband networking product
	Light speed	Voice-signaling technologies
98	Wheel group	Intrusion detection and security scanning software product
	netspeed	Customer premise equipment, central office products, and broadband remote access
99	Fibexsystem	Integrated-access digital-loop carrier product
	Sentient networks	ATM circuit emulation services gateway

Source: Cisco Systems, Official Press Releases, <http://www.cisco.com>.

The transition from strategic alliance to acquisition of a partner is quite common; Table 3 illustrates some examples [10]. The relationship terminates either after each partner accomplishes its initial business goal or one of the partners achieves a better

strategic position over the other and attempts to purchase the partner. The latter case happens when the alliance occurs between the technology-providing company and the company that provides marketing and sales efforts. After the company in charge of marketing and sales gets accustomed to and acquires technology of its partner, it gets in a better position and will try either managing the business alone or acquiring its partner. It was once found that the majority of terminated partnerships were initiated by a partner and the minority was by either by a third party or by dissolution of the company.

Table 5. History of acquisition by a major partner

Partnership	Start Date	Acquired by	Acquisition Date
Asahi-Dow	1952	Asahi	1982
Merck-Banyu	1954	Merck	1983
Credit Suisse-First Boston	1978	Credit Suisse	1988
Toshiba-Rank	1978	Toshiba	1980
Fujitsu-TRW	1980	Fujitsu	1983
DuPont-Philips (PD Magnetics)	1981	Philips	1988
Fiat-Rockwell	1981	Rockwell	1987
Mitsubishi-Verbatim	1982	Mitsubishi	1990
VW-Seat	1982	VW	1990
Sony-CBS (Digital Audio Disc Corporation)	1983	Sony	1985
Siemens-Telecom Plus International	1984	Siemens	1987
NatWest-Banca March	1985	NatWest	1989
Nestle-Rothmans	1986	Nestle	1988
Fujitsu-GTE	1987	Fujitsu	1988

2. Alliance Strategies and Characteristics for New Product and Business

Development

For new product and business development efforts, a company may use basically any number of different options: internal development, licensing, internal venture, venture capital investment, joint venture, and acquisitions. Internal development is quite safe and allows fuller control compared to other development mechanisms. But the time lag before the generation of sufficient return to break even was eight years on average for Fortune 500 companies [12]. This time lag is occurs partly due to the absence of relevant resources but also due to the risk-averse nature of corporate culture. In order to take advantage of resources available in a corporate and to retain entrepreneurial talent, many companies tried the internal venture methodology. This approach has been successful in installing a risk-taking culture into a large corporation, but designing an optimal reporting system, financial supporting hierarchy, and organizational structure and defining a range of authority and responsibility have been challenging tasks. Because of this kind of internal development and internal venturing limitation, a company relies on bringing in external technology and support. One of the ways to gain rapid access to a proven external technology without being involved heavily with the partner is to use a licensing agreement. The downside of this contract is high dependency for the licensor, especially when their technology is solely or exclusively owned, deteriorating the licensee's negotiation power and excluding any potential cross-licensing agreement.

On the other hand, venture capital investment has been a popular tool to make the company keep in touch with emerging business opportunities without being exposed to a high risk of disseminating the company's core resources. Many corporations such as

DuPont, Exxon, and General Electric used this method in order to get a channel to new technologies and products, but more corporations are using pooled funds instead of funding directly [13]. Using joint ventures or alliances has been a powerful tool in diversifying a company's business portfolio without its being exposed to a huge risk of failure, but because companies in this relationship are more involved in a wide range of businesses, harmful tensions may arise. In contrast, acquisition is an alternative tool to gain familiarity with new technology and business through skilled staff, patents, tacit knowledge, etc. without losing any control of the business because of a partner's involvement. But the success rate of generating sufficient return by this strategy has been less than expected, mostly because of the high cost of purchases and the unfamiliarity of assets that companies are buying.

Table 6. New business entry strategies

Development Mechanism	Advantages	Disadvantages
Internal development	Use existing resources	Time lag to break even
Internal venture	Hold talented entrepreneurs Use existing resources	Corporate culture
Licensing	Rapid access to proven technology	Not proprietary technology Dependent on licensor
Venture capital investment	Window on new technology/market	Unlikely to be source of corporate growth
Joint venture	Distribute risk	Potential conflict
Acquisitions	Rapid market entry	Unfamiliarity
Educational acquisition	Window	Departure of entrepreneurs

Source: Edward B. Roberts and Charles A. Berry, "Entering New Businesses: Selecting Strategies for Success," *Sloan Management Review*, 1985.

A number of options to enter into new business arena; this multiplicity raises the question of which entering strategy is best option under what conditions. With regard to this question, Roberts [13] suggested a familiarity matrix that shows different entry

strategies depending on the company's level of familiarity in various markets and technologies. This matrix consists of three distinctive regions: a base/familiar segment, a familiar/unfamiliar segment, and an interim segment.

Market Factor	New/Unfamiliar	Joint Venture: region a	Venture Capital or Educational Acquisition: region b	Venture Capital or Educational Acquisition: region c
	New/Familiar	Internal Development or Acquisition or Joint Venture: region d	Internal Venture or Acquisition or Licensing: region e	Venture Capital or Educational Acquisition: region f
	Base	Internal Development or Acquisition: region g	Internal Development or Acquisition or Licensing: region h	Joint Venture or Strategic Alliance: region i
		Base	New/Familiar	New/Unfamiliar
		Technology Factor		

Figure 8. Familiarity matrix.

Source: Edward B. Roberts and Charles A. Berry, "Entering New Businesses: Selecting Strategies for Success," *Sloan Management Review*, 1985.

The base/familiar region including region g, region d, and region h is the place where internal development, acquisition, or licensing is a potentially good entering strategy. Given the internal resources to develop a technology, product, and market, the company's best option is to do it alone or sometimes execute an acquisition of companies in the same business arena along an industry value chain. For region h, on top of the options of internal development and acquisition, a licensing agreement may be an additional feasible option. Because the company has adequate market intelligence with existing products and services, it can expand its offerings by bringing in the external

resources through licensing contract. In region d where the technology is base but the market is in new/familiar region, the company can try an acquisition or joint venture strategy besides the internal development option. In this case, the acquisition may be conducted in order to get market intelligence through the company acquired. In the case of joint venture, the potential partner may be a player that has a strong market presence that the first company with technology wishes to capitalize on. But as described earlier, much attention should be paid to protecting technology assets during the relationship because often after the partner gets accustomed to the technology resources, the likelihood is that they will have controlling power over the relationship.

The interim region including region a, region e, and region i is the place where either technology or market is base but the other component is in a new or unfamiliar region or both technology and market are in new or familiar region. This is one of typical situations where a complementary alliance is reasonable. Either of the partners is offering market channel or technology capabilities, and the company providing market access is likely to be a larger corporation and a small startup may offer technological assets. In the region where both the market and technology are in a new or familiar segment, an internal venture may be a good choice. The option in this region is likely to migrate to a base/familiar region after quickly acquiring familiarity technology and market. Managing a joint venture, however, creates a set of challenges in terms of strategy, governance, economics, and organization [13]. The likelihood is that the parent companies have a different set of reporting systems, processes, and metrics, so this difference may hamper the decision-making process and interaction between the joint venture and parent companies. Another potential issue to arise is strategy misalignment. If the parent

company has different strategic goals as opposed to those of the joint venture, this environment will affect the performance of alliance in a negative manner.

The lowest familiar region consists of region b, region c, and region f. In this region of low familiarity, the feasible strategy to take may be a venture capital investment or acquisitions. Because of high risk in entering new business with inadequate information, using two-step approaches is proposed [14]. The first step should be building familiarity with the technology or market through venture capital investment or educational acquisitions. Once the company achieves the first goal, then it is in a situation to decide whether to invest more resources or not. Educational acquisition of a small startup provides an alternative means of acquiring the necessary familiarity with which it can pursue a large-scale acquisition decision.

III. Understanding of Strategic Alliance in a System Architecture Context

1. Bilateral Alliance

1.1 Stakeholder Complexity

Planning strategic alliance typically involves a variety of participants inside and outside of the companies, as shown in Table 5. The internal stakeholders include top management, a strategy team, a business and R&D manager, a legal and financing team, and a managing team.

The top management and strategy team's major role is to formulate an upfront alliance strategy based on the company's core value and competence. From this initial formulation stage, they should pay much attention to potential dangers such as governance change, inflexibility, and leakage of core competence. Sharing control over a joint venture between two partners may complicate a joint venture's decision-making process and sometimes result in conflict in interests. Therefore, defining a clear role and scope while designing the alliance should be a first priority. Ensuring protection of its core information is also another crucial top management agenda. The business and R&D managers are the key people who are engaged at various stages of processes. They play a pivotal role in evaluating and screening the potential partners, executing due diligence, and providing staffing and other resources. Because they are the people interacting with the partner at the front line, cultural and legacy mismatch would pose a potential challenge.

A legal team will be in charge of managing contracts, intellectual property, negotiation, and other legal issues and it works as an internal legal consultant or a middleman to any external legal entity, offering legal services. The financial team's

major role is to perform a valuation of the alliance, to decide the financial ownership structure, and to provide pro forma financial data for both the parent company and the joint venture. The team's primary concern is to eradicate any potential trouble before the deal negotiation starts. An alliance management team will be engaged in the whole process but their focus will be on postmortem management, that is to say developing an alliance evaluation metric, managing the contract, providing alliance integration plan, and planning the future alliance scheme.

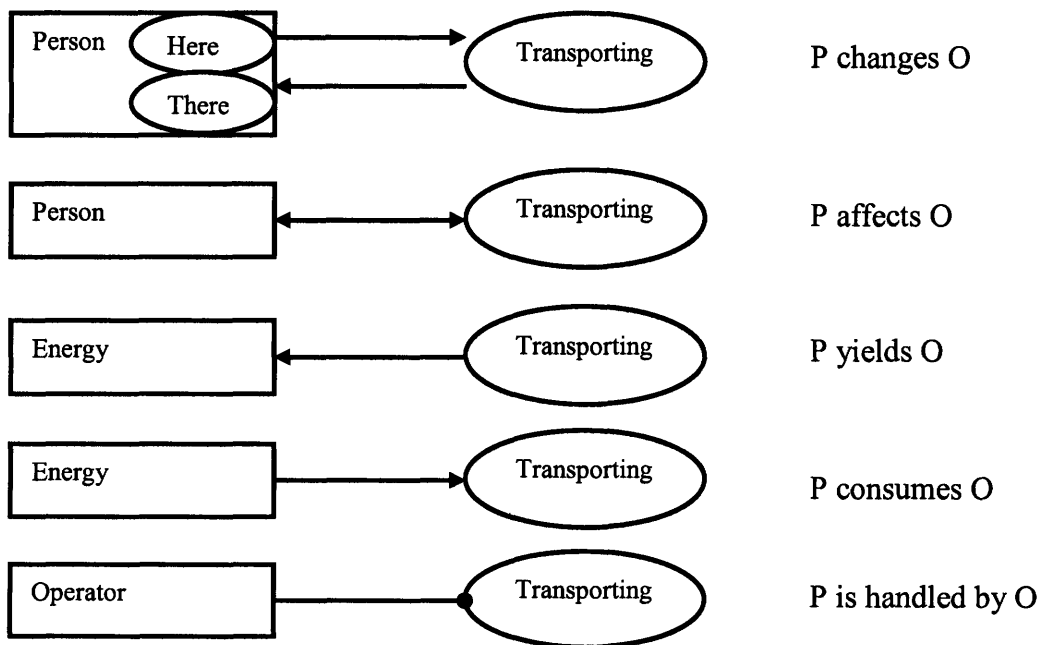
On the other hand, the external stakeholders are composed of potential partners, competitors, bankers, consultants, auditors, and the Securities Exchange Commission (SEC), and court. In screening and selecting a partner, misjudging the real synergy has posed one of the critical risks. The Securities Exchange Commission (SEC) and court provide legal frameworks, such as antitrust policy and disclosure requirements, in order to protect shareholder's and customer's rights and to regulate any legal infringement and conflicts. Bankers, consultants, and auditors are also key participants in the alliance process, providing financial and consulting services and auditing the alliance.

Table 7. Various stakeholders for alliances and partnerships

Types	Stakeholders	Roles and issues	Concerns
Internal stakeholders	Top management, Strategy team	Corporate and business strategy, synergy, core competence	Governance, strategy, economics, organization, protecting core competence
	Business and R&D manager	Business and R&D strategy, due diligence	Cannibalization of existing capabilities, culture mismatch
	Legal team	Intellectual property management, contract management, negotiation	Potential legal conflict, negotiation power
	Financing team	Valuation, financing, revaluation, due diligence	Financial structure, financing scheme, over payment
	Alliance managing team	Contract management, due diligence, alliance evaluation metric	Alliance integration, evaluation
	Potential partner	Synergy, valuation, due diligence, level of involvement, negotiation, credibility	Real synergy, protecting core competence, governance migration
External stakeholders	Competitors	Strategy, competitor's alliance partners	Reaction to alliance, competitiveness of alliance
	Bankers, consultants, auditors	Valuation, financing strategy, alliance positioning, auditing	Deal structure, regulation violation
	Securities exchange commission, court	Regulation, disclosure requirements, antitrust policies	Legal violation, regulation violation

1.2 Object Process Methodology (OPM)

Object process methodology (OPM) was introduced to tackle a complex system whether it is a technical system, social system, or organizational system [16]. This methodology demonstrates its usefulness in its simplicity and generic features for use analyzing a variety of complex systems. This methodology basically uses three building blocks: object, process, and state. An object is what has the possibility of stable form for a certain period of time and can be in tangible physical form or be in informational form. This object is linked to nouns and has its own state. A process is a transformation that is applied to the object. This process changes the state of the object and generally is linked to a verb. These three building blocks constitutes the object process methodology with a set of object process diagrams (OPD) and object process language (OPL), a group of descriptions for a corresponding object and process. Figure 9 shows examples of object process links.



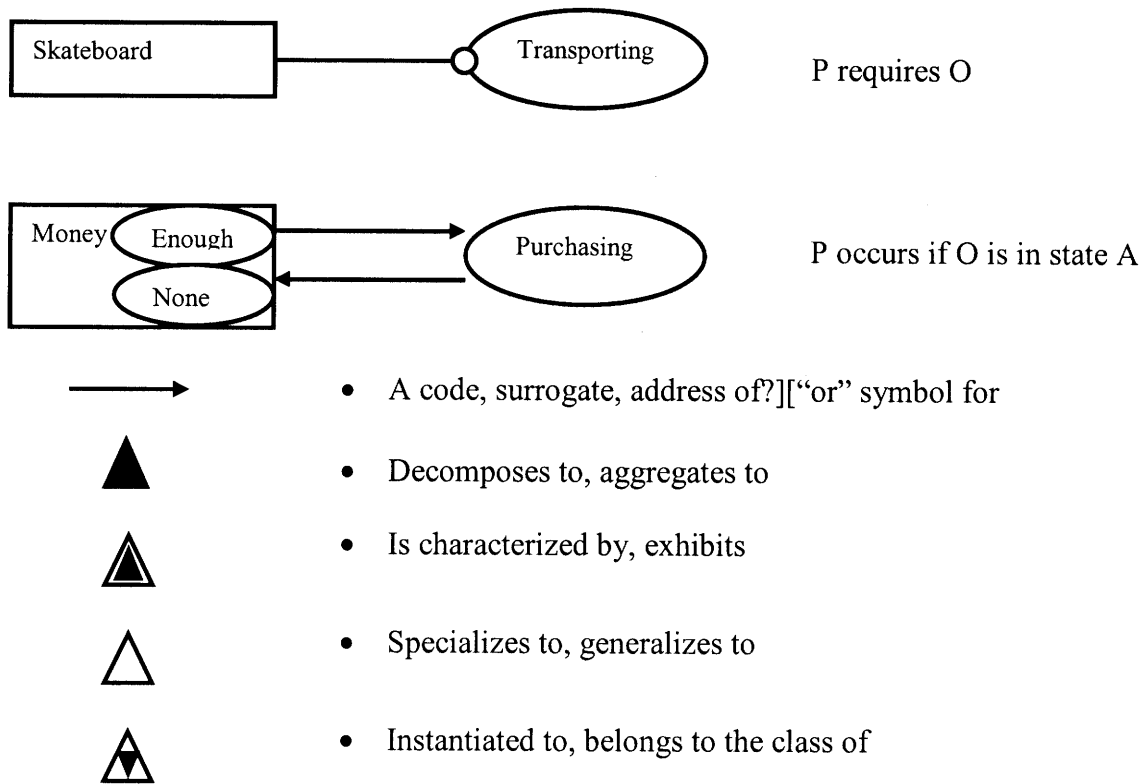


Figure 9. Examples of object process links and relational structural links.
 Source: Ed Crawley, system architecture lecture note, 2005.

1.3 OPM Architecture for Bilateral Alliance

Alliance structure comes in a variety of forms: simple bilateral alliances, many partners' alliances, and multiple alliances. The bilateral alliance is the simplest form of alliance; two partners share their resources for common goals. But forging this simplest form of alliance can be demanding due to the absence of any systematic processes, its high dependency on the company's legacy system, a complicated external environment, and the difficulty of evaluating this system because of lack of appropriate metrics. But in order to simplify the analysis and explain more about it in the latter part of this thesis, I first applied the object process methodology to this bilateral alliance architecture. As shown in the OPM architecture for the bilateral alliance, multiple stakeholders are assuming a number of roles in forging the alliance, generating distinctive outcomes. The latter part of this thesis discusses this simple alliance architecture in a more general framework, in which the alliance is incorporated in a new product and business development architecture.

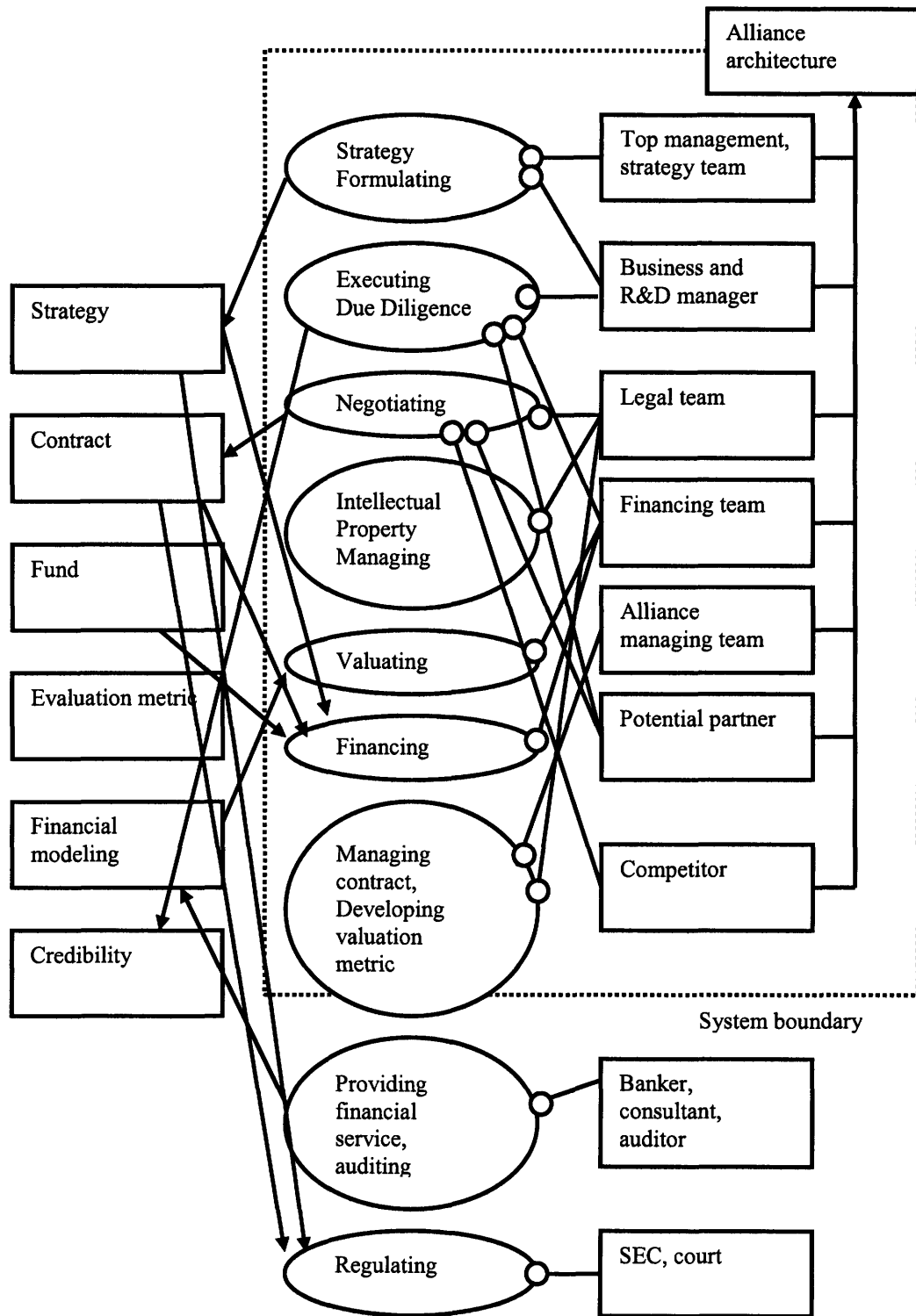


Figure 10. OPM architecture for a bilateral alliance.

1.4 Multiple Alliances

In many cases an alliance is formed in a more complex and ambiguous form than a simple bilateral alliance, as shown in Figure 9. But managing this complex alliance network poses a number of challenges during the forging and managing process. Especially when the alliance network includes competitors or companies whose strategic intent is not in harmony with others, the outcomes of this joint effort may be significantly damaged [6].

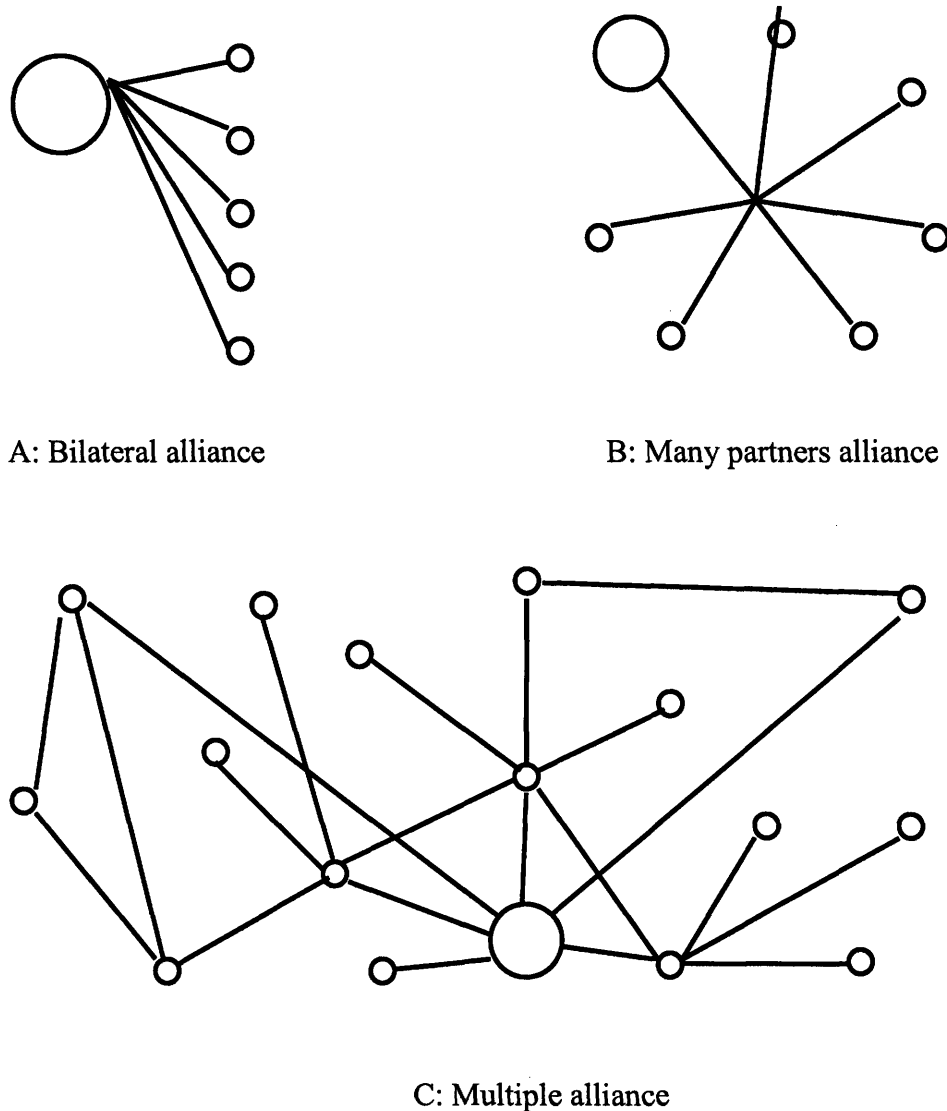


Figure 11. Various forms of alliance networks.

The bilateral is a quite common form of alliance in which a company forms multiple separate bilateral relationships with a number of partners. Corning, which formed this category of alliance with Dow Corning and Thomson, has been quite successful, making a large portion of profit out of this type of coalition. The many partners alliance is likely to be formed in the following cases:

- (1). Necessity to use multiple resources
- (2). Standard and norm setting
- (3). Ambiguous technology and market

In the case of the Iridium project described in the following section, no single participant completes the whole project alone, necessitating collaboration between a foreign government for telecommunication traffic right, investors for funding, frequency band users to get necessary bandwidth, launch vehicle companies for launching service, and many others for complementary capacities. It is interesting to notice that even major competitors of grounded cellular phone companies are one of the major participants. They join the ally to monitor the potentially disruptive product and to be ready to restructure their core competence when the time comes. Forming an alliance for the purpose of being involved in the process of setting a standard and norm is quite usual in such industries where standards are major drivers in shaping the industries. Several examples of these are SEMATECH for semiconductor companies, Nexia for accounting firms, and many others for setting up home electronic standards and computer electronic standards, including DVD and display. The last case occurs when the technology and market are not clear and many companies are joining the alliance in order to exchange information and networks.

1.4.1 Many Partners Alliance - Iridium Project Case

The Iridium project that was initiated by Motorola in the early 1990s was intended to develop a global satellite-based communication system and to provide services for high-end users who need this service in remote areas where the ground-based cellular phone systems gets obsolete [6]. This project required a wide range of collaboration and huge financing, and it thereby brought in multiple parties to complete the project, including telecommunication companies, satellite launch companies, investors and creditors, US and foreign governments, and low earth-orbit satellite companies. This alliance competed with another consortia called Globalstar, headed by Loral, but it launched its first service in 1997. The LEO communication satellite industry is the major supporting international alliance of telecommunication and aerospace companies. As opposed to this, terrestrial cellular phone companies attempted to provide global roaming service, threatening the success of the satellite phone project. The US government and other governments' interests in this project sometimes conflict. While the US government is interested in the success of this project to gain its leadership in telecommunication industry and to bolster its technological advancement, many other governments want to keep their monopolizing position in that industry. Given the expected high demands for launching service, a launch vehicle industry estimated rapid growth but it ended up with an over-supply of launch vehicle service. Investors and creditor were in conflict in their interests in an attempt to revive the project.

Some of the stakeholders in this project are complementary to each other but they sometimes are also potential competitors. They join this coalition for various reasons. The most obvious reason for forming an alliance is that each partner has its own

complementary skill set, such as distinctive resources, knowledge, capacity, and positions. Given the wide range of resources required for this project, an alliance based on this reason is not unavoidable. Slightly different purposes for an alliance can be found when it is formed between potential competitors. Motorola brought competitors into a coalition to reduce the threat of competition and to exclude the others from it.

Table 8. Stakeholders in the Iridium project

Stakeholders	Description
LEO (low earth orbit) communication satellite industry	This is the major supporter of the system; it is an international alliance of telecommunication and aerospace companies.
Potential Buyer	These are risk-taking investors, believing in the soundness of this project but attributing its failure to mismanagement.
Terrestrial cellular phone industry	This was a strong competitor of the LEO communication satellite industry because of its capability to provide international roaming service.
U.S. government (FCC)	This is the regulator of the system; it is interested in the success of the system in order to establish leadership in telecommunication satellite industry.
Foreign governments	This group needs to approve the building of gateways and gain permission from other countries adjacent but many countries monopolize telecommunications and refuse this permission.
Subscriber Community	This stakeholder includes a group who needs satellite phones in remote places.
Launch vehicle industry	High expectations existed due to the high launch volume but they have never been met due to over-competition.
Investors and Creditor Institutions	This is a group that suffered the loss of its investment, on the order of \$5 billion.
Radio astronomers and other frequency band users	This group was in conflict with using the bandwidth.

Source: MIT Industry Systems Study, "Communications Satellite Constellations - Technical Success and Economic Failure," Engineering Systems Learning Center (ESLC), 2003.

1.5 Cross Border Alliances

The alliance that involves cross-border allies makes partnership more complicated even in the case of a simple bilateral alliance. Each country has a different set of regulations and customs that restrict the architecture or process of forging alliances. Nonetheless the strategic alliance is considered a better option in approaching a new market across its own borders than the other forms of alliances, such as mergers and acquisitions [10]. The reason why the alliance is effective over acquisitions in expanding a company's presence outside of its territory is that the parent company can maintain its own core capabilities while at the same time maintaining control over the new entity. In contrast, when a company attempts to expand its geographic presence by acquisition, often they lose their tight control over the new market, failing to effectively enter the new market.

1.6 Upstream and Downstream Influences

Architecture is defined as “the embodiment of concept, and the allocation of physical/informational function to elements of form, and definition of interfaces among the elements and with surrounding context and this architecture consists of function related by concept to form connected to context through interfaces” [17]. Among the components of architecture, the form is a physical substance that exists or can exist and is what executes the function of the architecture. The function is an activity or an operation that operates and performs to achieve its goals. The concept is a system vision that maps a form to a function to achieve this vision. Under this architectural framework, a number of upstream factors such as regulation, corporate strategy, marketing strategy, customers, competitive environment, downstream strategies, and technology all together exert influences on the form of architecture, as illustrated in Figure 10. Among the downstream influences are implementation, operators, evolution, and design; the operators are agents who execute the system.

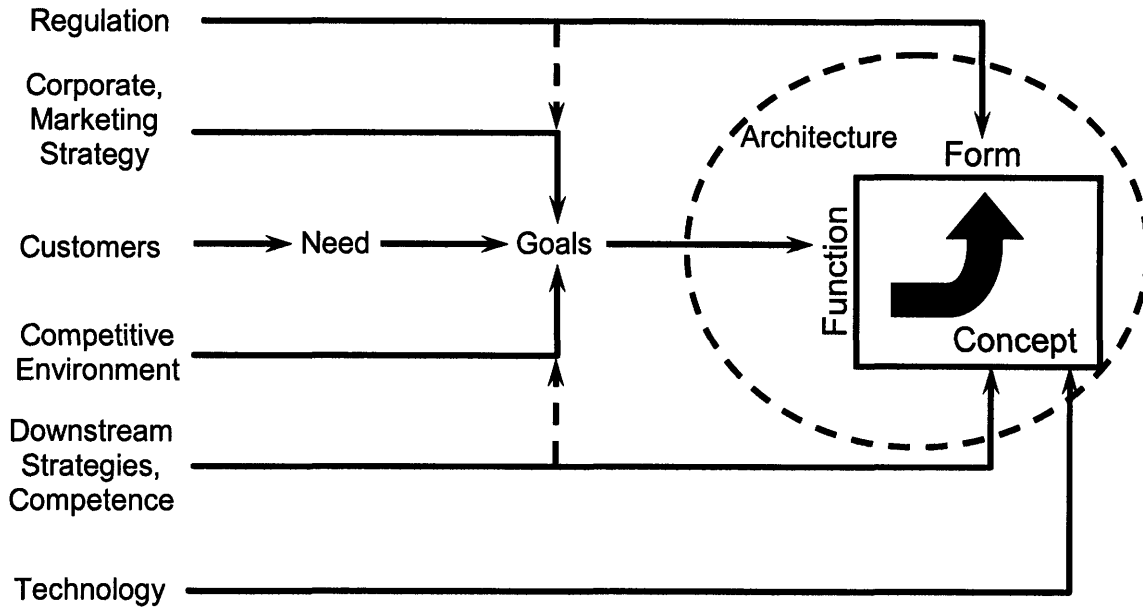


Figure 10. Framework for upstream influences.
 Source: Ed Crawley, system architecture lecture note, 2005.

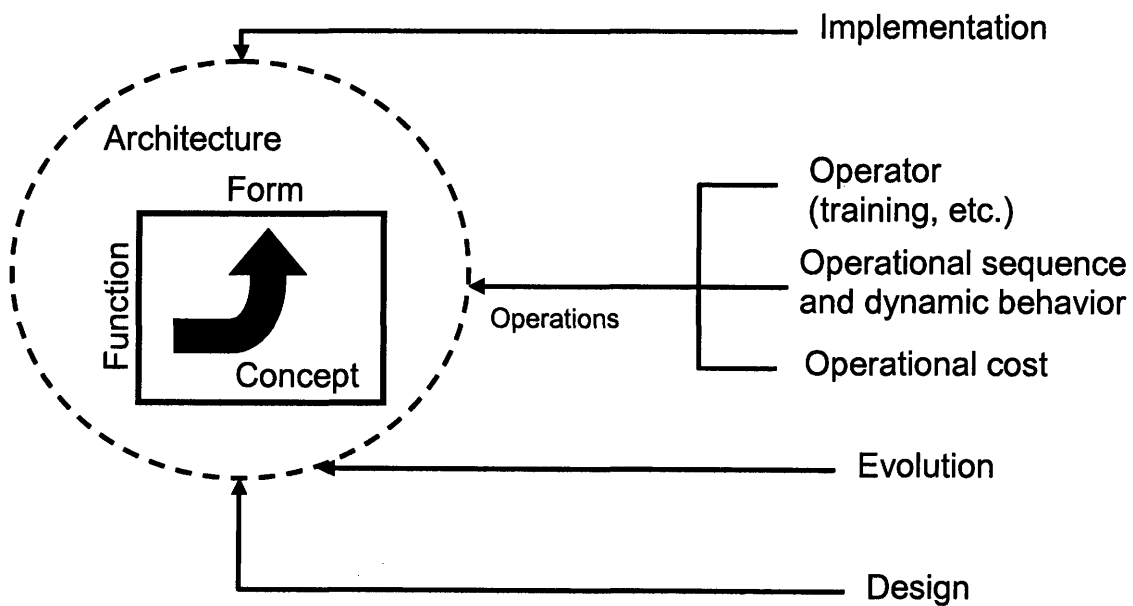


Figure 12. Framework for downstream influences.
 Source: Ed Crawley, System Architecture lecture note, 2005.

1.6.1 Influences in Bilateral Alliances

While companies forge alliance architecture, a number of upstream and downstream influences need to be taken into account. In the case of simple bilateral alliances, the upstream influences include higher-level considerations such as strategies and the market environment. The environment under which technologies and markets exist strongly influences the general direction of alliance architecture. Is the market that the company is planning on entering into emerging or maturing? Is the technology imbedded in a product in the ferment stage of its life cycle or in a maturing stage? Most companies are experiencing a pressure to venture into new technologies or markets, or to maintain a competitive advantage by forging a strategic alliance. In this competitive environment, corporate and business strategies are formed in consideration of a company's core competence and alliance intent. At this early stage of an alliance, direction of the strategy starts taking shape, whether it is strategic or operational to the extent the intent is strategic or operational. The higher-level decision about the alliance hold implications for its form at later stages in terms of additional influences of legal regulations, financial restrictions, and downstream strategy.

These upstream influences affect the form, concept, and function of alliance architecture. In a simple bilateral alliance case, a number of alliance forms materialize the concept through the functions of the alliance forms. But given the changes of alliance strategies and complexities of multiple alliances, the appropriate form and function should be designed to reflect this downstream aspect of the alliance. The downstream alliance includes the product and business development system, alliance management, and alliance termination. An alliance does not exist alone but instead is destined to be

engaged in the process of product and business development. The next section of this thesis will expand upon this principle by focusing on the case of DuPont's business initiative process (BIP). The key features include the integration into the product and business development system, alliance management, and alliance termination.

Table 9. Upstream and downstream influences of alliance architecture

Upstream Influences	Alliance Architecture	Downstream Influences
<ul style="list-style-type: none"> • Disruptive technology <ul style="list-style-type: none"> - Life cycle of technology • Market change <ul style="list-style-type: none"> - Emerging - Maturing • Competitive environment • Corporate strategy • Business strategy • Alliance intent <ul style="list-style-type: none"> - Strategic - Operational • Core competence <ul style="list-style-type: none"> - technology asset - complementary asset • Legal regulation • Financial restriction • Downstream strategy 	<ul style="list-style-type: none"> • Form, Concept, Function • Concept <ul style="list-style-type: none"> - Strategic reason - Operational reason • Form <ul style="list-style-type: none"> - Joint venture - Licensing - Venture capital • Function <ul style="list-style-type: none"> - New product and business development - In-house new technology - Entering new market - Expand geographic presence • Process <ul style="list-style-type: none"> - Alliance forging 	<ul style="list-style-type: none"> • Product and business development system <ul style="list-style-type: none"> - Adaptation to legacy system - Process design - Implementation - Operation • Alliance management <ul style="list-style-type: none"> - Management team - Review committee - Contract management - Re-evaluation - Assessment metrics development - Developing future plans • Termination <ul style="list-style-type: none"> - Acquisition - Divestiture

1.7 Holistic Framework

1.7.1 Bilateral Alliance Development

It is valuable to analyze the alliance architecture with a holistic framework, with which six questions of why, what, how, where, who, and when are analyzed at each phase of the alliance-forging process. In the design process phase, top management, strategists, and business and R&D managers are usually in charge of developing alliance strategies through inbound and outbound intelligence activities. On the other hand, the development process phase is the place where substantial activities of alliance are performed: due diligence, negotiation, and valuation. Due to the needs of detailed knowledge in each different business area, lawyers, treasurers, and practitioners team with each other to perform this phase. The managing process will cover both budgeting and assessment of the alliance and because of its assessing role, a separate team is likely to assume control of this phase. The integration and implementation phase is the place where the external resources are integrated with the existing product and business development legacy system. This phase might highly depend on the characteristics of the in-house company.

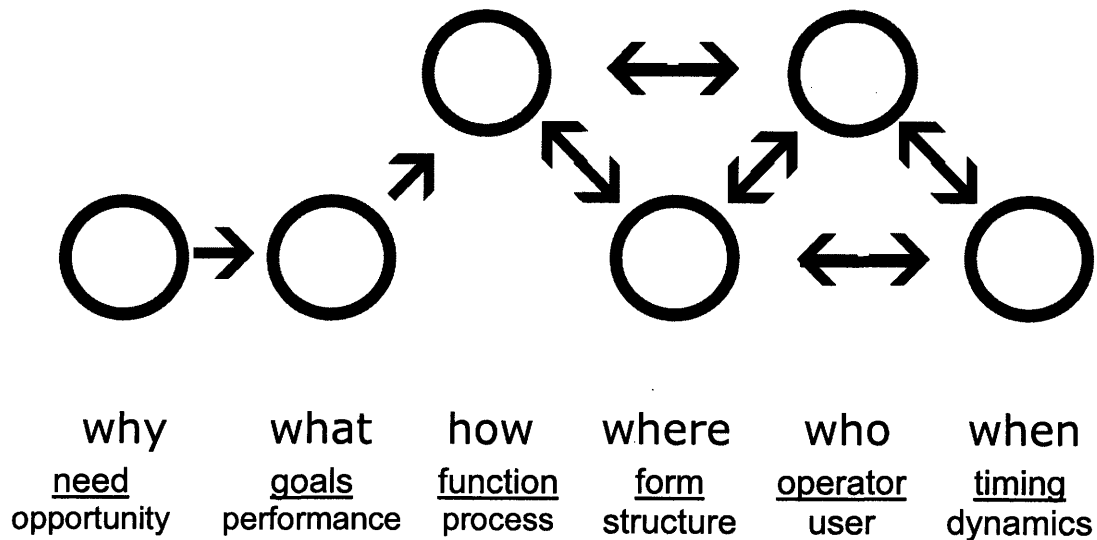


Figure 13. Holistic framework for alliances.

Source: Ed Crawley, system architecture lecture note, 2005.

Table 8 and Figure 13 describe the four distinctive alliance processes of design process, development process, integration and implementation, and management process for bilateral alliances under a holistic framework. Each step of the processes is decomposed in terms of six basic components; why, what, how, where, who, and when. In the corporate alliance context, “why” asks the strategy and intent of alliance, “what” describes the data and information involved in each step, “how” indicates the system or process that enables the process, and “where” and “who” show the organization or stakeholders who will be in charge of specific tasks. “When” would obviously indicate the schedule for the alliance. An alliance design process could include both strategy formulation and partner-searching activities, in which the core competence analysis of our company, a competitor analysis, and an industry analysis will be performed. This analysis eventually should discover the type of alliance and intents of alliance that are the best option for the company’s strategic movement. At the same time, the partner-searching process, in which synergy and financial analysis are performed and any potential legal regulations are cleared out, may be an iterative step for strategy formulation. That is to say, this step provides and specifies realistic information for strategy formulation regarding the types of options that are feasible at the moment. With this more specified scope of alliance, a more substantial partner search would be executed. the development process will typically include contacting the prospect partner company and starting and finalizing negotiation. Due diligence for investigation of finance, synergy, and legal restriction are core components for a successful alliance. The negotiation step deals with many issues regarding the alliance, such as alliance type, process, alliance management, post-alliance finance structure, and termination scheme.

The implementation and integration phase is the step where real organizational and financial structure is changed. Depending on the success or failure of integrating two different organizations, the final outcome of the alliance would look different. Nevertheless, management of an alliance is likely to be considered less critical and therefore less emphasis is found in the literature on this topic than on others. This process should make sure whether the alliance is performing well or not and also provide a plan for the next phase of the alliance, given that many alliances end up with mergers and acquisitions or a separation of the two companies.

Table 10. Holistic framework for bilateral alliances

	Why	What	How	Where	Who	When
	Strategy/ intent	Data / information	System/p rocess	Organizatio n	Stakeholde rs	Alliance schedule
Design process	Competitive environment, fit to corporate and business strategy, technology strategy	Alliance strategy, partner search, inbound search	Inbound and outbound intelligen ce	Strategy and intelligence team	Top manageme nt, strategists, business managers, technologis ts	Formulation and intelligence phase
Developme nt process	Forging an alliance, synergy, risk sharing	Due diligence, negotiation, valuation	Synergy and compet ence analysis, financial valuation	Strategy team, finance team, legal team	Business managers and technologis ts, treasurers, lawyers	Negotiation and deal phase
Integration and implemen tation	Integration to PDP legacy system	Technology, system, people	Mileston e check	Related business team	Business and R&D manager	During and after deal phase
Managem ent process	Management, assessment	Contract, post due diligence, budget	Budgetin g, assessing	Alliance managing team	Treasurer, lawyers, strategists	Post negotiation and deal phase

Figure 14 indicates the holistic framework for bilateral alliances in a qualitative manner. The competitive environment and environmental change drive companies to devise ways to survive the competition. In a less competitive industry or slower moving industry, companies tend to rely on more or less organic growth for expansion. But as the competition gets severe, a company may experience a stagnant period. For example, due to the characteristics of the business life cycle, in late stages the company feels needs to restructure its business and it will resort to alliance as an external approach to business expansion. This figure also depicts the interaction among different components of four distinctive processes. During the strategy design process, strategy formulation interacts with core competence and competitor analysis; on the other hand, intelligence focuses on alliance type and alliance intents. Due diligence interacts in multiple ways with financial, technological, and legal issues; negotiation and contracts; management; alliance process and termination; and the strategist and finance teams. The integration and management process generally consider subsequent activities after strategy formulation, negotiation, and contract, but these processes also can influence the previous step for planning of a next alliance.

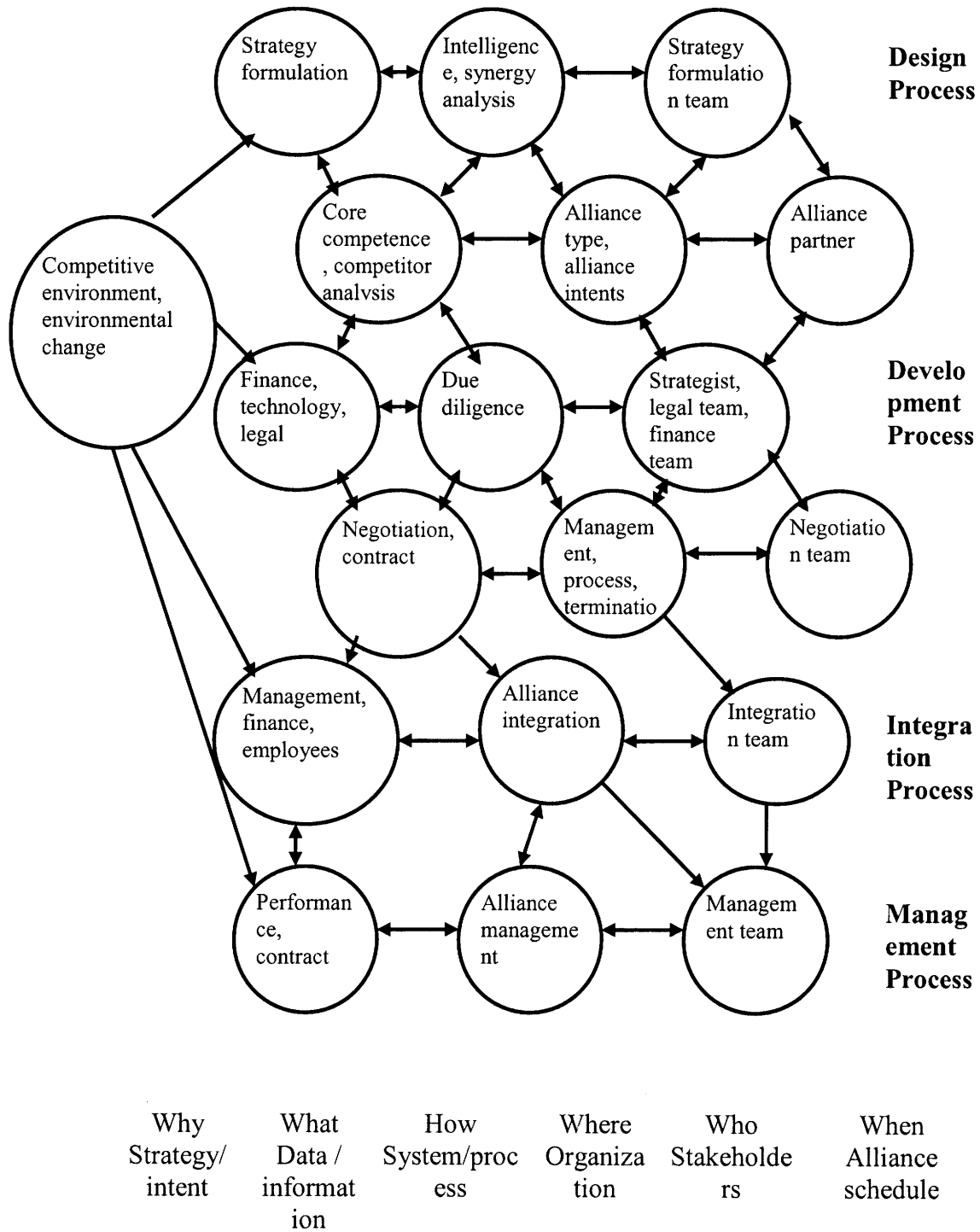


Figure 14. Holistic framework for bilateral alliances.

In the corporate level context, the alliance can be understood as a component interacting with not only external influences outside of corporate level but also corporate level influences. This concept is illustrated in Figure 15. Outside of corporate level the major driving force for forging an alliance is a competitive environment. A competitive environment among companies forces them to make allies with companies with complementary capabilities. The effort to reduce a business uncertainty is another critical driving force, especially when the market and technology are quite unfamiliar to the company involved. In this case many companies tend to join the alliance to ensure that each company is following up the recent trend of business and also reducing risks in terms of financial investment and business strategy. On the other hand, the business life cycle of the company may force it to look for partners to consolidate their capacities in order to accomplish economies of scale and market dominance. One of successful outcomes of an alliance would be geographic expansion or technology gap-filling among companies by sharing their distinctive complimentary capabilities. Additionally, a company can achieve shorter time to market by successfully plugging in a critical component in a fast-moving industry. The alliance structure also has an effect on the corporate governance structure. The participating companies may equally share authority over the new entity or distribute different amounts of authority unequally over the companies, as in the case of unequal equity investment. Often alliances end up with mergers and acquisitions, which means the transfer of governance from a distributed state to a concentrated status.

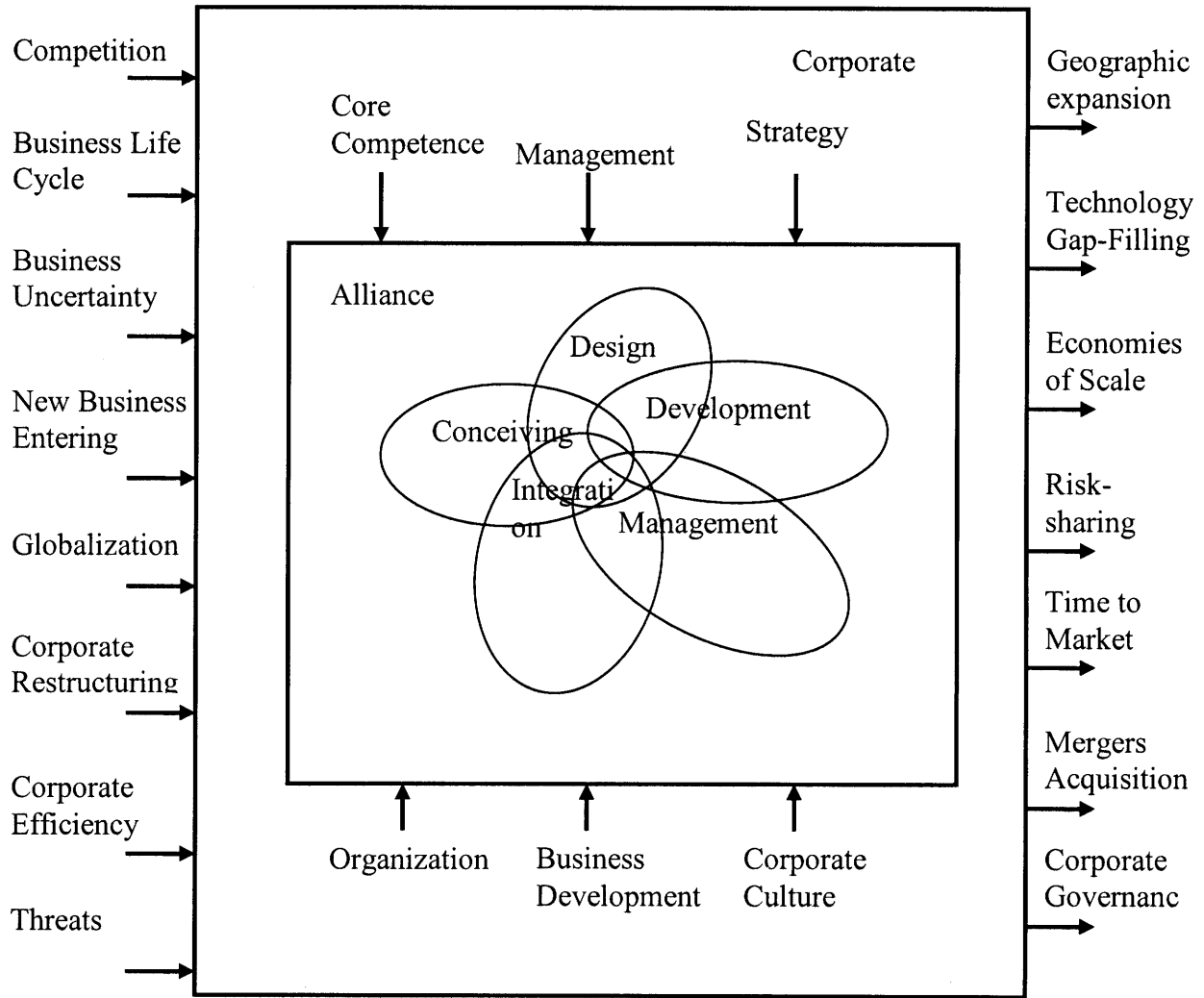


Figure 15. Alliances in a corporate context.

2. Business Development via Alliance

2.1 The Case of DuPont

New business development of many companies is a risky task, especially when it is quite strategic, which means the success or failure of a new business has a significant impact on existing core businesses. Especially new business development involves partnership with other companies and this element adds additional complication. Devising a more efficient process for new business development and establishing best practices would be important for most companies pursuing growth via alliance. DuPont, for example, developed a business initiative process (BIP), which frame best practices in terms of process and organizations. In BIP an alliance is an important core component for new business development so now the company understands framing solid alliances is critical for success [3, 4]. The BIP basically is using the typical staged decision approach like a new product development.

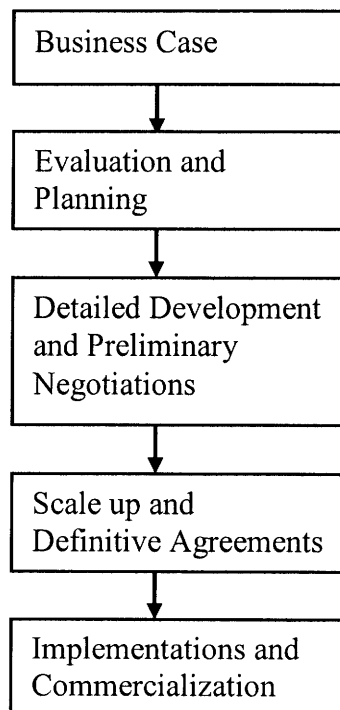


Figure 16. The DuPont business initiative process.

With this process DuPont could focus on specific tasks at each stage; i.e., potential partners are searched during a business case, research on commercialization partners is done during the evaluation and planning phase, and a preliminary agreement is made in detailed development and preliminary negotiation phases. The implementation of this process is ensured by five distinctive components consisting of Program Approval Committee (PAC), Phase Review, Continuous Improvement, Structured Business Initiative Process Guidelines, and Project Core Team. At each phase a project core team consisting of each team leader of legal, marketing, operation, finance, R&D, and engineering departments interacts with the program approval committee consisting of the business directors or VP of finance, marketing, operation, R&D, and engineering with structured business initiatives guidelines.

During the alliance forging process, DuPont uses strategic gap analysis with three criteria: gaps in terms of market presence, processes, and technology. Market gap indicates where DuPont is located compared to how it looks when it becomes a winner. This gap analysis helps the company understand how to better satisfy customers, how to improve a value proposition over competitors, and how to enhance the supply chain to better reach customers. The technology gap analysis raises issues about which technologies should be included to improve the performance of products, services, and processes. Finally the process gap analysis deals with how to optimize product development processes, information flow, distribution processes, and service processes. This gap analysis typically generates strategic options to fill the gap by either internal development or alliances such as licensing in and out, joint product development, joint ventures, minority equity investment, and mergers and acquisitions. These strategic

options will be reviewed, evaluated, and ranked with specific valuation criteria with inputs from experienced professionals outside the team.

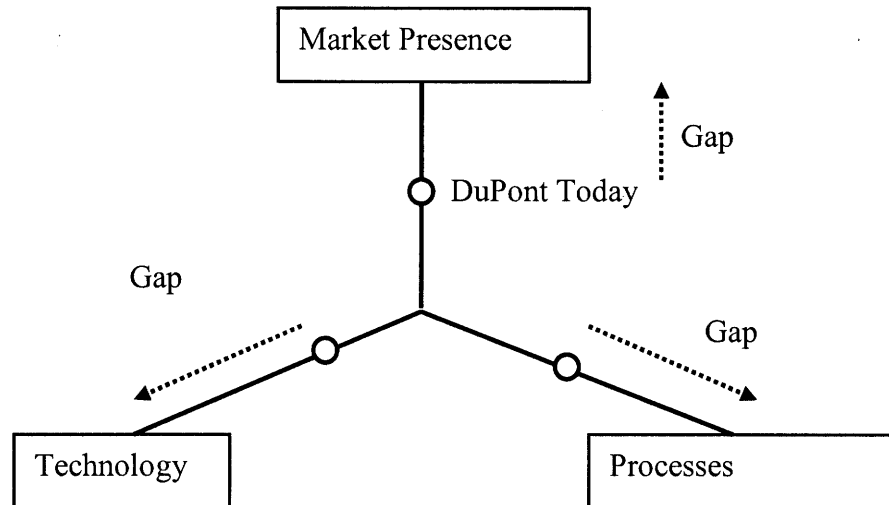


Figure 17. The DuPont gap analysis.

Figure 18 shows DuPont’s roadmap for its business initiative process. The first step of a business case includes six distinctive components: definition of target customers, value proposition, program objectives and criteria for success, business strategy and business model, development plan, and the business case. The target customers component clarifies which users have buying decision authority over products and services. During this phase, assessment of the whole value chain to the end customer should be performed. The value proposition process clarifies the distinctive value that the company can bring to the customers so they are willing to purchase its products or services. The program objectives and criteria for success focus more on the goals of the program in terms of competitive position, market penetration, growth rate, and scale. In order to deliver this value, proposition optimum business model and business strategies should be

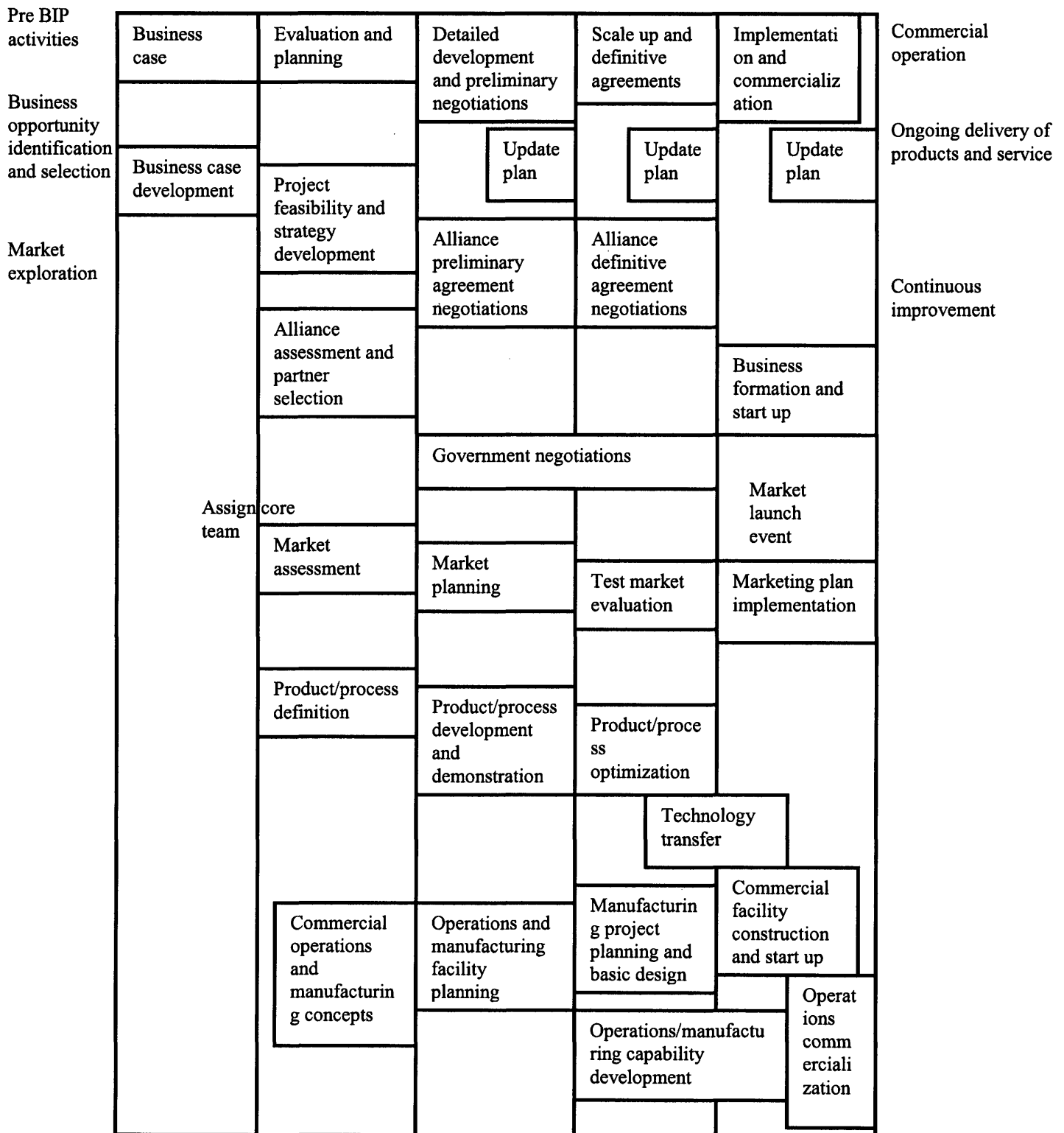


Figure 18. DuPont's roadmap for its business initiative process.

assessed and this is done during the processes of business strategy and model selection. The final step of the business case is the development plan and business case, where more holistic views of the work are discussed and assessed. This step usually leads to project proposals whose content typically includes an executive summary, opportunity and business development strategy, market definition and marketing approach, technology approach, commercial manufacturing and operations description, supply chain strategy, safety health and environmental impacts and strategy, legal and regulatory requirements, program organization, resources, plan and schedule, financial projections, and major issues, risks, and assumptions.

The evaluation and planning phase assess and evaluate business opportunity, strategy, and feasibility and also look for alternatives. This phase consists of project feasibility and strategy development, market assessment and preliminary market planning, alliance assessment and partner selection, product and process definition, conceptualizing commercial operations, and integration of the project plan. The purpose of project feasibility and strategy development is to assess a new business opportunity in terms of market opportunity, market dynamics, value chain status and needs, technology options, and financial analysis using the gap analysis. Market assessment and preliminary market planning is a phase where a thorough analysis of market ought to be done. This analysis will include market segmentation, industry analysis, competitor analysis, and value chain analysis. This step is instrumental for providing background data for developing a realistic picture of the overall strategy and business plan. Alliance assessment and partner selection phase are processes of searching for the best alliance plan and potential partner. During this phase, DuPont explores the full range of alliance options including informal

alliance, consortium, contractual alliance, minority holding, joint venture, and mergers and acquisitions as shown in Figure 19.

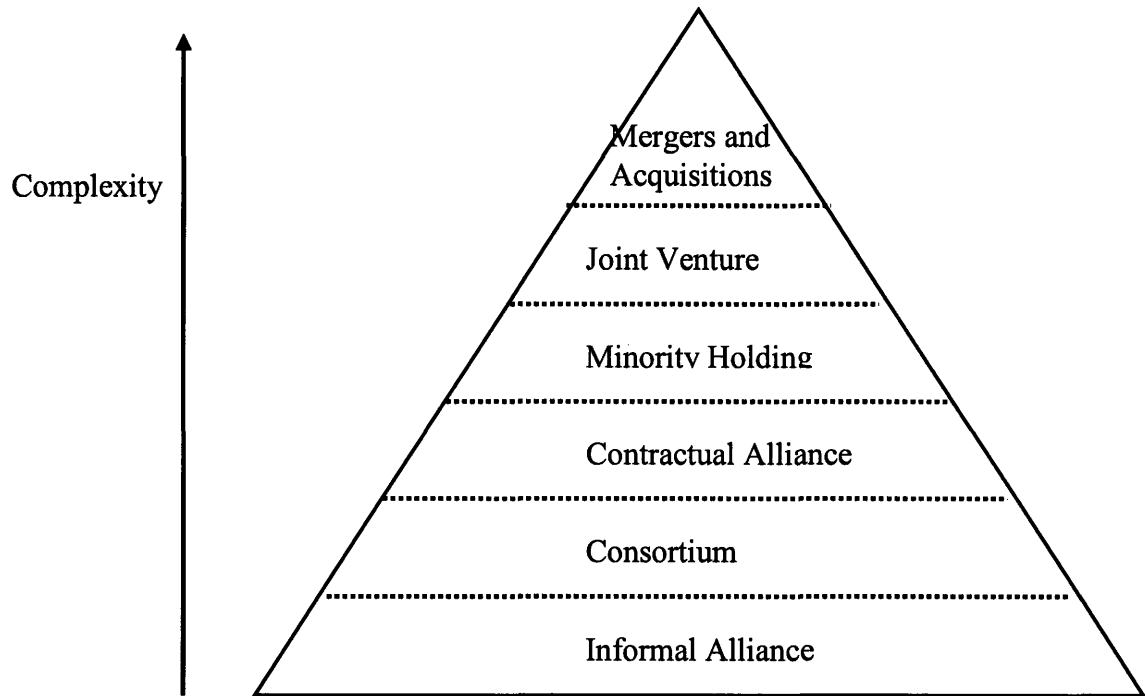


Figure 19. DuPont's "alliance landscape."

Next is to develop information of the potential partner about its competitive position, strengths, weaknesses, opportunities, and threats by using the "option evaluation sheet" which looks like Figure 20. This evaluation step leads to the selection of a preferred partner and the following detailed investigation. The product and process definition phases clarify the product, services, and manufacturing processes that will be used to deliver improved value to the customers. In DuPont's case, this process follows the company's own guidelines to ensure the value proposition proposed during the business case phase. The objective of conceptualizing commercial operations is to make sure the new business model works. This process will include the method of sourcing

components, manufacturing issues, method of distribution, the way of implementing additional administration, and the way customers will be integrated. Basically this broad scope means the whole range of components of a new business plan should be addressed and clarified. This array of works during the evaluating and planning results in an integrated project plan that contains detailed implementation plans for full commercialization. This plan as an updated version of the original project proposal works as a primary guideline for the next step of the alliance.

Winner Strategic Musts	DuPont's Capabilities		Potential Options	
	Current	Gaps	Option 1	Option 2

Partner Option Evaluation (Ratings: +, 0, -)		
1. Ability to deliver superior value		
2. Time to achieve strategic musts		
3. Financial return		
4. Probability of success		
5. Resulting competitive landscape		

Figure 20. DuPont's "Option Evaluation Sheet".

The detailed development and preliminary negotiations phase is a process in which the preliminary negotiations are performed with potential partners, prototypes of alliance are tested in terms of their validity for development, and marketing plan and process specifications are tested. This phase includes negotiating preliminary agreements, government negotiations, operations and facility planning, product and process development and demonstration, and a marketing plan. Negotiation of preliminary agreements will address and devise key components of agreements that will be used as a foundation for the final agreement. In DuPont's case, this is being done by a separate negotiating team consisting of members from finance, legal, and corporate plans. They identified several key elements in this step:

1. "Select a leader and build a negotiating team that is broad-based, multifunctional and has players experienced in negotiating as well as in the business."
2. "Clearly define the negotiation box up front."
3. "Create a small senior management direction team to provide ongoing direction to the negotiating team and to review and approve general terms of preliminary agreements."
4. "Hold structured negotiating team planning meetings before and after each negotiating session."
5. "Develop a written negotiation strategy that is revisited before and after each negotiation session."

This phase will lead to a preliminary agreement, such as a letter of intent or memorandum of understanding that will include such issues as ownership percentage, equity distribution structure, governance structure, management structure, technology ownership, and timeline of each execution. The government negotiation component describes the

government as one of stakeholders because often it is involved as critical decision-makers through its regulatory and approval role. Specific negotiations skills that reflect the business and regulatory environment of the country should be developed and accumulated. the operations and facility planning step describes how the new business works from manufacturing, distribution, support, information systems, and staffing perspectives. This step should provide the overall components of operations and clarify the distribution of requirements across stakeholders, DuPont, partners, and suppliers. The outcomes of this step would include cost estimates of operations, identifying suppliers, and detailed operations plans. The product and process development and demonstration step uses a prototype or full-scale operation equipment to make sure product and process specifications, the operation flow diagram, and preliminary operation data are suitable. the marketing plan is built on the previous marketing research and include the components of “product and offering description, product and offering positioning, target market segments, target customers, customer advantages for new product and offering, competitive position, preliminary marketing communication plan, pricing strategy, price and volume forecast, product and offering launch and ramp up plan, marketing resource requirements, and financial analysis.” Typically the marketing plan preparation is facilitated by initial activities of new product marketing to customers.

The scale-up and definitive agreements step complete the critical components of agreement and ensure a full implementation. This step will address final agreements with partners, management, staffing issues, technology transfer, and operations issues in a more comprehensive manner and make sure every component is well addressed before any full commitment to the partners and any significant financial investment. This step

will include definitive agreements, due diligence, test market evaluation, product and process optimization, technology transfer, manufacturing project planning, and operations capability development. The term definitive agreement describes the comprehensive partnership agreement including ownership distribution, authorities and roles, responsibilities and contributions, termination agreement, and milestones at each critical transition point. This phase may typically require more than several separate agreements. In particular, a plan for each transition should be deployed clearly to ensure smooth progress of the entire alliance. Due diligence is a validating process to make sure the data that a partner provides are correct enough to finalize the definitive agreement. This process will typically include management structure, operation resources, technologies, human resources, financial status, customers and suppliers relationship, regulatory and environmental issues, and any supporting system of the partners. This step is critical for a successful alliance because during this process a company can validate not only the partner's resources and capabilities upon which the partner analysis and selection are based but it can familiarize itself with the culture and realistic resources of partners so it can better integrate itself with partners. Test market evaluation tests and fully implemented marketing plan must be developed in advance. Positioning and pricing of the product and service are determined based on customer response and gathered data. This process results in a full marketing plan and project launching scheme. Product and process optimization uses market feedback to optimize product specifications and operation processes. During this process, technology implementation is done by technology data packages. Technology transfers make sure the technology is being

transferred into the organization in the way the definitive agreement describes. In DuPont's case, some key elements are identified as follows:

1. "Technology plan: a schedule was prepared earlier and performance vs. schedule must be tracked against overall project plan."
2. "Design documents, specifications, technology manuals, etc.: team routinely underestimate the amount and detail of documentation required."
3. "Communications process: because technology is never effectively transferred through documents alone, face to face meetings, conference calls, etc., are a must."
4. "Field follow up process: this will ensure that technology implementation is happening successfully."

Manufacturing project planning deals with modifications or construction of operation facilities, often at a partner's site, and this planning require tens or hundreds of millions of dollars. This step describes the roadmap with which projects are optimized in terms of scope, design, and execution and includes the selection of engineering contractors, equipment and facility specifications, hazardous reviews, design and construction schedule, environmental issues, etc. Operation capability development shows the supporting operation systems including staffing, supply support, financial systems, and customer support systems. This phase helps to ensure smooth progress to the full implementation.

The implementation and commercialization phase is a decision process for full commitment with definitive agreement being signed. A "go" or "no-go" decision is made at this phase and a significant amount of money will be spent for facilities, staffing, and inventory. This phase includes business formation and start-up, marketing plan

implementation, facilities construction and start-up, market launch, and full operations commercialization. The business formation and start-up step creates a new business entity by completing any legal requirements such as business licenses, and a new management team is appointed. This process is not just a completion of the agreement but a process whereby a whole business creation should be executed. A marketing plan implementation ensures the full implementation of the marketing plan, including full marketing and marketing support, and it should be ready for any correction in response to the customers. Facilities construction and start-up is the most expensive process, in which several tens or millions of dollars are spent for facilities construction. Design, engineering, construction, and start-up as well as their task descriptions will be included in this phase. the market launch addresses comprehensive issues in the marketing effort to ensure a successful market launch and services. Full operations commercialization is the step in which previous plans are fully deployed and implemented. During this step the following must be ensured:

1. "Manufacturing and operations can make the product at the cost, quality and delivery positions defined in the integrated project plan."
2. "The technology is proven and can be readily used by both customers and manufacturing and operations."
3. "Customers are delighted by the new product and offering."
4. "The project meets the strategic and financial objectives defined in the IPP."

3. Management Issues in Strategic Alliances

Management of strategic alliances creates many challenges because of its ambiguities in authorities and responsibilities at various points of time, complexities of organizational structures and management, and lack of holistic understanding of the new organization. These issues are described by Michael Yoshino [5] with several classifications, “ambiguities in alliance relationships, cooperation versus competition, managerial mind sets, tyranny of details, complex systemic issues, the network problem, and uniqueness of challenge.” The phrase, “ambiguities in alliance relationships” refers to several possible sources of ambiguities. The first is one arising from the mismatch of intentions of each participant. Outside of the agreement, each partner would have its own agenda and hidden intention and this agenda may show up during the alliance period, deteriorating the alliance. The second possible origin of ambiguities may be an inherent incompleteness of agreement. The agreement cannot hold the whole details and contingent and latent issues in the documents and therefore each partner should be flexible enough to reach a consensus for this kind of issues. This area of ambiguity could be quite annoying if the issues are no mere minor part of the agreement. The additional ambiguities may result from the alliance relationship. That is to say, often there are cases where each partner getting information that is outside the alliance itself. An unfavorable reaction to this communication by one partner because of its irrelevance can also deteriorate the alliance relationship at the manager’s level.

The phrase, ”cooperation versus competition” describes the inherent tension being developed during the alliance. This tension is a significant issue for almost all types of alliances because the partners should maintain a balance between helping their partners to

achieve goal but not so much that the effort has an adverse effect on one's own achievements. Each partner participates in the alliance because each partner needs the complementary capabilities of the other. But at some point one partner may realize that it could generate an additional benefit by taking over the partner's benefit. The phrase "managerial mind sets" describes the difficulty of managing alliances in US corporate settings. The preference of US corporations on clear managerial structure definitely works against the inherently less clear organizational structure. Additionally this less clear organizational structure with a multi-level decision-making process will hamper the problem of correcting efforts by alliance managers. The term "tyranny of details" indicates difficulties of managing an alliance because of alliance's strong dependence on the details of management for successful outcomes. An alliance manager is likely to feel the need to take care of every detail of an alliance to make it successful, but often he will realize some unintended omissions that will lead to confusion. The phrase "complex systemic issues" describes problems arising from the complex interrelationships among strategy, organization, systems, and structure. This complexity will become more obvious when the company and partners are multi-national and multi-business companies. This situation complicates the communications between the partners because of different languages, corporate cultures, and national cultures as well. Even within the corporation there would be high chances for alliance managers or others to miss the upward or downward influences due to the intensities of their own tasks at their levels. This narrow focus may impede the progress toward the holistic goals of the alliance. The network problem arises because of the complexities of the alliance network. The initial alliance may be easier to manage but often the company is likely to rely on more partners and

therefore seek more alliances. The needs for multiple partnership starts creating complex alliance networks, making more complicated tasks that needs managing. The phrase “uniqueness of the challenge” describes the difficulties of managing an alliance because of its unique characteristics of cooperation and competition, which have not been big issues in the management of subsidiaries or subdivisions.

IV. Mergers and Acquisitions

1. Overview of Mergers and Acquisitions

Mergers and acquisitions have been popular vehicles in bringing in external capabilities of technology, distribution channels, brand images, and many other core and complementary assets. According to Sullivan [19], these mergers and acquisitions activities have been changing with distinctive phases. The first phase was in the time period between 1895 and 1902, during which a number of firms were engaged in horizontal mergers; DuPont, General Electric, and many others were formed during this period. The second phase of mergers happened in the late of 1920's, when vertical acquisitions in the manufacturing industry and occurrence of public utility holding company occurred. The third phase of mergers happened during the 1960's has characteristics of conglomerate mergers, meaning acquisition of diverse types of businesses. During this time many small- to mid-size companies extended their business portfolio by integrating businesses outside of their business arenas. These activities, however, cooled down with the stock market collapse in 1970.

The current mergers endeavor started in the late 1970's. During 1985, General Electric purchased RCA for \$6 billion and also diversified its business to the financial industry by acquiring investment banking and financial services firms such as Kidder Peabody and Co. A number of mergers and acquisitions also happened in the entertainment industry during this time period. The mergers and acquisitions activities involve diverse parties during their formation and create complicated strategic, financial, and organizational issues. This thesis performs a systematic analysis of mergers and acquisitions with a number of system architecture tools to account for these complexities.

Table 11. The 10 biggest mergers of 1985 in billions of dollars

Deal	Value
General Electric, RCA	\$6.28
Beatrice, Kohlberg Kravis	\$6.2
Royal Dutch Shell, Shell Oil	\$5.67
Philip Morris, General Foods	\$5.63
General Motors, Hughes Aircraft	\$5.0
R.J.Reynolds, Nabisco	\$4.9
Allied, Signal	\$4.85
U.S. Steel, Texas Oil & Gas	\$4.0
Baxter Travenol, American Hospital Supply	\$3.63
Nestle, Carnation	\$2.89

Source: Adaniya, George A., "Mergers and Acquisitions in Technically Based Enterprises," Master's Thesis, Sloan School of Management, 1968.

2. Mergers and Acquisitions Types and Intent

Grouping mergers and acquisitions has been done with similar criteria but in a slightly different way. Tony Marciano classified it into three distinctive categories: financial acquisition, strategic acquisition, and diversification/conglomeration acquisition [20]. The motivation behind financial acquisitions is to improve a company's inefficiency in financial performance. This was done through either leveraged buyouts (LBO) or management buyouts (MBO), which were illustrated in the revolution in the 1980's with many hostile bids. The poor financial management of firms gives incentives of potential enhancement of financial management to the bidders. The typical target of acquisition through LBO has been companies holding more than enough free cash. The bidder can easily finance the buyout with cash or stock leveraged by using the target's own cash as collateral. The other grouping falls into strategic acquisitions. The strategic acquisitions involve two or more capabilities of the companies and make them get more synergistic. The motivation behind strategic mergers includes horizontal or vertical integration; horizontal integration aims at achieving economies of scales with lower cost structures by consolidating companies in the same business arena. On the other hand, vertical integration targeted at improving strategic or operational efficiency by internalizing externalities such as transaction cost between firms along the value chain. Other issues of tax benefits, political issues, and regulatory systems also affect the way in which these types of acquisitions are executed; regulatory systems such as antitrust law limit acquisitions that violates this regulation, and the financing mechanism is heavily affected and structured to the extent that tax benefits are maximized.

Another author classified the acquisitions using the terminology of vertical, horizontal, and conglomerate in order to avoid the less clear terminology of strategic acquisitions [18]. The horizontal acquisitions include acquisition of companies in the same kind of business area in an attempt to achieve economies of scale. Many behemoth chemical companies followed this type of acquisitions because of their maturity of businesses and overcapacity. This attempt tries to achieve and regain market control by eliminating the extra capacity but in many countries such attempts are subject to government regulatory rules aimed at preventing a monopolistic environment. The vertical mergers occur between companies in different phases of business operation along the business's value chain. The strategic goal of this type of acquisitions is to improve its business operation such as transaction cost, reduction of uncertainty between suppliers and buyers, and business performance improvement as well. Take materials companies in the flat panel display industry, for example. The typical materials companies supplying chemical products to their panel makers are trying to acquire device manufacturing capabilities to gain a share in the high profit margin panel and system product markets. This type of vertical integration is considered a forward integration, meaning its integration makes the company get close to the end customers. On the other hand, this vertical integration can be performed in an opposite direction, called backward vertical integration. This backward integration in the flat-panel display business may occur in order to acquire the stable material suppliers. The conglomerate acquisitions occur between companies with unrelated business domains. This conglomerate acquisition provides three different reasons for acquisitions: financial conglomerates, managerial conglomerates, and concentric conglomerates [18]. The financial conglomerate provides

financial benefits but has nothing to do with the company's other business operations. Investment companies may play a similar role to that of conglomerate acquisitions but the conglomerate acquisitions are different in that they exert a managerial control over the acquired companies as opposed to the simple financial investment. This control may be maximized through managerial conglomerate whereby managerial support is transferred between the firms. The general belief is that the firm with the superior managerial capability will offer benefits to its inferior counterpart. The level of overlapping of management functions defines whether it is a concentric conglomerate or not. The significance of overlapping of management in R&D, operation, manufacturing, and finance will increase the transfer of management capabilities between the firms involved. Alternatively the strategic reasons behind acquisitions are interpreted in a slightly different way by Dennis Sullivan: creation of shareholder value, diversification of risk, potential for speculative gain, entrepreneurial value creation, increased market power, and tax-related motivations [19].

3. Mergers and Acquisitions Tactics and Characteristics

Depending on the takeover environment, different mergers and acquisitions tactics are being used: bear hugs, a tender offer, or a proxy fight [21]. Out of these tactics, bear hugs are the least rigorous method used when a target is not strongly reluctant to the takeover and may be used before a hostile takeover attempt. The next takeover tactic of a tender offer was the most frequently employed methodology during 1980 to 2000, as illustrated in the following figure and is ruled by the filing requirements of the William Act.

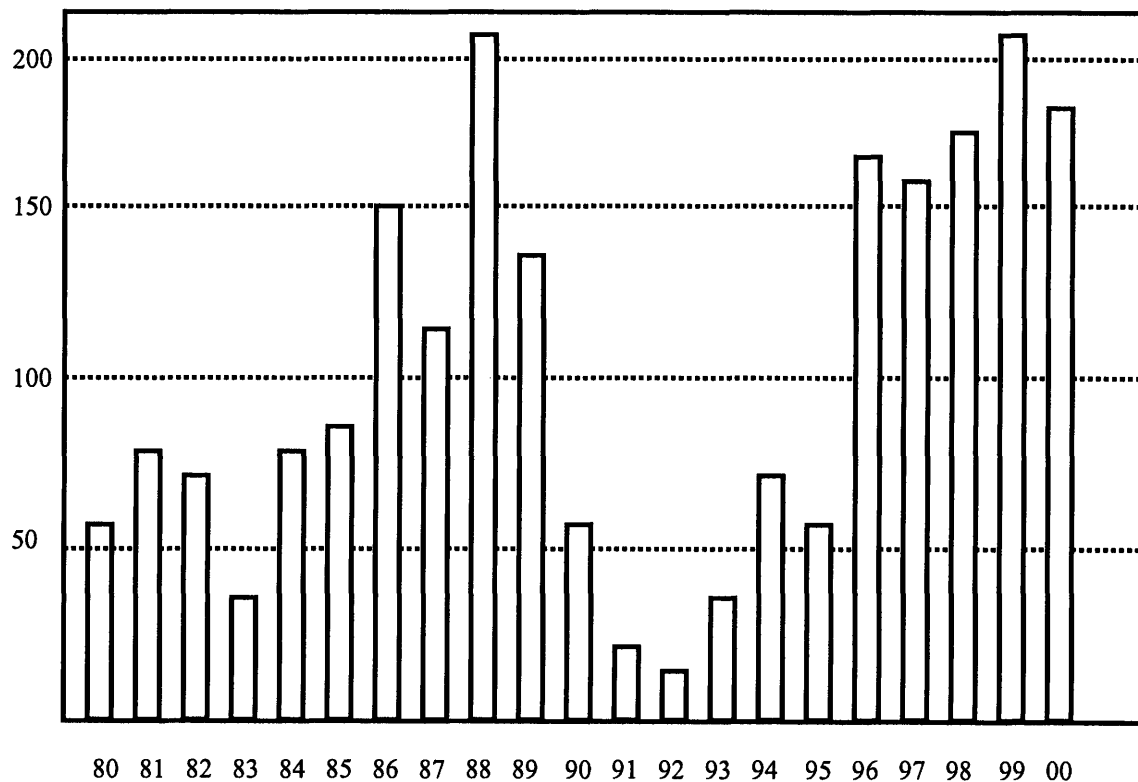


Figure 21. Tender offers, 1980 – 2000.

Source: Mergerstat Review, 1991 and 2001

The proxy fight was increasingly used in 1990s as a method to improve the success of tender offers. This method was used to reduce the resistance to takeovers by defenses of target especially in budget-constrained environment. The takeover attempt can reduce its cost by purchasing target shares in the market. This method was proved to

be effective in the tender offer success and in lowering the tender offer price. Despite this advantage, Arturo Bris found that only 15% of the firms studied employed this methodology [22].

The bear hugs tactic is the mildest form of takeover and can be done by contacting the board of directors of target company and expressing the intention to purchase the company. By doing this, a bear hug approach can exert pressure on the target to consider the offer because otherwise the tender offer option will follow. This bear hugs tactic may be used in a more aggressive way by offering a specific price that the target company should take into account to avoid any lawsuits or fiduciary issues. The typical reaction by the target management is to get a consultation from investment banking to support their decision not to accept the offer. But for some cases, this bear hugs method can create a good result without going through the expensive tender offer process and losing key assets of the target, such as key employees or a good culture, which may disappear with a hostile takeover.

The most frequently used takeover scheme, the tender offer, is in some sense not clear in its definition. Violation of the court ruling happened because of this ambiguity during the bid process by Sun Oil, Inc. for the Becton Dickinson Company in late 1977 [21]. Purchasing shares from open market generally does not mean the tender offer nor purchasing from a sophisticated financial institution. But if a public announcement is made after a gradual or non-gradual accumulation of the target share, it is considered a tender offer and the bidding company should follow the rule of William Act. In order to avoid this confusion, the court established the definition of tender offer that a bidding company must take into consideration before acting.

Table 12. Tender offer eight-factor test

1. Active and widespread solicitation of public shareholders for the shares of an issuer
2. Solicitation made for the substantial percentage of an issuer's stock
3. Offer to purchase made a premium over the prevailing market price
4. Terms of the offer firm rather than negotiated
5. Offer contingent on the tender of a fixed number of shares, often subject to a fixed maximum number to be purchased
6. Offer open for a limited period of time
7. Offeree subject to pressure to sell his stock
8. Public announcements of a purchasing program concerning the target company precede or accompany rapid accumulation of larger amounts of the target company's securities

Source: Larry D. Soderquist, "Understanding Securities Laws," New York: Practising Law Institute, 1998.

The history of tender offer dates back to 1973, when International Nickel Company acquired Electric Storage Battery Corporation [21]. This acquisition is considered the first acquisition in which major corporations and investment banking were involved, giving birth to the legitimate takeover activity in the corporate world. But the sudden proliferation of takeovers raised concerns among corporations and the financial industry about losing a control of the takeover rush and made the New York Stock Exchange prepare measures to resolve this problem. The additional legal rule of the "William Act" that regulates acquisitions was prepared and enacted by Senator Harrison Williams. Companies usually resort to the tender offer takeover method when a target is opposing to being acquired. The success rate of this tender offer was 83.8 % during 1980 to 1997 [24]. The tender offer takeover can be performed with cash or securities but the

latter case requires more processing time due to the securities regulation by the William Act, Blue Sky Laws, and Hart Scott Rodino. The William Act, for example, requests purchasers of 5% of outstanding shares to register with the SEC within ten days. This time window can give the bidding company the opportunity to purchase stocks without paying the price premium. The tender offer bidding was performed by the investment bank, legal advisors, the information agent, the depository bank, and the forwarding agent.

A two-tiered tender offer is a tool to force the stockholders to tender their shares at a company's first-tier tender by providing better compensation at the first-tier tender, followed by inferior compensation at the second-tier offer. This method had been a quite useful tool for a while but all-cash tender offers became more popular with the abundant availability of junk bonds at that time. With the decline of the junk bond market in the late of 1980, however, more offers were equity financed and companies that had no access to sufficient money had to resort to two-tiered offers, offering securities for the second tier [21].

The most rigorous type of acquisition is to use the proxy fight. This mechanism is a try to get rid of incumbents by competing for shareholder votes through mailings, advertisements, and telephone solicitation [21]. The number of proxy fights showed a steady increase from the early 1980's to the late 1980's, peaking with 41 proxy fights in 1989. This increase reflects the difficulty of tender offer acquisitions due to the collapse of junk bond financing but declined abruptly during early 1980's as the mergers and acquisitions were in a downturn. Proxy contests have major two forms of contests: those for seats on the board of directors and contests about management proposals. The former is an attempt to replace the incumbent management whereas the latter is a try to get

approval for an acquisition. The proxy fight process consists of major three components: starting the proxy fight, the solicitation process, and the voting process [21]. The first step may have a start with formal stockholders' meeting or with an insurgent call for a special meeting with an agenda of considering replacement of incumbent management. The solicitation process is a means of convincing the stockholders to vote for insurgent company's position by the proxy solicitor hired by the company. This may be done through a phone call or distribution of materials to stockholders in order to support the insurgent company's attempt at acquisition. The final voting process counts the stakeholders' votes. A brokerage firm or bank facilitates this process by collecting votes from stakeholders, tabulating them, and submitting them to the issuing company. The insurgent company usually hires proxy solicitors to have them oversee the tabulation process, ensure its accuracy, and challenge any discrepancies discovered during the process.

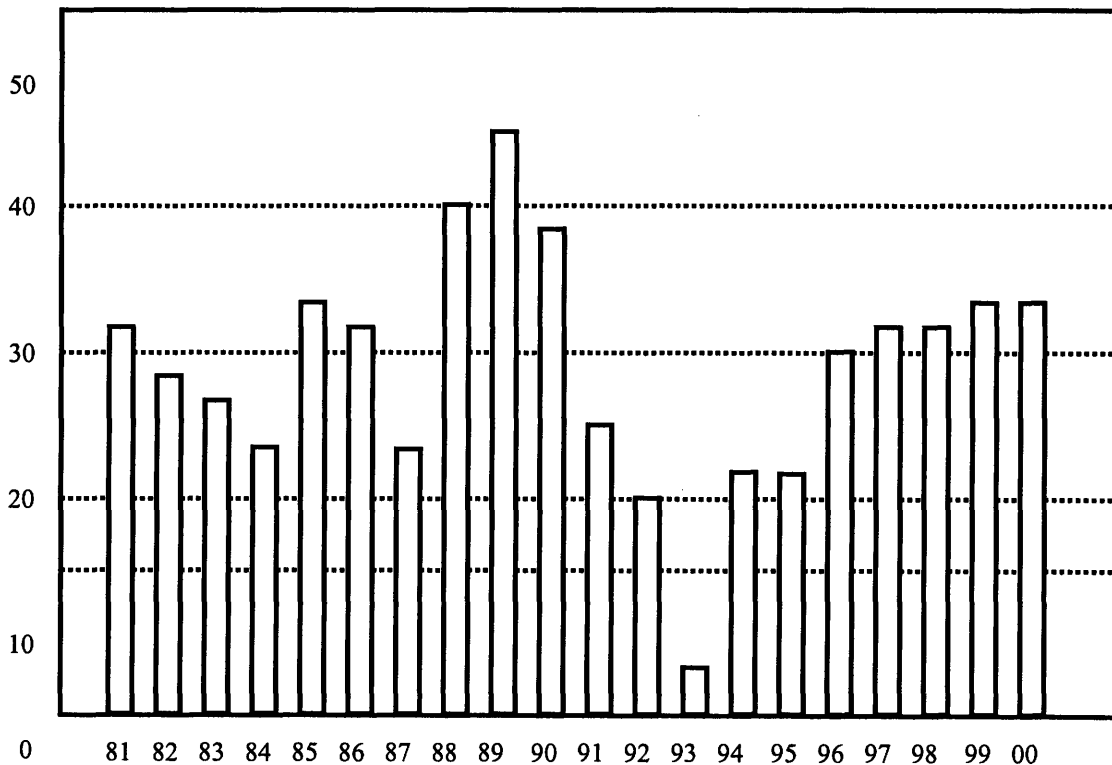


Figure 22. Number of contested proxy solicitations, 1981 – 2000.

Source: 2000 Annual meeting season wrap-up corporate governance, Georgeson Shareholder Communications, Inc.

4. Mergers and Acquisitions Process

The mergers and acquisitions generally carry a huge risk. The new entity may turn out to lack any synergistic effects or may be in trouble because of an incompatibility. Overpayment may make the company weak in financial return or raise a number of concerns from markets. Legal regulation also limits the degree of freedom in making a decision as to which firms to acquire and how to execute the acquisition. A systematic approach to the acquisition process is considered crucial in executing these activities. The acquisition deal flow model consisting of four stages of formulating, locating and investigating, negotiating and integrating can provide a framework for this process [27].

The formulating phase should provide clear understanding of the objectives and strategy of the deal; what is the company trying to achieve with this deal? What type of strategy is appropriate to support the acquisition objectives? The next phase of locating and investigating is a process of searching for the acquisition candidates and executing due diligence. The financial, legal, and business criteria are used to narrow down the field to appropriate targets during this process. The negotiation process takes into account such issues as price, governance, legal protection, technology, people, and performance and prepares for the negotiation strategy for the conditions and terms. The price is likely to be the most crucial issue given the uncertainty in the valuation of the target firm and the market concerns about overpayment. The valuation stage is discussed more in the latter part of this section. Restructuring governance, business, and employees of the target firm can pose big challenges given the different interests of the firms and government regulation. The final stage of integration is a process to integrate the target company's

people, technology, business process, and systems within the system of acquiring company.

The mergers and acquisition process described above includes the most time-consuming and critical tasks: due diligence, valuation, and structure and execution [18]. The due diligence is the investigation process by both parties, and its objectives include the following [18]:

1. To discover any latent liabilities before the start of deal execution
2. To figure out what has an effect on the price
3. To find out any potential problems
4. To gather relevant data and use the data during the negotiation process
5. To help the effective integration process.

Legal and accounting teams are in charge of investigating any potential financial liabilities, tax related issues, and regulatory issues. In the meantime, investment banking plays a critical role in devising a financing strategy to support the execution and completion of the deal. This due diligence process can be performed on an outsourcing basis, especially when the size of the deal is relatively huge but investment bankers may unintentionally underestimate minor findings that might have affected the deal decision had it been executed by the acquiring company.

4.1 Due Diligence

Due diligence with regard to legal investigation will include any materials that has potential to raise any legal complications such as a client contract, lease contract, employment agreement, shareholder agreement, bank loan contract, and alliance agreement. The corporation records such as its articles, shareholder meeting records, and board of director meeting records will be examined. The target company's history of legal conflicts may provide important clues as to how well the company has been managed. This will include any lawsuits with competitors, clients, vendors, government, and employees. Special attention should be paid to the legal rights of any tangible and intangible assets. These assets may include exclusive intellectual property, secrecy, or special rights to use resources for a certain period of time. Financial, accounting, and tax investigation is one of the key activities of due diligence, which is directly associated with the purchase price. Every part of the financial statement should be subject to thorough investigation, (i.e., account receivables, bad debts, inventories, tax returns, etc.). Marketing due diligence is considered consequential in ensuring a successful outcome from acquisitions. This process investigates the quality of marketing, customer relationships, and the potential of losing the market after the corporate governance change.

Managing key personnel of the target company is also critical. This what management is an attempt to keep the core people or prevent them from doing any non-beneficial action by having them sign an employment agreement or non-compete agreement. Requesting the non-compete agreement to target shareholders is quite common. The unusual trend of turnover should be subjected to careful investigation as

well. The use of business system belongs in the due diligence category. The acquirer should make a decision whether it will use its platform system or utilize and expand the target company's system. The most commonly used financial index, EBITDA, conducted by the buyer's team, is highly likely to propose a difference from the number suggested by the target company. This discrepancy may raise the necessity of renegotiating the purchase price.

The most common area where problems used to arise during the due diligence process was figured out [28]. The inventory distortions indicate the possible under- or over-estimation of inventory that can lead to underestimation of tax payment or potential loss from inventory obsolescence by a new technology or because of a changing environment. Litigation is an area where special attention should be paid, especially in an international deal. This litigation may limit the degree of freedom that the acquirer otherwise exploits. Any tactics that might be used for dressing up of a financial statement should be thoroughly identified. This dressing up may include deferral of expense payment or wrong record of reserves, bad debts, pension accounting, receivables not collectible, and personal expenses in the financial statements of a private company. The area of unrecorded liabilities such as vacation payment, allowances, discounts, pension, health and insurance liabilities is a common one to pay attention to. The need for substantial capital expenditure such as expansion, renovation and relocation of property, plant, and equipment may surface during the due diligence process. Regulatory problems, poor financial controls, regulatory problems, and credibility of management should be considered during the process.

4.2 Valuation

The valuation of company is one of key elements of due diligence execution but it is sometimes considered an art rather than science because of the difficulty of evaluation. A number of different methods may be used for this purpose and this step can be grouped into four types based on the nature of the business and the economic reason behind the acquisition [18].

- (1) Market value
- (2) Financial statements value
- (3) Intangible assets based value
- (4) Use of comparable transactions

The market value method takes into account the stock market value of the company. This valuation method can provide a good way to give a first estimate of the company's value but it has several weaknesses. This method is only applicable to a publicly traded company and does not account for intangible assets, which may be remarkable for a certain type of business. Another weak aspect of this method is its short-term nature. The market value can be influenced greatly even in a short-term period, showing a drawback in representing long-term and intrinsic value.

The financial statements value method includes discounted cash flow (DCF), payback period, internal rate of return (IRR), and average accounting return (ARR).

Table 13. Usage of investment decision methods

Method	Large U.S. Firms	Multinationals	
	% using each method	% using as primary method	% using as secondary method
Payback period	80.3	5.0	37.6
ARR	59.0	10.7	14.6
IRR	65.5	65.3	14.6
NPV	67.7	16.5	30.0
other		2.5	3.2

Source: Lecture notes, Financial Management course, Sloan Fellows Program, 1999.

The discounted cash flow method based on the NPV is considered one of the optimal valuation methods, given the importance of cash flow and the time value of it. Weighted average cost of capital (WACC) may be used as a discount rate, but it has some drawbacks.

- (1) This discounting must reflect other costs and benefits
- (2) Using WACC assumes the capital structure is not changing for the span of the company's life
- (3) The cost of equity changes every time the debt ratio changes
- (4) The weights are based on book value or market values that are not constant over time

The adjusted present value (APV) method offers an alternative to the DCF method. This method allows using different discount rates for different sources and therefore it is easy to understand where the added values are coming from. The intangible assets-based valuation approach attempts to capture intangible assets that are not reflected on the financial statements, listed as below [18].

- (1) Reputation, customer and government relations
- (2) People's skills and relations
- (3) Intellectual property, secrecy, tacit knowledge
- (4) Market shares
- (5) Distribution system
- (6) Franchise and distribution agreement
- (7) Government approvals
- (8) Access to raw materials
- (9) Synergies

Some of the above may possibly be quantified, but most others are still left to the judgments of management and the negotiation process.

The use of a comparable transaction provides a relatively easy way to value the companies. The typical reference includes multiples of sales, net income, cash flow, EBITDA, EBIT, and book value [18]. It is worthwhile to notice that a specific industry favors a certain method over others. Multiple of proven reserves is the preferred method for the oil and gas industries. On the other hand, multiples of cash flow and dollars per unit of installed capacity provide valuation for the cement industry.

5. General Electric's Case

GE Capital Services' acquisition integration case provides a good example of an acquisition process [30]. It has been successful in turning a number of acquisition endeavors into its core competence, establishing a replicable acquisition process using experiences acquired with more than 100 acquisitions. The acquisitions came in different sizes and forms. New financial business was formed within GE Capital Service when it acquired the Travelers Corporation's Mortgage Services business. Whole business consolidation occurred when it acquired Chase Manhattan Bank's leasing business. The minimal size of acquisition may include the purchase of assets and portfolio without integrating the people. This GE Capital Services' acquisition process includes the following distinctive stages [30].

(1) Reacquisition

a. Due Diligence

b. Negotiation and Announcement

c. Close

Begin cultural assessment

Identify business/cultural barriers to integration success

Select integration manager

Assess strengths and weaknesses of business and functional leaders

Develop communication strategy

(2) Foundation building

a. Launch

b. Acquisition integration workout

c. Strategy formulation

Formally introduce integration manager

Orient new executives to GE Capital business rhythms and non-negotiables

Jointly formulate integration plan, including 100-day and communication plans

Visibly involves sufficient resources and assign accountability

(3) Rapid integration

a. Implementation

b. Course assessment and adjustment

Use process mapping, CAP, and workout to accelerate integration

Use audit staff for process audits

Use feedback and learning to continually adapt integration plan

Initiate short-term management exchange

(4) Assimilation

a. Long term plan evaluation and adjustment

b. Capitalization on success

Continue developing common tools, practices, processes, and language

Continue longer-term management exchanges

Utilize corporate education center and Crotonville

Use audits of staff for integration audit

6. Mergers and Acquisitions in the Corporate Context

Mergers and acquisitions share many upstream influences in common with strategic alliances, but mergers and acquisitions tend to involve more financial components and therefore understanding the economic climate becomes an important element. Competition, stage of business life cycle, globalization pressure, and corporate restructuring needs all drive a corporation to consider mergers and acquisitions as a means of achieving its goals. The typical strategy in improving a corporation's business efficiency is to be a pure play with concentration on its core business and closing less profitable and less core businesses. So it attempts to acquire businesses related to its core and adopt other mechanisms to restructure its businesses. Sell-offs, spin-offs, carve-outs, split-offs, and tracking stocks are some of typical way to reorganize businesses. Sell-offs and divestitures are sale of a portion of the firm's assets and the seller receives cash or securities [31]. Historically GE was very aggressive in both acquiring and executing divestitures. In 2005 General Electric executed 17 divestitures while Carlyle Group did 11 and El Pasco did 11. Spin-offs are distributions of shares in a subsidiary to shareholders of the parent as a dividend. This event generates separate trading of parent and subsidiary stock but does not involve any cash flow. In 2005 the largest spin-off was Viacom Cable Network, which was 31.2 billion dollars equity. Carve-outs are partial IPOs of stock in a wholly owned subsidiary and the parent usually keeps a controlling ownership about 80% in the carved-out subsidiary. The carve-out needs a separate board of directors for the subsidiary and its stock trades independently. The large carved-out companies includes ICRA Ltd in India, Athens Intl Airport SA in Greece, and China COSCO Holdings, to name a few. [31] On the other hand, Split-offs are similar to spin-

offs because ownership of a subsidiary is delivered to shareholders and shareholders get subsidiary stock in exchange for part of the parent stock. But unlike the spin-offs, this method does not involve cash flow, such as a dividend. One example is split-offs done by Viacom. It offered 5.15 Blockbuster common shares per Viacom share in a 1.1 billion dollars transaction in 2004. In tracking stock, one board of directors and one tax return are maintained and voting rights vary according to the value of the underlying businesses.

Economic conditions have a strong effect on the shape and process of mergers and acquisitions. Depending on the environment of public equity markets and debt markets, the structure and timing of a deal would be different. The downstream influences of mergers and acquisitions include geographic expansion, business gap-filling, economies of scales, corporate governance, market reactions, competitor reaction, financial performance, and pure play. In particular, financial efficiency achieved differentiates this alliance from other types of alliances.

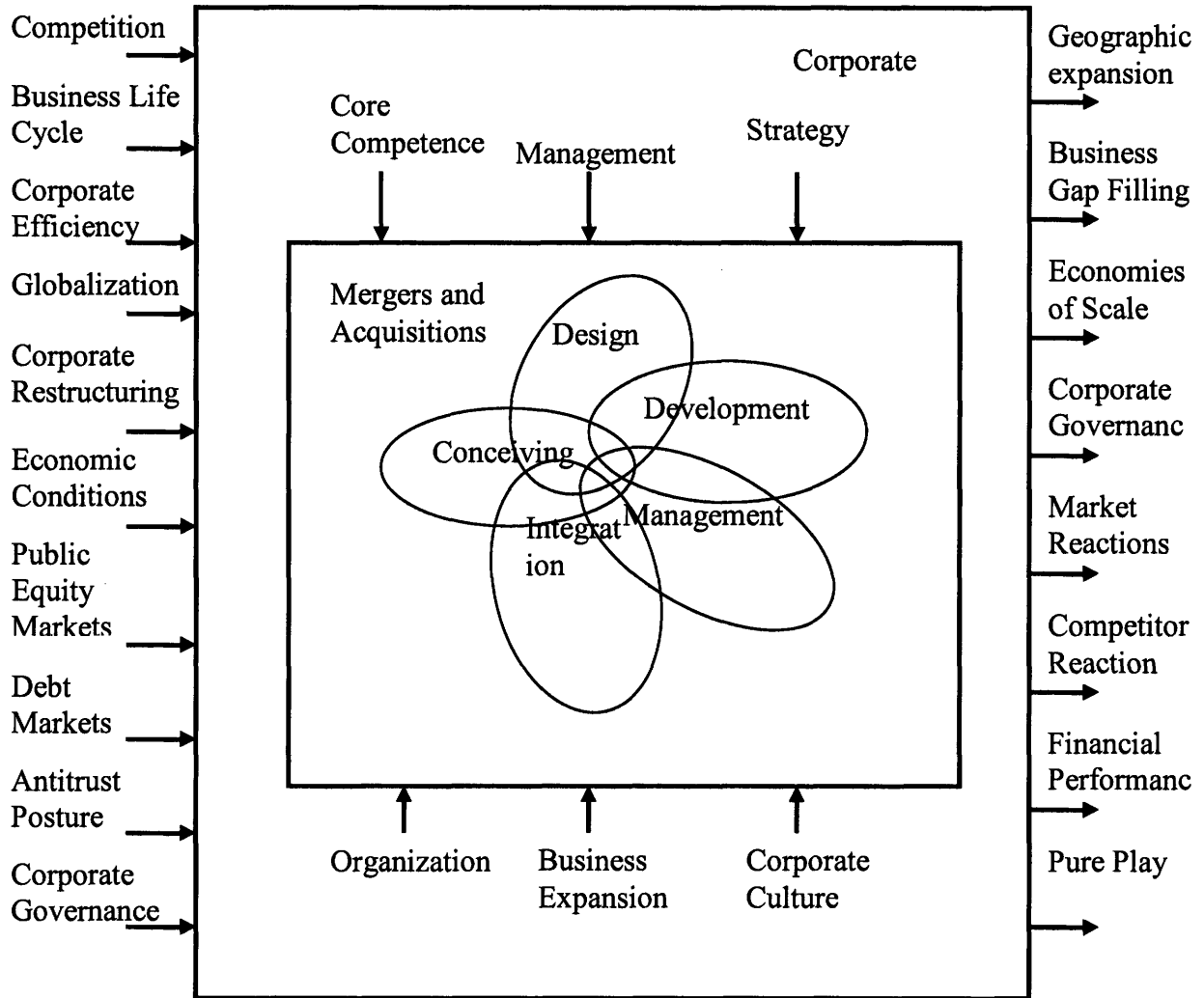


Figure 23. Mergers and acquisitions in a corporate context.

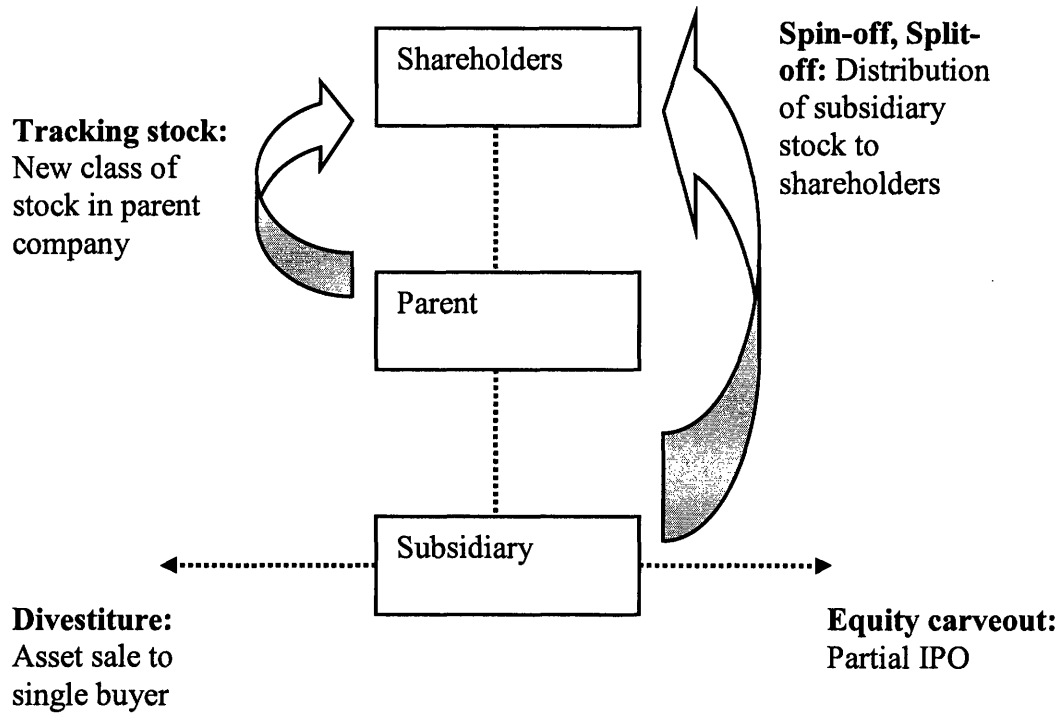


Figure 24. Equity restructuring [31].

7. Corporate Governance Issues in Mergers and Acquisitions

Corporate governance failure in Sunbeam, Enron, Worldcom, Tyco, and some oil companies raised issues about the problem of US corporate governance. Enron entered into long-term contracts but inflated the first-year sales by significantly underestimating costs. Also, this company created artificial profits for its partner and itself with large payments going to executives. On the other hand, Worldcom treated operating expenses as capital expenditures, with large loans being made to top executives. Sunbeam inflated its sales by booking the delivery of appliances in warehouses supplied by Sunbeam as sales. Tyco made high P/E ratios artificially and also made loans to top executives and eliminated them. Some oil companies lent money to buy their subsidiaries to inflate the profits but the stock price fell when stocks were sold in the open market.

Responding to this failure, the Sarbanes Oxley Act (SOA) was enacted into law on July 20, 2002. The key features of SOA in terms of corporate governance are a public company accounting oversight board (PCAOB), auditor independence, certification, disclosure, insider trading, conflicts of interest, professional responsibility, studies and reports, fraud accountability, penalties, and SEC power [32]. The PCAOB is a private, nonprofit organization subject to SEC regulation and oversight. It manages the auditing of public companies and also responsible for the establishment of audit standards. Audit independence describes the separation of audit from the corporation management. An audit partner should not provide any consultation to the corporation and audit partner rotation should be made every five years. Insider trading in the corporation is a disclosable event that should be reported within two days. Conflicts of interest prohibit

personal loans to management. Alteration or falsification of records is considered criminal fraud by the standards of fraud accountability.

The corporate governance would be maintained either by internal control mechanisms or by external control mechanisms. The research sources on inside control mechanisms includes the board of directors, ownership concentration, and executive compensation. On the other hand, the external control mechanisms include stock price performance, institutional investors, proxy contests, and takeovers. The proxy contests are some of the external forms of corporate control, where a dissident group is trying to obtain control over the existing governance. The strategy of mergers and acquisitions is a typical example of external control of governance. When the corporate management efficiency falls short of expectations, then external group attempts to merge or acquire the corporation and successful mergers and acquisitions result in better market performance of the corporation.

V. Summary and Conclusions

1. Strategic Alliances in the System Architecture Context

In this thesis I reviewed the intent, strategy, and process of strategic alliances and then analyzed the strategic alliances in a system architecture framework such as stakeholder complexity, object process methodology (OPM) for bilateral alliances, upstream and downstream influences, holistic framework, and multiple and cross-border alliances.

The alliance is a part of corporate strategies in an attempt to obtain a leading position in businesses when the internal development option is not sufficient to secure the desired capabilities. In this case, a corporation relies on an alliance option. The alliance process basically consists of alliance formulation, partner selection, negotiation, and alliance management. Alliance formulation deals with high-level objectives of the alliance. The right objectives of an alliance could be identified through scenario analysis where industry analysis, core competence analysis, gap analysis, and competitor analysis are performed. These analyses may lead to the objectives of an alliance, which could be either market penetration, geographic expansion, economies of scale, new business development, technology acquisition, or risk-sharing. These high-level objectives of an alliance help planners to find the best strategy for an alliance. One of the strategies we can employ is the familiarity matrix by Edward Roberts of Sloan School of Management. This matrix uses the two parameters of technology familiarity and market familiarity. Depending on the level of familiarity regarding these two parameters, a corporate can make a selection among alliance strategies: internal development, joint venture, mergers and acquisitions, minority equity investment, and educational acquisitions. As the

familiarity of market and technology get improve, a corporate can safely develop the necessary capabilities without an external alliance but if it lacks significantly either in market or technology familiarity, a joint-venture type of alliance strategy would make sense. When the corporation is not familiar with either the technology nor with the market, then the matrix says an educational acquisition would be a safer option.

Using the system architecture framework, I analyzed the complexity of stakeholders in forging alliances. This process includes many participants (either internal or external), such as top management, strategists, a finance team, a legal team, technologists, business managers, investment bankers, consultants, auditors, the SEC, and government organizations. I captured the basic interactions among these parties with a bilateral object process methodology diagram. The upstream and downstream influences and holistic framework identified key components of alliance processes, driving forces, and results of alliance. The holistic framework illustrates the key components of each alliance process: formulation, development, integration, and management. On the other hand, the diagram of alliances in the corporate context helps us to understand the driving forces of alliance and the external and internal components that exert forces on the formulation and results of alliance. I illustrated the alliance practice in DuPont, and as shown, the key component of alliance process well fits into the alliance analysis in system architecture framework except for one component, alliance management. This lack of management does not mean the insufficient management during alliance formulation or integration but during post-mortem alliance management. I recommend that alliance planner design appropriate metrics for evaluation of alliance performance on an ongoing basis.

2. Mergers and Acquisitions in System Architecture Context

Mergers and acquisitions are dealt in a separate chapter from strategic alliances because this is not a strategic alliance in a strict sense and also needs special attention. I reviewed the intents, process, and specific strategies of mergers and acquisitions and then analyzed this strategy using a holistic framework. The corporate governance of mergers and acquisitions is a big issue in the US corporate environment, as shown in Enron and Worldcom cases, so the topic is discussed separately.

The process of mergers and acquisitions shares most things in common with the general alliance process of strategy formulation, partner search and selection, negotiation and execution. But mergers and acquisitions need special attention in tactics, due diligence and valuation because this phase carries a huge risk. The different types of mergers and acquisitions tactics are discussed: bear hugs, tender offer, and proxy fight. Due diligence process will investigate every dimension of businesses. This process will investigate the customer relationships, finance, accounting, tax history, operational issues such as level of inventory and business IT systems, and employees. Legal investigation must be made to ensure any legal complications such as employment agreements, alliance agreements, and shareholder agreements. The documents regarding shareholder meetings, board of director meetings, and legal conflicts should be examined. Examining the value of intangible assets such as R&D capabilities, value of patents and corporate brand is also critical.

method, intangible assets-based method, and use of comparable transactions. The financial-statements-valuation method is more analytic than others so the others can be used as complementary data with this method. Net present valuation (NPV) or adjusted present valuation (APV) is a typical discounted cash flow method.

Mergers and acquisitions are analyzed in the corporate context using a holistic framework and some key driving components are identified. The results share some of its driving components with general strategic alliances but mergers and acquisitions case is more complicated and more dependent on economic conditions, such as debt markets and public equity markets. Corporate governance is a big issue in understanding the mergers and acquisitions in corporate contexts because mergers and acquisitions constitute a way of adjusting corporate governance in an external method and this adjustment results in a huge change in corporate governance.

References

- [1]. Gary Hamel and C. K. Prahalad, "Competing for the Future," Harvard Business School Press, 1994.
- [2]. Edward Roberts, Lecture Note, Sloan School of Management, 2005.
- [3]. Robin A. Karol, Ross C. Loeser and Richard H. Tait, "Better New Business Development At DuPont – I, Research Technology Management, 24, 2002.
- [4]. Robin A. Karol, Ross C. Loeser and Richard H. Tait, "Better New Business Development At DuPont – II, Research Technology Management, 47, 2002.
- [5]. Michael Y. Yoshino, "Strategic Alliances", Harvard Business School Press, 1995.
- [6]. Yves L. Doz, Gary Hamel, "Alliance Advantage – The Art of Creating Value through Partnering," Harvard Business School Press, 1998.
- [7]. Joseph L. Bower, "Not All M&As are Alike – and That Matters," *Harvard Business Review*, 2001.
- [8]. Joel Bleeke and David Ernst, "Is Your Strategic Alliance Really a Sale," Harvard Business Review on Strategic Alliances, A Harvard Business Review Paperback, 2002.
- [9]. Edward Roberts and Wenyun Kathy Liu, "Ally or Acquire? Case Studies of Compaq and Cisco as Additional Tests of the External Technology Life Cycle Model", MIT Sloan School of Management, Working Paper 4421-03, 2003.
- [10]. Joel Bleeke and David Ernst, "The Way to Win in Cross-Border Alliances," Harvard Business Review on Strategic Alliances, A Harvard Business Review Paperback, 2002.
- [11]. Cisco Systems, Official Press Releases, <http://www.cisco.com>.

- [12]. H. R. Biggadike, "The Risky Business of Diversification," *Harvard Business Review*, 1979.
- [13]. James Bamford, David Ernst, and David G. Fubini, "Launching a World-Class Joint Venture," *Harvard Business Review*, 2004.
- [14]. Edward B. Roberts and Charles A. Berry, "Entering New Businesses: Selecting Strategies for Success," *Sloan Management Review*, 1985.
- [15]. MIT Industry Systems Study, "Communications Satellite Constellations - Technical Success and Economic Failure," *Engineering Systems Learning Center (ESLC)*, 2003.
- [16]. Dov Dori, "Object Process Methodology," Springer, 2002.
- [17]. Ed Crawley, "System Architecture," lecture note, 2002.
- [18]. Jesus Saenz Gonzalez, "A Process Perspective of Acquisitions – Keys to Success," MIT Thesis, 2000.
- [19]. Dennis B. Sullivan, "The Acquisition Process," MIT Thesis, 1986.
- [20]. Tony Marciano, "Mergers and Acquisitions", lecture note, 2005.
- [21]. Patrick Gaughan, "Mergers and Acquisitions, and Corporate Restructuring," John Wiley & Sons Inc; 2nd edition, 1999.
- [22]. Arturo Bris, "When Do Bidders Purchase a Toe Hold? Theory and Tests," Yale University Working Paper, October 1998.
- [23]. Source: Larry D. Soderquist, "Understanding Securities Laws," New York: Practising Law Institute, 1998.
- [24]. "Mergerstat Review," Mergerstat, 1988.
- [25]. 2000 Annual Meeting Season Wrap-up Corporate Governance, Georeson Shareholder Communications, Inc.

- [26]. Adaniya, George A., "Mergers and Acquisitions in Technically Based Enterprises," Master's Thesis, Sloan School of Management, 1968.
- [27]. Timothy J. Galpin and Mark Herndon, "The Complete Guide to Mergers and Acquisitions," Jossey Bass, 2000.
- [28]. Milton L. Rock, Robert H. Rock and Martin Sikora, "The Mergers and Acquisitions Handbook," Second Edition, McGraw-Hill, 1994.
- [29]. Timothy A. Luehrman, "Using APV: A Better Tool for Valuing Operations," Harvard Business Review, 1994.
- [30]. Ronald N. Ashkenas, Lawrence J. DeMonaco, and Suzanne C. Francis, "Making the Deal Real: How GE Capital Integrates Acquisitions," Harvard Business Review, 1998.
- [31]. Hamid Mehran, "Corporate Restructuring," Lecture Note, Sloan School of Management, 2006.
- [32]. Tony Marciano, "Mergers and Acquisitions," Lecture, Sloan School of Management, 2005.