

## **INFORMATION TO USERS**

**This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.**

**The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.**

**In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.**

**Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps.**

**Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.**

**ProQuest Information and Learning  
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA  
800-521-0600**

**UMI<sup>®</sup>**



**Strategic Alliances: Market Structure, Conduct and Antitrust**

by

**James H. Sawler**

**Submitted in Partial Fulfillment of the Requirements  
for the degree of Ph.D**

at

**Dalhousie University  
Halifax, Nova Scotia  
Canada**

**October, 2000**

**© Copyright by James H. Sawler, 2000**



**National Library  
of Canada**

**Acquisitions and  
Bibliographic Services**

**395 Wellington Street  
Ottawa ON K1A 0N4  
Canada**

**Bibliothèque nationale  
du Canada**

**Acquisitions et  
services bibliographiques**

**395, rue Wellington  
Ottawa ON K1A 0N4  
Canada**

*Your file Votre référence*

*Our file Notre référence*

**The author has granted a non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of this thesis in microform, paper or electronic formats.**

**The author retains ownership of the copyright in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author's permission.**

**L'auteur a accordé une licence non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de cette thèse sous la forme de microfiche/film, de reproduction sur papier ou sur format électronique.**

**L'auteur conserve la propriété du droit d'auteur qui protège cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.**

0-612-66675-1

**Canada**

**DALHOUSIE UNIVERSITY**

**FACULTY OF GRADUATE STUDIES**

The undersigned hereby certify that they have read and recommend to the Faculty of Graduate Studies for acceptance a thesis entitled "Strategic Alliances: Market Structure, Conduct, and Antitrust"

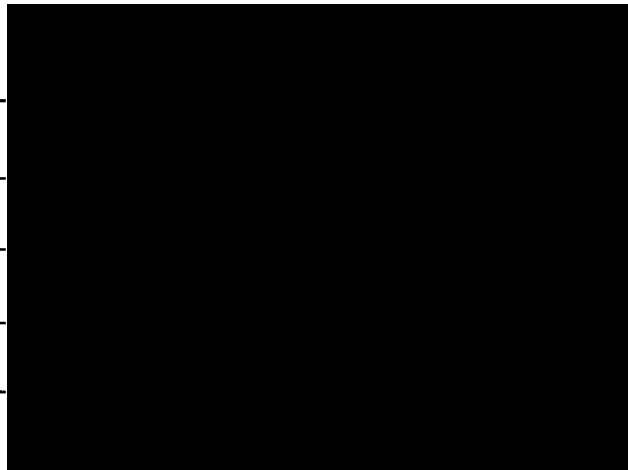
---

by James H. Sawler

in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

Dated: September 22, 2000

External Examiner \_  
Research Supervisor \_  
Examining Committee \_



DATE: October 10, 2000

AUTHOR: James H. Sawler

TITLE: Strategic Alliances: Market Structure, Conduct, and Antitrust


DEPARTMENT OR SCHOOL: Economics

DEGREE: Ph.D.

CONVOCATION: May

YEAR: 2001

Permission is herewith granted to Dalhousie University to circulate and to have copied for non-commercial purposes, at its discretion, the above title upon request of individuals and institutions.

  
Signature of Author

THE AUTHOR RESERVES OTHER PUBLICATION RIGHTS, AND NEITHER THE THESIS NOR EXTENSIVE EXTRACTS FROM IT MAY BE PRINTED OR OTHERWISE REPRODUCED WITHOUT THE AUTHOR'S WRITTEN PERMISSION.

THE AUTHOR ATTESTS THAT PERMISSION HAS BEEN OBTAINED FOR THE USE OF ANY COPYRIGHTED MATERIAL APPEARING IN THIS THESIS (OTHER THAN BRIEF EXCERPTS REQUIRING ONLY PROPER ACKNOWLEDGEMENT IN SCHOLARLY WRITING) AND THAT ALL SUCH USE IS CLEARLY ACKNOWLEDGED.

**To my parents, Harold and Kathleen**

## Table of Contents

Table of Contents	v
List of Tables	ix
List of Figures	x
Abstract	xii
Acknowledgement	xiii
<b>Chapter 1: Introduction</b>	<b>1</b>
1.1: Strategic Alliances	1
1.1.2: The Proliferation of Strategic Alliances	2
1.1.3: Classification of Alliances	4
1.1.4: Motives for Forming Strategic Alliances	6
1.1.5: Complementary Capabilities	6
1.2: Outline, Existing Literature, and Contribution	7
<b>Chapter 2: The Structure of Cooperation</b>	<b>15</b>
2.1: Patterns of Alliance Formation: Clustered and Amorphous Alliance Structures	15
2.1.1: The Clustered Alliance Structure	16
2.1.2: The Amorphous Structure of Alliance Formation	20
2.2: The Propensity to Cluster	23
2.2.1: The Choice Between Strengthening an Existing Relationship Versus Allying with an Independent Firm	29
2.2.2: The Choice Between Forming an Alliance Cluster Versus Allying with an Independent Firm	34
2.3: Interdependence and the Willingness to Compete	42
<b>Chapter 3: Virtual Bigness</b>	<b>50</b>
3.1: Explaining the Proliferation of Alliances	50
3.2: The Advantages of Smallness	53
3.2.1: Specialization	53
3.2.2: Flexibility	54
3.3: The Advantages of Bigness and How They Can Be Realized Through Alliances	56



3.3.1: Globalization	59
3.3.2: Economies of Scale	61
3.3.3: Research and Development	63
3.3.4: Network Effects and Increasing Returns	64
3.3.5: Convergence and Diversification	66
3.4: Virtual Bigness: Centripetal or Centrifugal?	69
3.4.1: Clustered Alliance Formation	69
3.5: Alliances as Merger Alternatives	71
3.6: Conclusion	75
<b>Chapter 4: The Impact of Strategic Alliances on Barriers to Entry</b>	<b>77</b>
4.1: Centrifugal Effects of Alliances with Respect to Entry	78
4.1.1: Strategic Alliances and Geographic Entry	78
4.1.2: Vertical Alliances and Geographic Entry	80
4.1.3: Strategic Alliances and Entry into New Product Markets	81
4.2: Centripetal Effects of Alliance with Respect to Entry	82
4.2.1: Alliance-Created Entry Barriers	82
4.2.2: The Elimination of Potential Entrants	84
4.2.3: Alliances and Artificial Entry Barriers	85
4.3: Conclusion	86
<b>Chapter 5: Strategic Alliances and Innovation</b>	<b>88</b>
5.1: Virtual Bigness and Innovation	88
5.2: Pooled Research Efforts and Duplication	91
5.3: Knowledge Transfer	92
5.4: The Appropriation of Research Costs	94
5.5: Strategic Alliances and the Free-Rider Problem	97
5.6: The Simultaneous Model of Innovation	99
5.7: Conclusion	103

<b>Chapter 6: Strategic Alliances in the Automobile Industry</b>	<b>105</b>
6.1: The Structure of the World Automobile Industry	107
6.2: Alliance formation in the Automobile Industry: The Amorphous Structure	110
6.3: Automobile Alliances and Market Entry	116
6.3.1: Geographic Entry	116
6.3.2: Product Entry	120
6.3.3: Automobile Alliances and Entry: A Centrifugal Force	122
6.4: Automobile Alliances and Virtual Bigness	124
6.4.1: The Advantages of Remaining Small	124
6.4.2: How Alliances Provide Small Automakers with Large Firm Characteristics	127
6.4.3: Virtual Bigness as a Centrifugal Force	133
6.5: Automobile Alliances and Innovation	134
6.5.1: Virtual Bigness and Automotive Innovation	134
6.5.2: Automobile Alliances and the Appropriation of Research Costs	136
6.5.3: Automobile Alliances and the Diffusion of Knowledge	138
6.5.4: Automobile Alliances and the Simultaneous Model of Innovation	139
6.6: Automobile Alliances and the Willingness to Compete	141
6.7: Conclusion	143
 <b>Chapter 7: Strategic Alliances in the International Airline Industry</b>	 <b>145</b>
7.1: Introduction	145
7.2: The International Airline Industry	146
7.2.1: The Hub and Spoke Network	146
7.2.2: The Problem of Market Definition	148
7.2.3: Barriers of Entry to Foreign Markets	149
7.3: Alliance Formation in the International Airline Industry: The Clustered Structure	152
7.4: Virtual Bigness	157

7.4.1: Explaining Airline Alliances Through Virtual Bigness	157
7.4.2: Centrifugal and Centripetal Aspects of Virtual Bigness	159
7.5: Airline Alliances and Entry	160
7.6: The Impact of Airline Alliances on Consumers	164
7.7: Conclusion	168
<b>Chapter 8: Antitrust Treatment of Alliances</b>	<b>171</b>
8.1: The National Cooperative Research and Production Act	173
8.2: The Competitor Collaboration Guidelines	176
8.2.1: Outline of the Competitor Collaboration Guidelines	177
8.2.2: An Assessment of the Competitor Collaboration Guidelines	180
8.2.3: Recommendations	182
8.3: Canadian Competition Policy Towards Strategic Alliances	186
8.3.1: The Current Status of Competition Policy Towards Strategic Alliances	188
8.3.2: Proposed Changes to Alliance Treatment Under the Competition Act	192
8.4: Two Cases to Illustrate a Competitive Assessment of Alliances	196
8.4.1: Ballard Power, DaimlerChrysler, and Ford	196
8.4.2: American Airlines and British Airways	198
<b>Chapter 9: Conclusion</b>	<b>201</b>
<b>Bibliography</b>	<b>204</b>

## **List of Tables**

<b>Table Name</b>	<b>Page</b>
Table 2.1: A Summary of the Characteristics of the Clustered and Amorphous Structures	23
Table 6.1: Worldwide Production of Automobiles of the Largest Automakers, 1999	108
Table 6.2: Four-Firm Concentration Ratios and Leading Firms' Market Shares in Selected National Markets, 1984 and 1996	109
Table 6.3: Major Horizontal Alliances Among the World's Largest Automakers	110
Table 6.4: Automaker Research and Development Expenditure, 1987 and 1997	131
Table 6.5: Return on Revenues of the World's Largest Automakers and the Weighted Average Return of the Fortune Global 500	142
Table 7.1: The World's Largest Airlines by Revenue Passenger Kilometres, 1998	147
Table 7.2: Freedoms of the Air	150
Table 7.3: Global Airline Alliance Clusters	152
Table 8.1: The Ten Largest Canadian and American Corporations by Revenue, 1998	186
Table 8.2: A Contrast of Concentration Levels of Canadian and U.S. Manufacturing Industries	187

## **List of Figures**

	Page
Figure 1.1: Alliances as a Percentage of Revenue for the 1000 Largest U.S. Corporations	3
Figure 1.2: Distribution of Alliances of Canadian Corporations According to Operational Relationships, 1995	5
Figure 2.1: Clustered Alliance Formation	18
Figure 2.2: The Amorphous Structure of Alliance Formation	23
Figure 2.3: The Choice Between an Existing or a New Partner	25
Figure 2.4: The Choice Between a New Partner or an Existing Partner's Partner	26
Figure 2.5: Two Scenarios of Alliance Partner Formation	38
Figure 2.6: The Effect of Alliance Interdependence on a Cournot Duopoly	51
Figure 3.1: Aggregate Values of U.S. Divestiture and Other Merger and Acquisition Activity, 1981-1995	55
Figure 3.2: Aggregate Value of U.S. Divestitures as a Percent of All Merger and Acquisition Activity	55
Figure 3.3: Research and Development Expenditure as a Percentage of Sales in the U.S. Pharmaceutical Industry	63
Figure 3.4: A Pro-Competitive Example of Clustered Alliance Formation	70
Figure 3.5: Monthly Alliances and Acquisitions in the Biotechnology Industry	74
Figure 5.1: Information Flow in the Linear Model of Innovation	99
Figure 5.2: Information Flow in the Simultaneous Model of Innovation	101
Figure 6.1: Horizontal Alliances of the World's Major Automakers	106
Figure 6.2: Imports as a Percentage of New Passenger Registrations, 1987 and 1997	121

<b>Figure 7.1: The Growth of Airline Alliance Activity, 1994-1998</b>	<b>145</b>
<b>Figure 7.2: Hypothetical Airline Networks: No Hub vs. Hub and Spoke</b>	<b>148</b>
<b>Figure 7.3: Network Expansion Through a Codeshare Alliance</b>	<b>158</b>

## **Abstract**

The past two decades have witnessed an unprecedented rise in alliance activity which is transforming the nature of markets. This study analyses the effect of strategic alliances on market structure and conduct, culminating in an examination of the antitrust treatment of competitor collaborations.

Given the widespread proliferation of alliances in many industries, any analysis of a market's structure must include an assessment of the nature of alliance formation. A framework for assessing this structure of cooperation is introduced which distinguishes between clustered alliance formation, where firms ally into competing constellations, and amorphous formation, where there are no such groupings or patterns. A model is developed which demonstrates that firms' propensity to cluster rises with the interdependence created by their alliances. Another model demonstrates that rising alliance-created interdependence reduces competitors' willingness to compete.

The recent proliferation of alliance activity can be partly attributed to firms' reaction to two opposing sets of environmental forces: one pushing firms to become larger, and another pushing them to remain small. Alliances enable firms to respond to these opposing forces by providing them with virtual bigness, the ability to achieve large firm advantages, while remaining small.

An examination of the impact of alliances on traditional elements of market structure, concentration and entry barriers, is conducted. This is facilitated by placing alliances into the framework of centripetal and centrifugal market forces developed by J.M. Blair. This is followed by a review of alliances' effect on innovation.

Two case studies illustrate how the study's findings relate to real markets. The automobile industry provides an opportunity to examine the effects of amorphous alliance formation, while the airline industry allows an examination of the effects of clustered formation.

The study concludes with an examination of how, given the study's findings, antitrust should treat alliances among competitors.

## **Acknowledgement**

I wish to express my sincere gratitude to my supervisor, Professor Christian Marfels, for his patient guidance and support. I also wish to thank my external examiner, Professor William G. Shepherd, and my committee members, Professors Melvin Cross and Gouranga Rao for their valuable time and many helpful suggestions.



## **Chapter 1: Introduction**

General Motors and Toyota, DaimlerChrysler and Ford, British Airways and American Airlines, NCR and Unisys, Hitachi and Mitsubishi, Apple Computer and Microsoft: these pairings represent some of the fiercest rivalries in the corporate world. Surprisingly, they are also among its most significant partnerships. What are the implications when such fierce competitors establish alliances; how will these relationships transform the structure and conduct of markets; how will they affect the nature of competition; what is the role of antitrust in dealing with the effects of alliances? These are the principal questions addressed by this study.

### **1.1: Strategic Alliances**

A strategic alliance is a relationship between two or more firms that involves the sharing of resources: capital, technology, experience, distribution networks, etc. Strategic alliances involve co-operative activities that go beyond ordinary arms-length transactions, but fall short of mergers. A joint venture is a separate entity owned by two or more firms. As such, joint ventures make up a subset of strategic alliances.

In defining strategic alliances, it is helpful to distinguish between alliances and mergers. Mergers unite separate businesses into single decision-making entities; on the other hand, while alliances combine some of the resources of different firms, the firms, themselves, remain separate entities with the ability to make decisions independently. Mergers are designed to be permanent, while alliances are typically of limited duration (even if there is no specifically stated time limit). Finally, in the case of horizontal mergers, competition between the merged entities is completely eliminated; with alliances

among competitors, however, the potential for competition, if not always competition itself, is preserved.

It is similarly helpful to distinguish between alliances and cartels. While in some respects a cartel could be considered a type of alliance, this report considers cartels as a separate entity. Here, the essential difference stems from the purpose of the relationship. When firms form cartels, their primary goal is to subvert competition -- to jointly control price or output to realize monopoly profits. When firms establish alliances, however, their primary objective is to enhance their competitiveness by combining their resources with the resources of other firms.<sup>1</sup>

### **1.1.2: The Proliferation of Strategic Alliances**

The last two decades have witnessed an unprecedented acceleration in the pace of alliance activity. Alliance activity is difficult to quantify as firms are not required to report all of their relationships; most of the data on alliance formation is derived from press reports which tend to be weighted towards large organizations. Nevertheless, there is no doubt that the use of alliances is spreading rapidly. One study, for example, asserts that, while only a few hundred were established each year in the 1970's, two thousand alliances were formed in 1990, ten thousand in 1995, and twenty thousand are expected to be established during 2000.<sup>2</sup>

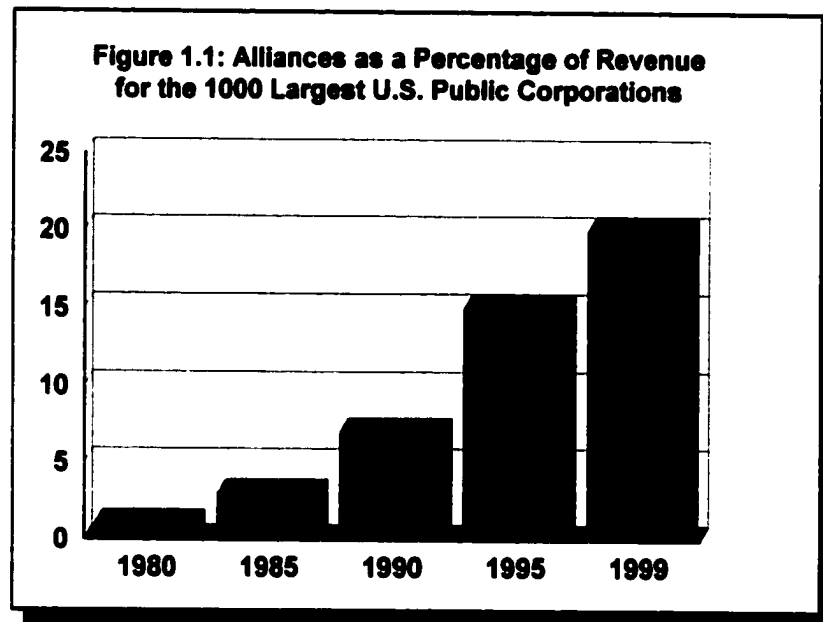
---

<sup>1</sup> This is not to say that alliances do not give rise increased market power or other anticompetitive concerns, only that that they typically have enhanced competitiveness as their primary objective. A group of firms may deceptively call their cartel an alliance, but it is still a cartel.

<sup>2</sup> Harbison, John R., Perkar, Peter Jr., "Cross-Border Alliances in the Age of Collaboration," Booz-Allen & Hamilton Inc. Study, 1995.

Freidheim, Cyrus F., "The Battle of the Alliances," *Management Review*, September, 1999, pp. 46-51.

At the same time, strategic alliances are becoming an ever-more important component of corporations' strategies. Figure 1.1 illustrates the percentage of the 1,000 largest U.S. public companies' revenue derived from strategic alliances.



The percentage of revenue generated from alliances has increased 2,000% over the last two decades.<sup>3</sup>

This alliance revolution is very broad-based, extending across many industries. The industries most active in alliances include telecommunications, computer hardware and software, electronics, entertainment and multimedia, biotechnology and pharmaceuticals, energy, oil and gas, commercial aviation, financial services, public accounting and other business services, mining, and automobiles.<sup>4</sup> These

<sup>3</sup> *Ibid.*

<sup>4</sup> Magun, Sunder, "The Development of Strategic Alliances in Canadian Industries: A Micro Analysis," Industry Canada, Working Paper Number 13, October 1996.

Harbison, John R., Perkar, Peter Jr., "Cross-Border Alliances in the Age of Collaboration," Booz-Allen & Hamilton Inc., 1995.

alliance-intensive industries span the entire private sector of the economy -- resources, manufacturing, and services -- and include both young research-intensive industries and mature markets.

### **1.1.3: Classification of Alliances**

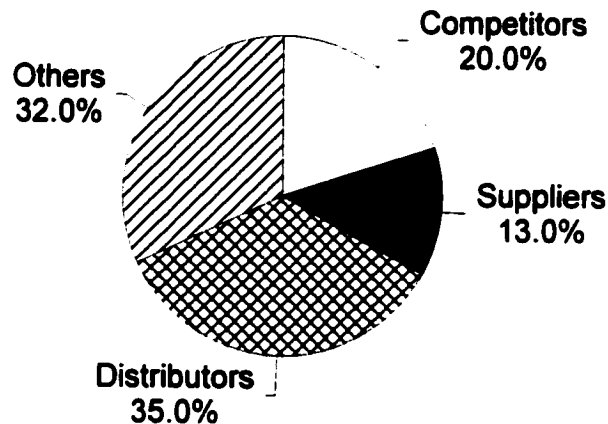
Like mergers, strategic alliances can be classified according to the operational relationships that exist among their partners. A conglomerate alliance is a co-operative relationship among firms in different industries. Such alliances typically converge the expertise associated with producing two or more different products into a single new product. There are numerous multimedia alliances, for example, in which software developers combine their technology with entertainment firms. A vertical alliance is a partnership among firms along different levels of the supply chain of the same industry. For example, Ford Motor has an alliance with supplier Seimens Automotive, where they jointly develop components for Ford's electric vehicle program.<sup>5</sup> A horizontal alliance is a co-operative relationship among firms competing at the same supply level in the same industry. Competitors Ford and Mazda have a wide-ranging horizontal alliance in which they jointly design, produce, and distribute certain vehicles. Figure 1.2 illustrates the distribution of alliances among Canadian companies according to the operational relationships of the partners.

---

Freidheim, Cyrus F., "The Battle of the Alliances," *Management Review*, September, 1999, pp. 46-51.

<sup>5</sup> "Suppliers on Board", *Ward's Auto World*, July 1996, p.63.

**Figure 1.2: Distribution of Alliances of Canadian Corporations According to Operational Relationships, 1995**



Source: Magun, Sunder, "The Development of Strategic Alliances in Canadian Industries: A Micro Analysis," Industry Canada, Working Paper Number 13, October 1996, p.25.

Because horizontal alliances, like horizontal mergers, have the greatest potential to affect the structure and competitiveness of markets, this study will focus primarily on horizontal alliances. As the above figure illustrates, these constitute a minority of all alliances. Thus, simply given the operational relationship among most alliance partners, it would appear that the majority of alliances do not create significant anticompetitive concerns.

Strategic alliances can also be classified according to the function which they perform. The most common types of alliances include the following:

1. a joint production venture is a separate entity created by two or more firms to produce a product,
2. a joint research venture is a separate entity created by two or more firms to conduct research,
3. a technology swap is an alliance which involves the sharing of technology,

4. a joint marketing agreement is an co-operative agreement to jointly promote or sell partners' products, and
5. a distribution agreement occurs when firms share distribution systems.

#### **1.1.4: Motives for Forming Strategic Alliances**

Firms establish alliances to realize strategic objectives by sharing resources with other organizations. These strategic objectives include the following:

1. gaining access to new geographic and product markets
2. gaining access to new technologies or resources
3. achieving economies of scale and scope
4. reducing financial risks
5. integrating markets and technologies
6. increasing the rate of new product or process development
7. reducing the cost or risk of research and development
8. achieving cost competitiveness.<sup>6</sup>

Alliances can affect both inputs and final products. For example, two firms might establish a joint purchasing agreement so they can obtain volume discounts through joint purchases from their suppliers and, in so doing, lower the cost of their inputs. On the other hand, the two firms could establish a joint production venture which enables them to realize plant level scale economies and lower the production costs of their final products.

---

<sup>6</sup> Magun, Sunder, "The Development of Strategic Alliances in Canadian Industries: A Micro Analysis," Industry Canada, Working Paper Number 13, October 1996.

### **1.1.5: Complementary Capabilities**

The success of an alliance often depends upon how well its partners' capabilities complement each other and on the alliance's ability to harness these capabilities.

Complementary capabilities are the expertise and resources that allow partners to achieve through their alliances what they could not independently. For an illustrative example, consider the multimedia industry. A film production company might possess the content and skills to develop entertaining programming, but might lack the software development proficiency to present it in an interactive computer format. Likewise, a software developer might possess the computer expertise, but lack the ability to produce entertaining content. Clearly, these two firms possess complementary capabilities. Only by uniting through a strategic alliance can they obtain the requirements for producing multimedia entertainment.

### **1.2: Outline, Existing Literature, and Contribution**

The traditional school of industrial organization asserts that there is a causal relationship among an industry's structure, conduct, and performance. An industry's structure is defined in terms of the number and size distribution of its firms, market concentration, and the extent of entry barriers. Conduct refers to the strategies -- pricing, product differentiation, innovative development, etc. -- that firms employ. An industry's conduct is partly determined by its structure. For example, there is a greater likelihood that firms will collude if they operate in a market with high concentration and high entry barriers than if they operate in a market with low concentration and low entry barriers. An industry's performance refers to its static efficiency, its ability to provide consumers with

goods and services at the lowest possible cost, and its dynamic efficiency, its ability to create and develop new products and processes or make improvements on existing ones. The conduct of an industry's firms will determine its performance. For example, a market where prices are set above marginal costs will be allocatively inefficient. Thus, market performance is determined by the conduct of firms, which, in turn is influenced by market structure. One of this paper's principal objectives is to examine how strategic alliances relate to the structure-conduct-performance paradigm.

Given the widespread proliferation of strategic alliances throughout numerous industries, the nature and extent of alliance formation has to be considered an essential component of an industry's structure. Chapter 2, *The Structure of Cooperation*, provides a framework for analysing an industry's alliance formation. Previous studies by Gomes-Casseres and Suarez-Villa describe the tendency of firms to ally into clusters (also called alliance constellations or networks).<sup>7</sup> These authors describe the characteristics of alliance clusters, including the internal structures which may evolve, and observe that the alliance cluster often displaces the firm as the primary competitive unit. Gulati offers an explanation as to why firms tend to ally into clusters.<sup>8</sup> The social relationships of existing alliances help to build trust among partners; thus, when a firm seeks a partner for a new

---

<sup>7</sup> Suarez-Villa, Luis, "The Structures of Cooperation: Downscaling, Outsourcing and the Networked Alliance," *Small Business Economics*, 10: 5-16, 1998.

Gomes-Casseres, Benjamin, "Alliance Strategies of Small Firms," *Small Business Economics*, 9: 33-44, 1997.

Gomes-Casseres, Benjamin, *The Alliance Revolution: The New Shape of Business Rivalry*, Harvard University Press, Cambridge, Massachusetts, 1996.

<sup>8</sup> Gulati, Ranjay, "Social Structure and Alliance Formation Patterns: A Longitudinal Analysis," *Administrative Science Quarterly*, Vol. 40, Issue 4, Dec. 1995, p. 619.

Gulati, Ranjay, "Alliances and Networks," *Strategic Management Journal*, Vol. 19, 1998, pp.293-317.



alliance, it can reduce the risk of choosing an untrustworthy partner by choosing one with which the firm or its existing partners have an existing relationship.

Chapter 2 expands on these insights by distinguishing between two types of alliance formation. The framework introduced includes, not only the clustered structure, but the amorphous structure, where there are few discernible patterns of alliance formation, and more important, the firm (not the cluster) remains the primary competitive unit. An additional explanation of alliance clustering is offered based on the extent of interdependence among competitor/partners created by their alliances. The characteristics distinguishing clustered from amorphous alliance formation are discussed as they arise from this alliance-created interdependence. Finally, a simple Cournot model of the competitive effects of alliances is introduced. The model produces results similar to a more sophisticated model developed by Reynolds and Snapp, essentially that competitor collaborations can reduce competition, even in the absence of collusion.<sup>9</sup> However, the model presented here relates the reduction in competitor/partners' willingness to compete to increased levels of alliance-created interdependence. Given that interdependence also leads to alliance clustering, this helps to explain why cluster-partners typically do not compete with one another and, therefore, under clustered alliance formation, the cluster rather than the firm becomes the primary competitive unit.

The next two chapters discuss how strategic alliances affect the evolution of other aspects of market structure - entry and concentration. To date, analysis of the effects of strategic alliances on these dimensions of market structure has been scarce.

---

<sup>9</sup> Reynolds, Robert J. And Snapp, Bruce R., "The Competitive Effects of Partial Equity Interests and Joint Ventures," *International Journal of Industrial Organization*, 1986, pp. 141-154.

Gomes-Casseres observes that, while the formation of alliance constellations tends to reduce the number of competitors in a market, constellations of small firms can become effective competitors to dominant individual firms. He argues that, since dominant firms tend to shun alliances, the likely overall effect of alliances is to enhance rivalry.<sup>10</sup> Finally, Gomes-Casseres discusses the "paradox of barriers to collaboration." Alliances can enhance entry by helping firms acquire the required capabilities; however, widespread alliance formation can block entry by foreclosing further opportunities for sharing capabilities.<sup>11</sup>

Chapters 3 and 4 expand on this analysis by placing alliances into the framework of centripetal and centrifugal market forces developed by J.M. Blair.<sup>12</sup> According to Blair, there is a struggle between two opposing sets of environmental forces over the structure of industry. On one side are the centripetal forces: those that have a centralizing effect on industry leading to higher concentration levels and lessened competition. Common centripetal forces include mergers and acquisitions, regulation, tariffs and other trade barriers, predation, and new technologies favoring large scale economies. Opposed to the centripetal forces are the centrifugal forces: those that have a decentralizing effect on industry, lowering concentration levels and enhancing competition. Common centrifugal forces include competition policy, the globalization of markets, the acceleration of innovation, and deregulation. These two sets of forces act against one another to determine the market structure of various industries. Those industries in which the

---

<sup>10</sup>Gomes-Casseres, Benjamin, *The Alliance Revolution: The New Shape of Business Rivalry*, Chapter 5, "Alliances and the Organization of Industry," Harvard University Press, Cambridge, Massachusetts, 1996.

<sup>11</sup>*Ibid.*

<sup>12</sup>Blair, John M., *Economic Concentration: Structure, Behavior and Public Policy*, Harcourt Brace Jovanovich, Inc., New York, 1972.

centripetal forces are strong will generally be highly concentrated, while those in which there are strong centrifugal forces will generally have lower concentration levels.

Chapter 3, *Virtual Bigness*, introduces an explanation for the recent proliferation of alliance activity. Although alliances have been used as a business strategy for decades, they have only recently become widespread. One explanation for this phenomenon is that alliances are a strategic response to the development of two sets of opposing environmental forces. One set of forces pushes firms to become larger; these include globalization, information technology that requires greater economies of scale and scope, rising research and development costs, network effects, and market convergence. The other set pushes firms to remain or become small. These forces include rapidly changing technology and market conditions which require firms to remain flexible and maintain specialized focuses. Strategic alliances allow firms to respond to both sets of opposing forces; by providing small firms with the resources of larger organizations, alliances help such firms become virtually big without having to become actually big. The concept of *virtual bigness* is introduced which helps to explain the recent expansion of alliance activity.

Chapter 3 also describes how strategic alliances and virtual bigness affect the evolution of market concentration. Whether or not virtual bigness is a centripetal or centrifugal force depends, greatly, on whether alliance formation in the industry under consideration is amorphous or clustered. In markets where alliance formation is clustered, virtual bigness can act centripetally, as alliance clusters typically reduce the number of real or potential competitors, or it can act centrifugally as alliance clusters create effective competitors for dominant firms. In markets where alliance formation is amorphous,

however, alliances typically do not reduce the number of competitors, and because virtual bigness provides small firms with the advantages of large firms without actually having to become large, alliances act as substitutes for internal growth and mergers. Thus, by preventing the increased concentration that otherwise would occur through mergers or internal growth, virtual bigness acts as a centrifugal market force when alliance formation is amorphous.

Chapter 4 describes the impact of strategic alliances on entry. Here, alliances can be either centrifugal, entry promoting, or centripetal, entry inhibiting. Alliances can promote entry by providing firms with the resources they require to gain access to new geographic and product markets. As alliance formation in an industry becomes more widespread, however, existing alliances can raise entry barriers. Potential entrants may need to establish their own alliances to obtain the resources to effectively compete with incumbents; but, particularly if alliance formation is clustered and widespread, they may be unable to find a suitable partner. Thus, while alliances help to promote entry when alliance formation is amorphous or unextensive, they can inhibit entry when alliance formation is clustered or widespread.

One topic which, unlike the effect of alliances on market structure, has received considerable attention is the impact of strategic alliances on innovation. Chapter 5, *Strategic Alliances and Innovation*, provides an overview of this research, most of which has shown that alliances can greatly enhance innovation. Alliances enable small, specialized, research-intensive firms to survive and appropriate their innovation costs; they allow firms to pool their research efforts so that they can diffuse cost and risk and eliminate wasteful duplication. A model by D'Aspremont and Jacquemin provides an

example which illustrates that, when spillovers are significant, co-operative research and development, along with competition in the output market, is greater than competitive research and development. Furthermore, the model finds that cooperative research with competition in the product market is more profitable than competitive research, so firms have a natural incentive to establish such R&D joint ventures.<sup>13</sup> Thus, research alliances can help promote a more efficient level of innovation by internalizing R&D externalities, while retaining competition in the product market. Inkpen demonstrates that long-term alliances are an effective means of transferring tacit knowledge, allowing more rapid diffusion of innovation.<sup>14</sup> Jorde and Teece discuss the importance of alliances, not just in research and development but in the production of innovative products, in assisting innovators to appropriate their research costs.<sup>15</sup> Smith, Jorde and Teece describe the importance of maintaining long-term alliances to provide innovators with the continuous feedback and intercorporate brainstorming mechanisms they require under the simultaneous model of innovation.<sup>16</sup>

---

<sup>13</sup>D'Aspremont, Claude and Jacquemin, Alexis, "Cooperative and Noncooperative R&D in Duopoly with Spillovers," *American Economic Review*, Dec. 1988, pp. 1133-1137.

<sup>14</sup>Inkpen, Andrew, "Learning and Knowledge Acquisition through International Strategic Alliances," *Academy of Management Executive*, Vol. 12, No. 4, 1998, pp. 69-80.

<sup>15</sup>Jorde, Thomas M. and Teece, David J., "Innovation and Cooperation, Implications for Competition and Antitrust," *Journal of Economic Perspectives*, Volume 4, Number 3, Summer 1990, pp. 147-149; Jorde, Thomas M. and Teece, David J., "Rule of Reason Analysis of Horizontal Arrangements: Agreements Designed to Advance Innovation and Commercialize Technology," Comments made to the *FTC Joint Venture Hearings*.

<sup>16</sup>Smith, Keith, "New Directions in Research and Technology Policy: Identifying the Key Issues," STEP (Studies in Technology, Innovation, and Economic Policy) Group Report, Oslo, May 1994.

Jorde, Thomas M. and Teece, David J., "Innovation and Cooperation, Implications for Competition and Antitrust," *Journal of Economic Perspectives*, Volume 4, Number 3, Summer 1990, pp. 142-146.

In addition to describing these direct effects of alliances on innovation, Chapter 5 introduces a potential indirect effect, resulting from the centrifugal nature of many alliances. Scherer first studied the relationship between innovation and firm size and found the relationship to be ambiguous.<sup>17</sup> More recently, however, Acs and Audretsch provide evidence that small firms and competitive markets are more innovative.<sup>18</sup> The centrifugal nature of many alliances further promotes innovation by enabling small, flexible firms to survive and by reducing concentration to maintain the competitiveness of markets.

Chapter 5 also acknowledges the effect of alliance-promoted innovation on market structure. Innovation accelerates existing products' life-cycles, increasing the rate at which dominant firms decline. Thus, alliances are acting centrifugally to reduce market concentration when they enhance innovation.

Chapters 6 and 7 are case studies on strategic alliances in the global automobile and airline industries. Their objective is to illustrate how the concepts developed in the previous chapters relate to actual markets. The choice of automobiles and airlines for the case studies is significant, as the impact of strategic alliances on market structure, conduct, and performance is greatly dependent on whether alliance formation is amorphous or clustered. The case study of the automobile industry provides an opportunity to assess the impact of alliances when formation is primarily amorphous,

---

<sup>17</sup> Scherer, F. M., *Industrial Market Structure and Economic Performance*, Houghton Mifflin Company, Boston, 1990. pp. 644-660.

<sup>18</sup> Acs, Zoltan J. and Audretsch, David B., "Innovation in Large and Small Firms: An Empirical Ananalysis," *The American Economic Review*, Vol. 78, No. 4, Sept. 1988, pp. 678-690; Acs, Zoltan J. and Audretsch, David B., *Innovation and Small Firms*, The MIT Press, Cambridge Massachusetts, 1990, pp. 37-77.

while the airline industry allows for an examination of the effects of clustered alliance formation.

Chapter 8, *Antitrust Treatment of Alliances*, is a discussion of how antitrust should deal with strategic alliances. The principal problem is to find the correct balance between overly lenient enforcement, which could result in the accumulation and abuse of joint market power, and overly strict enforcement, frightening firms from establishing legitimate alliances which would otherwise have benefited consumers. The first legislative attempt to attack this problem, the National Cooperative Research and Production Act, is discussed, along with the Federal Trade Commission's and Justice Department's recently released Competitor Collaboration Guidelines. These guidelines are assessed in accordance with the findings of the previous chapters.

## **Chapter 2: The Structure of Co-operation**

### **2.1: Patterns of Alliance Formation: Clustered and Amorphous Alliance Structures**

The proliferation of strategic alliances described in the introductory chapter has been so widespread that the patterns and the extent of alliance formation should now be considered an essential part of the analysis of industry structure. Studies by Gomes-Casseres and Suarez-Villa describe how firms often ally into constellations or clusters.<sup>1</sup> This chapter expands on the work of these authors by developing a more complete framework for assessing the structure of alliance formation. It is proposed to classify alliance formation into two distinct types of structural framework; along with the clustered structure, the amorphous structure is introduced, and the distinguishing characteristics of each type are described.

The principal difference between the two types of alliance formation is that with the clustered structure, constellations of allied firms evolve to compete with other constellations of alliances, while with the amorphous structure, alliance formation follows no discernible pattern, and the individual firms, themselves, remain competitors.

---

<sup>1</sup> Suarez-Villa, Luis, "The Structures of Cooperation: Downscaling, Outsourcing and the Networked Alliance," *Small Business Economics*, 10: 5-16, 1998.

Gomes-Casseres, Benjamin, "Alliance Strategies of Small Firms," *Small Business Economics*, 9: 33-44, 1997.

Gomes-Casseres, Benjamin, *The Alliance Revolution: The New Shape of Business Rivalry*, Harvard University Press, Cambridge, Massachusetts, 1996.



### 2.1.1: The Clustered Alliance Structure

The clustered structure is typified by constellations of allied firms, with little or no cooperation among firms in different clusters.<sup>2</sup> Figure 2.1 provides examples of clustered alliance formations. The diagram shows three distinct clusters of alliances (the circles represent firms and the lines represent alliances). Each cluster can, itself, take a separate form. In type-A cluster, for example, there is a single central firm that acts as a coordinating nucleus of the activities of the cluster. Despite the central firm's coordinating activities, the firms in this cluster are equals -- no one firm dominates the cluster's decisions (illustrated by circles of the same size). In type-B cluster, there is a central firm coordinating the cluster's activities; however, in this case, that central firm also dominates alliance decision-making (illustrated by the larger circle). In type-C cluster, there is no central firm coordinating activities. Decisions in this cluster are made jointly among all of the clusters' partners or on a bilateral basis between partners in single alliances.<sup>3</sup>

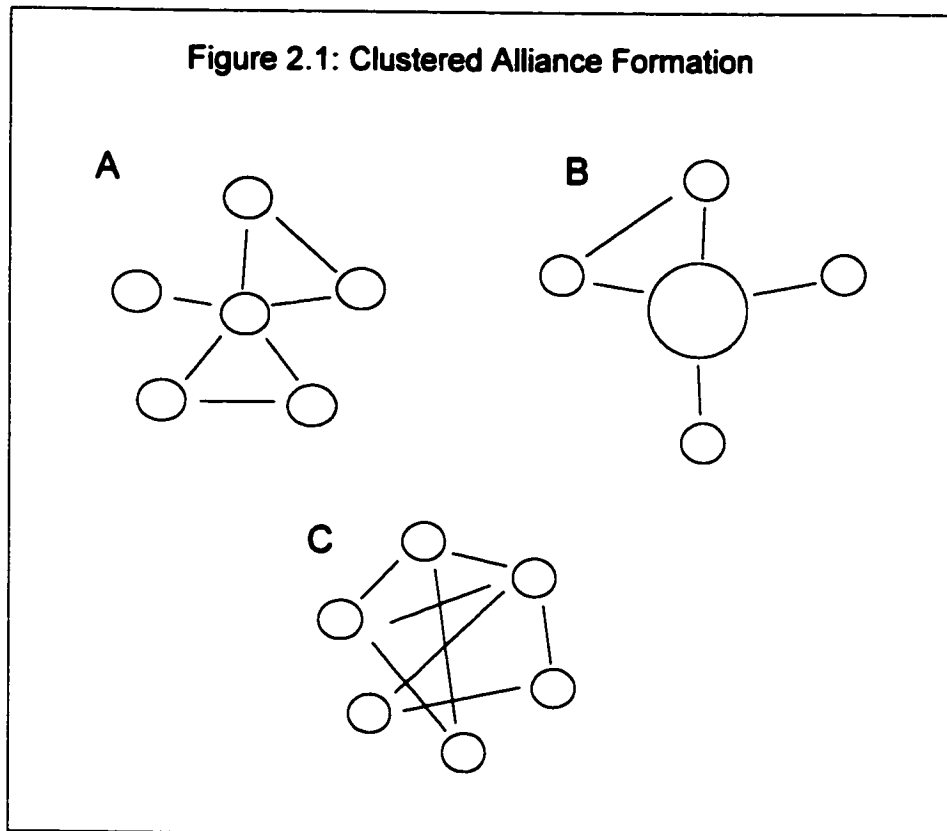
---

<sup>2</sup> Suarez-Villa, Luis, "The Structures of Cooperation: Downscaling, Outsourcing and the Networked Alliance," *Small Business Economics*, 10: 5-16, 1998.

Gomes-Casseres, Benjamin, "Alliance Strategies of Small Firms," *Small Business Economics*, 9: 33-44, 1997.

Gomes-Casseres, Benjamin, *The Alliance Revolution: The New Shape of Business Rivalry*, Harvard University Press, Cambridge, Massachusetts, 1996.

<sup>3</sup> The type-C cluster differs from the amorphous structure described below. The type-C cluster represents only part of the firms in the industry, and firms within the cluster typically do not compete against one another, but, rather, against other firms and clusters. This is not the case in the amorphous structure of alliance formation.



One of the factors which determines firms propensity to cluster is the level of interdependence alliances create among their partners. Clustered alliance formation tends to prevail in markets where such interdependence is high (Section 2.2 below presents a model which illustrates the relationship between alliance-created interdependence and the propensity of firms to cluster.). There are two general types of market environments where clustering occurs. The first is in industries where there are extensive networks, such as in the airline or telecommunications industries. Each partner in a cluster of alliances typically owns a smaller “subnetwork.” The alliance cluster unites these small subnetworks to create a single, extensive network. Here, interdependence is high because alliances provide firms with valuable scale economies and network externalities which

could not be realized independently. The second environment where the clustered structure is prevalent is in markets that have been created from a convergence of technologies - such as in the multimedia and communications satellite industries.<sup>4</sup> Each firm in the cluster typically contributes specific expertise from its own specialized field. Forming a cluster of alliances with firms whose specialized expertise complements their own allows firms to develop and produce products for the new converging market. With convergence alliances, interdependence is high because each firm is dependent on its partners to provide the expertise it requires to compete in the converging market.

The level of dependence on the alliance cluster can vary from firm to firm. In network alliances, for example, a firm that owns only a small part of the overall network will be more dependent on the cluster than a firm that owns a large part; the small firm has more to lose from leaving the cluster than the large one. Additionally, large firms may possess the resources to expand their own networks in the case of network alliances, or to purchase the technology they need to exploit converging markets independently. Thus, large firms may not be as reliant on their alliances as small firms.<sup>5</sup> This unbalanced level of dependence can create a strategic advantage for some partners over others, which can lead to situations (such as in cluster B in Figure 2.1) where one or two large firms dominate an alliance cluster.

---

<sup>4</sup> Converging markets are those which combine the technologies or capabilities of traditionally separate industries to form a new industry, often replacing the two traditional markets. Multimedia, for example combines the capabilities of the software development industry with the visual and audio entertainment industries to create entirely new interactive computer entertainment products.

<sup>5</sup> This explains why dominant firms tend to shun alliances. See Gomes-Casseres, Benjamin, "Alliance Strategies of Small Firms," *Small Business Economics*, 9: 33-44, 1997.

The interdependence associated alliance clusters can be self-reinforcing. Section 2.2.1 below presents a model which illustrates that, when interdependence is high, firms are more likely to fortify existing relationships than to establish new alliances. The expansion of existing alliances further increases the level of interdependence associated with alliance clusters, and expands clustered alliance activity into a much broader range of functions.

The high level of interdependence associated with alliance clusters can reduce partners' willingness to compete with one another. When a firm's success becomes increasingly dependent upon its competitor/partner's success, the firm will be less likely to compete rigorously, lest by weakening its partner, the firm indirectly weakens itself.<sup>6</sup>

Because high levels of interdependence can reduce firms' willingness to compete, with the clustered alliance structure, where alliance-created interdependence tends to be high, most firms do not compete on their own. Rather, clusters of alliances typically compete with other clusters (or with nonallied firms). In Figure 2.1, for example, even though there are seventeen separate firms in the market, there are only three distinct competing entities. Thus, alliance clusters can, though not necessarily, reduce the number of real or potential competitors.

Entry into an alliance cluster can be quite difficult, as the acceptance of a new partner can require the approval of more than one firm. Each firm in the cluster (or at least the firms with the decision-making power) must perceive that it will benefit before a new partner is accepted into the cluster. Thus, alliance clusters can act as barriers to entry

---

<sup>6</sup> Section 2.3 below presents a model which illustrates how alliance-created interdependence can affect partners' willingness to compete.

of new alliances. Likewise, exit from an alliance cluster is relatively difficult. The greater dependence among cluster partners makes it less likely that firms will leave their clusters (particularly given that joining a new cluster can be so difficult).

Because both entry to and exit from alliance clusters is difficult, the structure of clustered alliance formation tends to be relatively stable over time. Firms generally do not abandon their existing alliances to establish new ones on a regular basis but, rather, tend to stick to their alliance cluster once it has been established. The international airline industry provides an illustrative example of the clustered alliance structure.<sup>7</sup>

### **2.1.2: The Amorphous Structure of Alliance Formation**

It is proposed to call the second general form of alliance formation the amorphous structure, which is alliance formation that lacks any specific type of pattern. In the amorphous structure, the firms in the industry do not converge to form separate groups of alliances; rather, firms establish alliances with any of the other firms in the industry, regardless of the alliances which these firms already have. While partners cooperate on specific business functions, they generally continue to compete directly against one another.

Firms in industries where amorphous alliance formation is prevalent tend to be less dependent upon their alliances for their success; alliances tend to be limited to specific tasks. While choosing to cooperate on these specific functions, individual firms generally retain their ability to compete independently. As the degree of partner

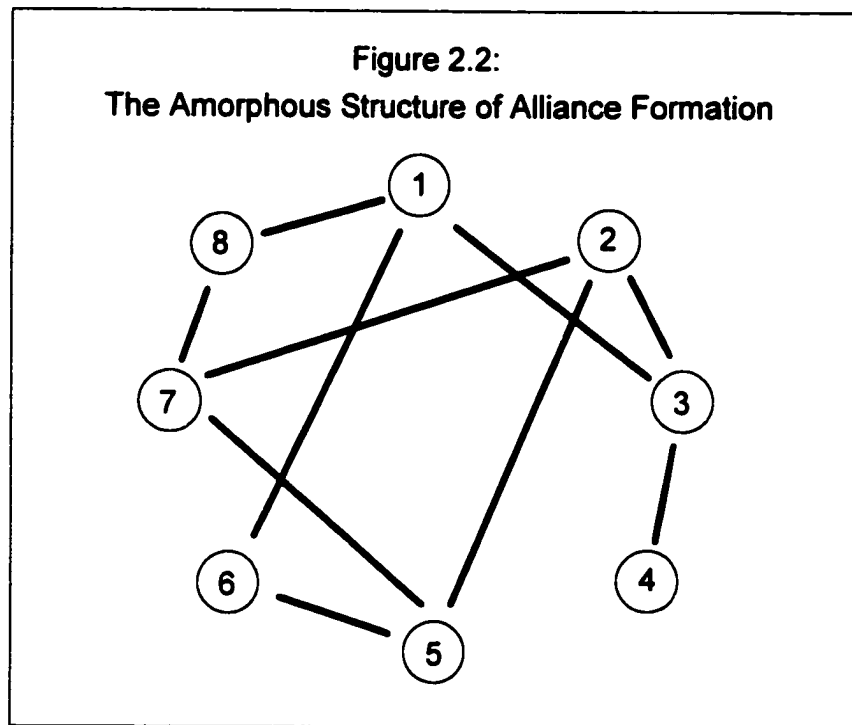
---

<sup>7</sup> See Chapter 7, *Strategic Alliances in the International Airline Industry*

interdependence is relatively low, partners typically retain their willingness to compete and remain competitors in the marketplace -- if they were to become too dependent upon their alliances, their competitor/partners could use the threat of breaking up the alliances to gain an advantage.

Because the amorphous structure of alliance formation involves less dependence, it is easier for firms to terminate a relationship if the alliance has run its course, or if the perceived benefits have not materialized. Entry into new alliances is also easier, as the formation of a new alliance doesn't require the consent of the existing allied firms. As both entry to and exit from alliances are relatively easy, the structure of amorphous alliance formation tends to be relatively unstable over time with continuous creation of new alliances and termination of old ones.

Figure 2.2 illustrates the amorphous structure of alliance formation. The firms in the industry are represented by circles, and the alliances are represented by the lines joining the firms. There is no discernible pattern of alliance formation. Notice that there is no direct relationship/interdependence between firms 1 and 2, 4 and 5, 6 and 7, etc.



The automobile industry provides an illustrative example of an amorphous alliance structure.<sup>8</sup>

---

<sup>8</sup> See Section 6.2 of Chapter 6, *Strategic Alliances in the Automobile Industry*.

<b>Table 2.1: A Summary of the Characteristics of the Amorphous and Clustered Structures</b>		
	<b>Amorphous</b>	<b>Clustered</b>
<b>Level of Partner Interdependence</b>	less interdependence	more interdependence
<b>Extent of Co-operation</b>	task-specific cooperation	more extensive cooperation
<b>Extent of Competition Among Alliance Partners</b>	partners generally retain their willingness to compete and to remain as competitors	partners generally lose their willingness to compete and unite to create a single competitor
<b>Ease of alliance Entry and Exit</b>	easier entry to and exit from alliances	more difficult entry and exit to and from alliances
<b>Stability of Alliance Structure</b>	constantly shifting structure as new alliances are established and old alliances terminated	relatively stable alliance structure
<b>Examples</b>	automobiles steel chemicals oil and gas	airlines telecommunication services shipping multimedia

The above analysis has classified alliance formation into two distinct categories.

However, actual alliance formation may not always follow a strict dichotomous pattern of either amorphous or clustered; rather, alliance formation may exist somewhere along a continuum between the two. In the airline industry, for example, even though large international alliance clusters predominate, there still exist numerous bilateral agreements which exhibit the characteristics of amorphous alliance formation. Similarly, although alliance formation in the automobile industry is mostly amorphous, some relationships (G.M.-Isuzu, Ford-Mazda) possess characteristics ordinarily associated with clusters. While, actual alliance formation may not always fit neatly into one extreme or the other,



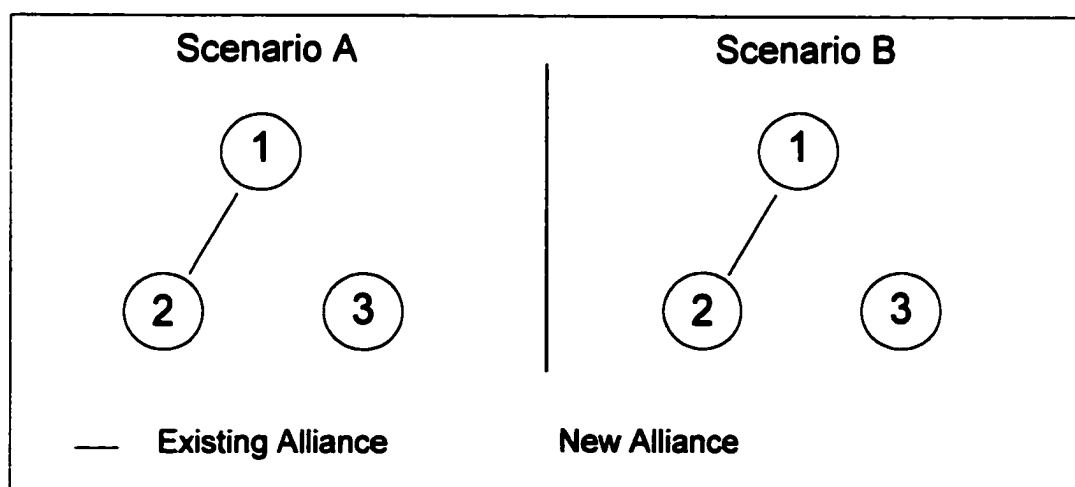
it is still possible to identify which pattern predominates so that classification as amorphous or clustered provides a useful conceptual framework for assessing the structure of an industry's alliance formation.

## 2.2: The Propensity to Cluster

Why do the firms in some industries form alliance clusters? To answer this question, the process of partner selection must be examined. Clusters materialize when firms choose to either strengthen associations with their existing partners, or to ally with firms with which their partners have preexisting relationships.

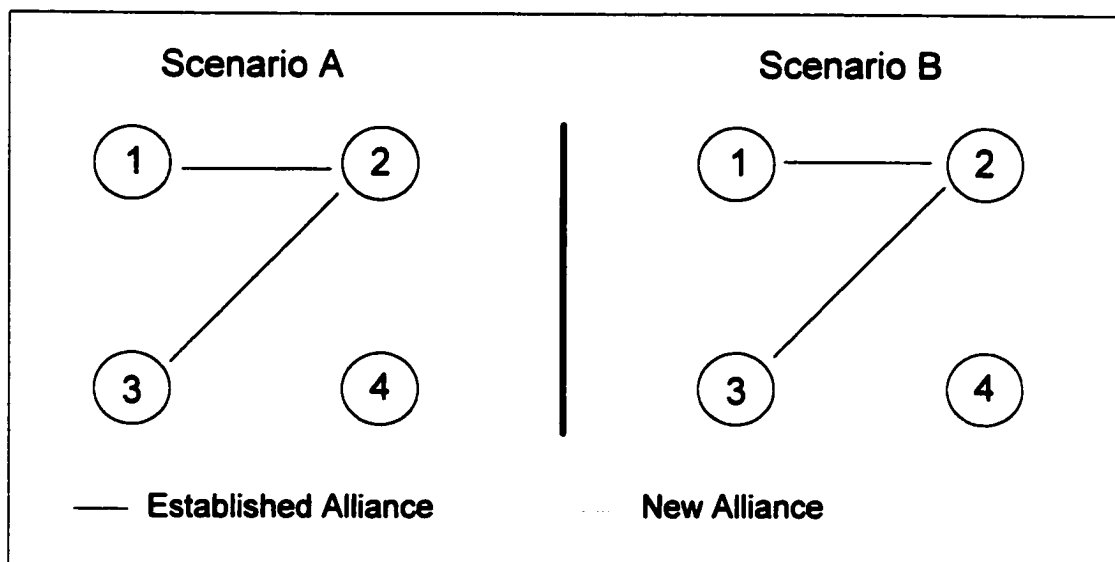
Figure 2.3 illustrates the first case. Suppose firm 1 has an existing alliance, and has decided to establish a new alliance. It can choose to either strengthen its relationship with its existing partner, firm 2, as depicted by Scenario B, or it can form a new alliance with an independent firm 3 - Scenario A. The choice of Scenario B is akin to clustering as it strengthens an existing relationship, while other firms are excluded from the group..

**Figure 2.3: The Choice between an Existing or a New Partner**



Clusters also materialize when firms choose to ally with firms with which their partners have existing relationships. Figure 2.4 illustrates this case. Suppose there are two preexisting alliances, one between firms 1 and 2, and another between firms 2 and 3. Firm 1 has decided to establish a new alliance, but its existing partner lacks the complementary capabilities required to make the alliance a success; thus, the choice of a partner for the alliance lies between firms 3 and 4. If firm 1 chooses to ally with its existing partner's partner, firm 3 (depicted by Scenario B), it will establish an alliance cluster; the interrelationship between firms 1, 2, and 3 will strengthen to the exclusion of firm 4.

**Figure 2.4: The Choice Between a New Partner or an Existing Partner's Partner**



One explanation of clustered alliance formation is that clustering is a response to firms' desire to reduce the uncertainty involved in selecting a new partner. Lack of information with respect to both the capabilities and trustworthiness of potential partners adds considerably to the risk of alliance formation. However, Gulati argues that

pre-existing alliances act as social networks which provide firms with such information, thus making potential partners aware of alliance opportunities and lowering alliance risk.<sup>9</sup> If two firms are engaged in a successful pre-existing alliance, then they will have accumulated valuable information regarding each others' capabilities, along with a certain degree of mutual trust. As such information reduces the risk of partner selection, given a choice between establishing an alliance with either a new partner or an existing one, other things being equal, a firm will choose to form the new alliance with its existing partner: i.e., the firm will choose Scenario B over Scenario A in Figure 2.3. Similarly, if each of two potential partners share a separate alliance with a third partner, they will have better access to information regarding the capabilities and trustworthiness of each other than if they did not have such pre-existing relationships. Therefore, given the choice between allying with a partners' partner or a firm with which it has no direct or indirect pre-existing relationship, a firm will choose to ally with an existing partner's partner (Scenario B over Scenario A in Figure 2.4).<sup>10</sup> Thus, the formation of alliance clusters can be partially explained by firms' use of existing alliances as social networks to reduce the risk associated with partner selection.

A supplemental explanation of clustered alliance formation is introduced here. This explanation suggests that when partner interdependence is high, it is more profitable for a firm to form alliances that strengthen existing partners than to form alliances with firms with which it has no direct or indirect relationships (in this discussion,

---

<sup>9</sup> Gulati, Ranjay, "Social Structure and Alliance Formation Patterns: A Longitudinal Analysis," *Administrative Science Quarterly*, Vol. 40, Issue 4, Dec. 1995, p. 619.

Gulati, Ranjay, "Alliances and Networks," *Strategic Management Journal*, Vol. 19, 1998, pp.293-317.

<sup>10</sup> *Ibid.*

*interdependence* refers to the degree to which the success a particular firm depends upon the success of its alliance partner(s).<sup>11</sup>).

Refer to Figure 2.3 above, which illustrates the choice between an existing or a new partner. Why might firm 1 choose Scenario B over Scenario A? Suppose that the success of the existing alliance between firms 1 and 2 depends upon the success of each partner as a whole. There are a number of circumstances where such an assumption is justified. In a manufacturing joint venture, for example, the ability of the alliance to realize scale economies is dependent upon the ability of the parent firms to sell sufficient quantities of the venture's output (either directly, or as a component in a separate product). In other instances, a partner's ability to commit resources to its alliances might depend on its profitability. As a further example of such dependence, consider international airline alliances. Here, the success of an alliance depends partly upon the overall size of the network of destinations it creates by linking partner airlines (see below). Thus, for an airline alliance to be successful, each partner airline must successfully maintain a broad network of destinations. The success of the alliance as a whole depends upon the success of each individual partner. If the profitability of an alliance depends upon the success of its partners, then, indirectly, the profitability of the partners are themselves interdependent.

Return to the example in Figure 2.3. Suppose that firm 1 has decided to establish a new cooperative venture, and can choose as the partner to this venture either firm 2, its existing partner (Scenario B) or firm 3 with which it has no existing relationship

---

<sup>11</sup>This definition differs slightly from the definition of interdependence given in some of the managerial literature on alliances. There, *interdependence* refers to the extent to which partners' assets complement each others'.

(Scenario A). Assume also that each potential partner possesses identical capabilities to offer the new collaborative venture so that, in the absence of any existing alliances, firm 1 would have no preference over its choice of partner. If firm 1 chooses firm 2 as its partner in the new venture, firm 2 will become more profitable. Given alliance-created interdependence, this will make the existing alliance between firms 1 and 2 more successful, which will further increase firm 1's profitability. If, on the other hand, firm 3 is chosen as the partner in the new venture, firm 1 will not benefit from this positive feedback as it has no existing alliance with firm 3. Thus, other things being equal, it is more profitable for firm 1 to choose Scenario B over Scenario A; it is more profitable to establish the new cooperative venture with its existing partner.

A firm's tendency to make this choice is a function of the extent of the interdependence the existing alliance creates between its partners. If such interdependence is high, then firms will be more likely to strengthen existing relationships than establish new alliances with independent firms. Thus, the tendency to cluster in this fashion will be greater in industries where alliances create a high level of interdependence. As more and more new alliances are added to an existing relationship, the interdependence between the partners will rise, and, consequently, the tendency to fortify existing relationships will also rise. Therefore, the tendency of firms to cluster in this fashion is self-reinforcing.

Now refer to Figure 2.4: the choice between allying with either an existing partner's partner or with a new partner. The reasoning behind the choice to cluster in this fashion is similar to that of choosing to strengthen an existing relationship. As before, assume that both firm 3 and firm 4 are identical in terms of the capabilities they can offer

a new alliance, and suppose that the success of the existing alliances depends upon the success of the alliances' partners. If firm 1 chooses firm 3 as the partner to its new venture, firm 3 will become more profitable. Given the interdependence created by the existing alliances, firm 3's increased profitability will make firm 2's alliance with firm 3 more successful, resulting in increased profitability for firm 2. In turn, this will make firm 1's alliance with firm 2 more successful, resulting in increased profitability for firm 1. If, however, firm 1 establishes its new venture with firm 4, it will not benefit from this feedback effect as there is no array of existing alliances linking firm 4 back to firm 1. Therefore, other things being equal, it is more profitable for firm 1 to choose Scenario B over Scenario A; it is more profitable to establish an alliance cluster than to ally with an independent firm.

Again, the tendency to cluster is a function of the extent of the interdependence the existing alliances create among firms 1, 2, and 3. If the level of interdependence is high, then forming a new alliance with a partner's partner will have a significant positive impact on a firm's own profitability, and thus, clustered alliance formation will prevail. Again, as new alliances increase the level of interdependence, the tendency to cluster is self-reinforcing. If, on the other hand, the level of interdependence created by alliances is low, other considerations in choosing alliance partners (such as how well potential partners' capabilities complement one another) become relatively more important; in such cases of low interdependence, the amorphous structure of alliance formation will prevail.

Sections 2.2.1 and 2.2.2 below introduce two new models which illustrate how the level of partner interdependence can affect a firm's choice of new alliance partners, resulting in the formation of alliance clusters.

### **2.2.1: The Choice Between Strengthening an Existing Relationship Versus Allying with an Independent Firm**

Consider a 3-firm market with a homogenous product and a linear inverse demand function given by:

$D^{-1} = p = \theta - dQ$ , where  $Q = q_1 + q_2 + q_3$ , the sum of the outputs  $q_i$  ( $i=1,2,3$ ) of the three firms.

Each firm's output is subject to an identical constant marginal cost,  $c$ . Firms 1 and 2 have an existing cost-saving alliance. The savings the alliance provides each partner is an increasing linear function of the outputs of the two partners of the form:

$$S = A_i(q_1 + q_2). \quad (i=1,2)$$

Note that the savings an alliance provides each partner are not necessarily the same (hence the need for the subscript,  $i$ ).

Cost savings that increase with joint output might exist in a manufacturing joint venture, for example, where increasing sales by each partner enable the joint venture to obtain greater scale economies. The coefficient,  $A_i$ , represents the level of interdependence created by this existing alliance between firms 1 and 2; the greater the value of  $A_i$ , the greater the extent to which the success of the alliance to firm  $i$  depends upon the output of its partner.

Suppose that, given this initial structure, firm 1 has decided to establish a new alliance which also will provide savings as a linear function of the outputs of the two partners of the form  $B_i(q_i + q_j)$ . Firm 1 must now decide which of the other two firms to choose as its partner in the new alliance. The two alternatives are represented in Figure 2.3 above. In Scenario A, firm 1 chooses to form the new alliance with firm 3, with which it does not have an existing alliance. In Scenario B, firm 1 chooses to fortify its existing relationship by forming the new alliance with firm 2 with which it has an existing alliance.

The three firms engage in a two-stage, non-cooperative game. In the first stage, firm 1 chooses its partner for the new alliance. In the second stage, the three firms choose their outputs so as to maximize their profits. The profit functions for the three firms for each scenario are given below.

**Scenario A:** Firm 1 establishes the new alliance with firm 3, the independent firm:

$$\Pi_1 = (\theta - dQ)q_1 - [cq_1 - A_1(q_1 + q_2) - B_1(q_1 + q_3)]$$

$$\Pi_2 = (\theta - dQ)q_2 - [cq_2 - A_2(q_1 + q_2)]$$

$$\Pi_3 = (\theta - dQ)q_3 - [cq_3 - B_2(q_1 + q_3)]$$

**Scenario B:** Firm 1 establishes the new alliance with firm 2, its preexisting partner:

$$\Pi_1 = (\theta - dQ)q_1 - [cq_1 - A_1(q_1 + q_2) - B_1(q_1 + q_3)]$$

$$\Pi_2 = (\theta - dQ)q_2 - [cq_2 - A_2(q_1 + q_2) - B_2(q_1 + q_2)]$$

$$\Pi_3 = (\theta - dQ)q_3 - cq_3$$



where;

$\Pi_i$   $\equiv$  the profit of firm  $i$

$\theta$   $\equiv$  the intercept of the linear inverse demand function

$Q \equiv q_1 + q_2 + q_3$   $q_i$   $\equiv$  the output of firm  $i$

$c$   $\equiv$  the constant marginal cost of each firm

$d$   $\equiv$  the negative of the slope of the market demand curve

$A_i, B_i$   $\equiv$  the savings coefficients for alliances A and B for firm  $i$

$0 \leq q_i, \theta, c, A_1, A_2, B_1, B_2, d$

The first-order conditions for Scenario A produce reaction functions for firms 1,

2, and 3 respectively as follows:<sup>12</sup>

$$q_1 = \frac{\theta + A_1 + B_1 - c - d(q_2 + q_3)}{2d}$$

$$q_2 = \frac{\theta + A_2 - c - d(q_1 + q_3)}{2d}$$

$$q_3 = \frac{\theta + B_2 - c - d(q_1 + q_2)}{2d}$$

Solving this system yields the following:

$$q_1 = \frac{\theta - c + 3A_1 + 3B_1 - A_2 - B_2}{4d}$$

$$q_2 = \frac{\theta - c + 3B_2 - A_1 - B_1 - A_2}{4d}$$

$$q_3 = \frac{\theta - c + 3B_2 - A_1 - A_2 - B_1}{4d}$$

---

<sup>12</sup> The decision for each firm is to maximize its profits with respect to a single variable, its own output. Therefore, the second-order condition for each profit function requires that  $\frac{\partial^2 \Pi_i}{\partial q_i^2} < 0$ . In each case, this requires that  $d > 0$ , which has been assumed. Note that  $d$  is the negative of the slope of the market demand curve, so the second order condition simply implies that the demand curve is negatively sloped.

These outputs represent the Nash equilibrium for the second subgame for Scenario A.

Given this equilibrium, the profit accruing to firm 1 under Scenario A is as follows:

$$\begin{aligned}\Pi_1^A = & \frac{1}{16d}[\theta^2 + c^2 - 2c\theta + (\theta - c)(10A_1 + 10B_1 - 2A_2 - 2B_2) + A_2^2 + 2B_1B_2 + 6A_1A_2 \\ & - 10B_1A_2 + B_2^2 - 10A_1B_2 + 6B_1B_2 + 5A_1^2 + 10A_1B_1 + 5B_1^2]\end{aligned}$$

The first-order conditions for Scenario B produce reaction functions for firms 1, 2 and 3 respectively as follows:<sup>13</sup>

$$\begin{aligned}q_1 &= \frac{\theta + A_1 + B_1 - c - d(q_2 + q_3)}{2d} \\ q_2 &= \frac{\theta + A_2 + B_2 - c - d(q_1 + q_3)}{2d} \\ q_3 &= \frac{\theta - c - d(q_1 + q_2)}{2d}\end{aligned}$$

Solving this system yields the following equilibrium outputs for the second stage of the game for Scenario B:

$$\begin{aligned}q_1 &= \frac{\theta - c + 3A_1 + 3B_1 - A_2 - B_2}{4d} \\ q_2 &= \frac{\theta - c + 3B_1 + 3B_2 - A_1 - A_1}{4d} \\ q_3 &= \frac{\theta - c - A_1 - A_2 - B_1 - B_2}{4d}\end{aligned}$$

These outputs represent the Nash equilibrium for the second subgame for Scenario B.

Given this equilibrium, the profit accruing to firm 1 under Scenario B is as follows:

$$\begin{aligned}\Pi_1^B = & \frac{1}{16d}[\theta^2 + c^2 - 2c\theta + (\theta - c)(10A_1 + 10B_1 - 2A_2 - 2B_2) + A_2^2 + 2B_1B_2 + 6A_1A_2 \\ & + 6B_1A_2 + B_2^2 + 6A_1B_2 + 6B_1B_2 + 5A_1^2 + 10A_1B_1 + 5B_1^2]\end{aligned}$$

---

<sup>13</sup> The second-order condition for each profit function requires that  $d > 0$ , which has been assumed.

The difference in profit to firm 1 between Scenario A and Scenario B is given by the following:

$$\Pi_1^B - \Pi_1^A = \frac{B_1A_2 + A_1B_2}{d} > 0$$

This difference is greater than zero. Thus, the subgame perfect equilibrium consists of firm 1 choosing to form the new alliance with its existing partner (Scenario B) in the first stage, and the three firms choosing the profit-maximizing outputs shown above under Scenario B in the second stage. Other factors equal, it is more profitable for a firm to fortify an existing partnership than it is to establish a new partnership.

The difference between the profits from the two scenarios,  $(B_1A_2 + A_1B_2)/d$ , represents the tendency of firm 1 to choose to strengthen its existing partnership over establishing a new partnership with the independent firm. This tendency increases as the savings coefficients of the alliances,  $A_1$ ,  $A_2$ ,  $B_1$ , and  $B_2$ , increase. Given the discussion preceding the model, this result is expected, as these coefficients represent the interdependence between partners created by their respective alliances; they are the extent to which the success of each alliance depends upon not only a firm's own output but also the output of its partner. By forming the new alliance with its existing partner, firm 1 increases the output and profit of the partner as determined by the size of  $B_2$ . This increased output of the partner affects firm 1's profit by creating more savings through their existing alliance. The extent to which the increase in the partner's output will

enhance firm 1's profits depends upon the level of interdependence resulting from the existing alliance.

To summarize, this model demonstrates that, given the specified assumptions, there is a natural tendency for firms to choose to fortify existing relationships over establishing new relationships with independent firms. This tendency increases with the level of interdependence the alliances create between partner firms.

### 2.2.2: The Choice Between Forming an Alliance Cluster Versus Allying with an Independent Firm

Consider a four-firm market with a homogeneous product with a linear inverse demand function given by

$$D^{-1} = p = \theta - dQ, \text{ where } Q = q_1 + q_2 + q_3 + q_4, \text{ the sum of the outputs } q_i \\ (i = 1, \dots, 4) \text{ of the four firms respectively.}$$

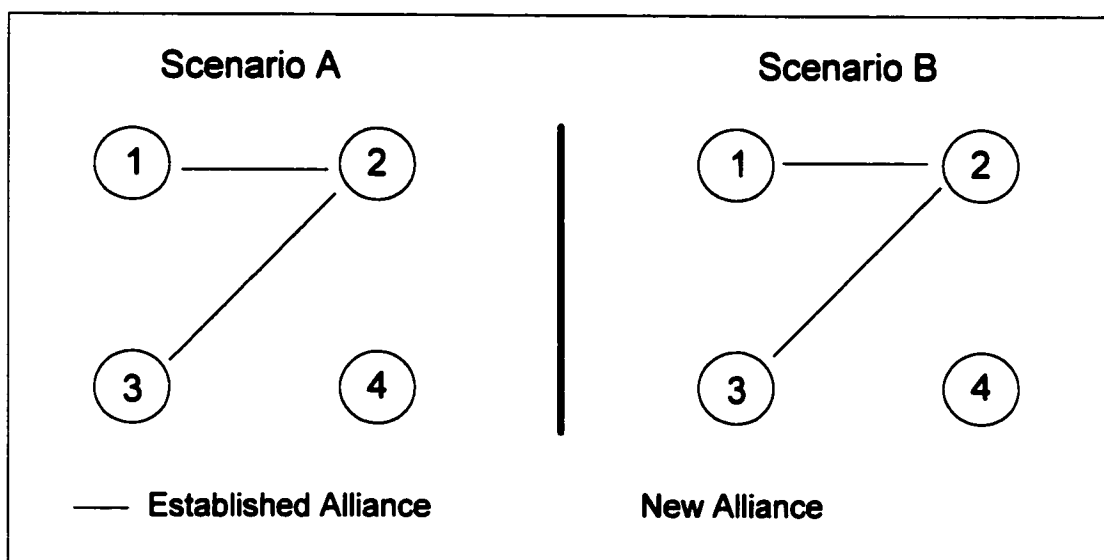
The output of each firm is subject to an identical constant marginal cost,  $c$ . Suppose these firms can engage in cost-saving strategic alliances where, as in the previous model, the savings an alliance provides a firm depend on the outputs of both partners to the alliance. There are two preexisting alliances in the four-firm industry, one between firms 1 and 2, and another between firms 2 and 3. The savings the alliances provide are of the form,  $K(q_i + q_j)$ , with the exception of the effect the existing alliance between firms 2 and 3 has on firm 2, which is of the form  $Kq_2q_3$ .<sup>14</sup> In each specification, the coefficient,  $K$ , represents the extent of interdependence the alliance creates between the two firms: the greater the value of  $K$ , the more a firm's cost savings are dependent upon the output of its partner.

Suppose that firm 1 has an opportunity to establish a new cost-saving alliance, and must choose either firm 3 or firm 4 as the partner to this new alliance. Figure 2.5 illustrates the choice facing firm 1.

---

<sup>14</sup>This different specification is required to produce the desired feedback effect of an increase in firm 3's output increasing firm 2's output. The remaining alliance relations are kept linear to allow a more workable analysis.

**Figure 2.5: Two Scenarios of Alliance Partner Formation**



In Scenario A, firm 1 chooses to form the new alliance with firm 4, with which no firm has a preexisting alliance. By making this choice, firm 1 is perpetuating an amorphous structure of alliance formation. In Scenario B, however, firm 1 chooses to form the new alliance with firm 3, the established partner to its established partner. By making this choice, firm 1 is creating an alliance cluster among itself, firm 2 and firm 3. Thus, insight into the propensity of firms to form alliance clusters can be obtained by analysing the conditions under which firm 1 will choose Scenario B over Scenario A.

The firms engage in a two-stage, non-cooperative game. In the first stage, firm 1 chooses its partner for the new alliance. In the second stage, the four firms choose their outputs so as to maximize their profits. The profit functions for the four firms for each scenario are given below:

**Scenario A: Firm 1 Allies with the Independent Firm, Firm 4**

$$\Pi_1 = (\theta - dQ)q_1 - [cq_1 - A_1(q_2 + q_1) - C_1(q_4 + q_1)]$$

$$\Pi_2 = (\theta - dQ)q_2 - [cq_2 - A_2(q_1 + q_2) - B_1q_3q_2]$$

$$\Pi_3 = (\theta - dQ)q_3 - [cq_3 - B_2(q_2 + q_3)]$$

$$\Pi_4 = (\theta - dQ)q_4 - [cq_4 - C_2(q_1 + q_4)]$$

**Scenario B: Firm 1 Allies with Its Partner's Partner, Firm 3**

$$\Pi_1 = (\theta - dQ)q_1 - [cq_1 - A_1(q_2 + q_1) - C_1(q_3 + q_1)]$$

$$\Pi_2 = (\theta - dQ)q_2 - [cq_2 - A_2(q_1 + q_2) - B_1q_3q_2]$$

$$\Pi_3 = (\theta - dQ)q_3 - [cq_3 - B_2(q_2 + q_3) - C_2(q_1 + q_3)]$$

$$\Pi_4 = (\theta - dQ)q_4 - cq_4$$

Where:

$\Pi_i$   $\equiv$  profit of firm  $i$

$q_i$   $\equiv$  firm  $i$ 's output ,  $Q \equiv q_1 + q_2 + q_3 + q_4$

$\theta$   $\equiv$  intercept of inverse demand function

$d$   $\equiv$  the negative of the slope of inverse demand function

$c$   $\equiv$  constant marginal cost

$A_i$   $\equiv$  coefficient of alliance savings from the existing alliance between firms 1 and 2

$B_i$   $\equiv$  coefficient of alliance savings from the existing alliance between firms 2 and 3

$C_i$   $\equiv$  coefficient of alliance savings from the new alliance between firm 1 and its partner

With:  $\theta, d, c, A_i, B_i, C_i, q_i \geq 0$  ;  $d \geq B_1$  ;  $\theta > c$

The first-order conditions for Scenario A produce reaction functions for the four firms respectively as follows:<sup>15</sup>

$$q_1 = \frac{\theta - c + A_1 + C_1 - d(q_2 + q_3 + q_4)}{2d}$$

$$q_2 = \frac{\theta - c + A_2 + (B_1 - d)q_3 - d(q_1 + q_4)}{2d}$$

$$q_3 = \frac{\theta - c + B_2 - d(q_1 + q_2 + q_4)}{2d}$$

$$q_4 = \frac{\theta - c + C_2 - d(q_1 + q_2 + q_3)}{2d}$$

Solving this system yields the following Nash equilibrium outputs for the second subgame under Scenario A:

$$q_1 = \frac{d(\theta - c - C_2 - B_2 - A_2 + 4C_1 + 4A_1) + B_1(A_1 + C_1 - B_2)}{(5d + B_1)d}$$

$$q_2 = \frac{d(\theta - c - C_2 - B_2 - A_1 - C_1 + 4A_2) + B_1(\theta - c - A_1 - C_1 - C_2 + 3B_2)}{(5d + B_1)d} \quad *$$

$$q_3 = \frac{\theta - c - A_1 - C_1 - A_2 - C_2 + 4B_2}{5d + B_1}$$

$$q_4 = \frac{d(\theta - c - A_1 - C_1 - A_2 - B_2 + 4C_2) + B_1(C_2 - B_2)}{(5d + B_1)d}$$

---

<sup>15</sup>Each firm is maximizing its profits with respect to a single variable, its own output. Therefore, the second-order condition for each profit function requires that  $\frac{\partial^2 \pi_i}{\partial q_i^2} < 0$ . In each case, this requires that  $d > 0$ , which has been assumed.



The first-order conditions for Scenario B produce reaction functions for the four firms respectively as follows:<sup>16</sup>

$$q_1 = \frac{\theta - c + A_1 + C_1 - d(q_2 + q_3 + q_4)}{2d}$$

$$q_2 = \frac{\theta - c + A_2 + (B_1 - d)q_3 - d(q_1 + q_4)}{2d}$$

$$q_3 = \frac{\theta - c + B_2 + C_2 - d(q_1 + q_2 + q_4)}{2d}$$

$$q_4 = \frac{\theta - c - d(q_1 + q_2 + q_3)}{2d}$$

Solving this system yields the following Nash equilibrium outputs for the second subgame under Scenario A:

$$q_1 = \frac{d(\theta - c - C_2 - B_2 - A_2 + 4C_1 + 4A_1) + B_1(A_1 + C_1 - B_2 - C_2)}{(5d + B_1)d}$$

$$q_2 = \frac{d(\theta - c - C_2 - B_2 - A_1 - C_1 + 4A_2) + B_1(\theta - c - A_1 - C_1 + 3C_2 + 3B_2)}{(5d + B_1)d} \quad **$$

$$q_3 = \frac{\theta - c - A_1 - C_1 - A_2 + 4C_2 + 4B_2}{5d + B_1}$$

$$q_4 = \frac{d(\theta - c - A_1 - C_1 - A_2 - B_2 - C_2) - B_1(C_2 + B_2)}{(5d + B_1)d}$$

Calculating the profit of firm 1 from the Nash equilibrium outputs from Scenario B, equation set \*\*, and subtracting firm 1's profits resulting from the Nash equilibrium outputs from Scenario A, equation set \*, yields the following:

$$\begin{aligned} \Pi_1^B - \Pi_1^A = & (2dB_1B_2C_2 + 10dB_1C_1B_2 + 12dA_1B_1C_2 - 13dB_1C_1C_2 + 2dB_1A_2C_2 - 2d\theta B_1C_2 \\ & + 2dcB_1C_2 + B_1^2C_2^2 + 25d^2C_1B_2 + 2dB_1C_2^2 + 2B_1^2C_1B_2 + B_1^2C_1B_2 + 2A_1B_1^2C_2 \\ & - 3B_1^2C_1C_2) / (d(5d + B_1)^2) \end{aligned}$$

---

<sup>16</sup>The second order condition for each profit function requires that  $d > 0$ .

The sign of this difference is ambiguous; therefore, it cannot be stated that there is always a natural tendency for firm 1 to choose Scenario B over Scenario A. In other words, there is not necessarily a natural tendency for firms always to ally into clusters. However, by examining how the difference in profits under the two scenarios varies with changes in certain variables, the factors which make clustering more likely can be assessed. The partial derivatives of

$(\Pi_1^B - \Pi_1^A)$  with respect to three of the six the interdependence coefficients are shown below.

$$\frac{\partial(\Pi_1^B - \Pi_1^A)}{\partial A_1} = \frac{12dB_1C_2 + 2B_1^2C_2}{d(5d + B_1)^2} \geq 0$$

$$\frac{\partial(\Pi_1^B - \Pi_1^A)}{\partial A_2} = \frac{2B_1C_2}{(5d + B_1)^2} \geq 0$$

$$\frac{\partial(\Pi_1^B - \Pi_1^B)}{\partial B_2} = \frac{10dB_1C_1 + 2dB_1C_2 + B_1^2C_1 + 2B_1^2C_2 + 25d^2C_1}{d(5d + B_1)^2} \geq 0$$

The signs of the partial derivatives of  $(\Pi_1^B - \Pi_1^A)$  with respect to the other interdependence variables ( $B_1$ ,  $C_1$ , and  $C_2$ ) are indeterminate. However, given the non-negative values of the partials above, it can be concluded that the propensity to cluster (i.e. the propensity for firm 1 to choose Scenario B over Scenario A) increases as the level of interdependence created by the alliance between firms 1 and 2 (represented by  $A_1$  and  $A_2$ ) increases, and as the dependence of firm 3 on its alliance with firm 2 (represented by  $B_2$ ) increases. Where definitive relationships between interdependence and the propensity to cluster exist, they are positive.

The cause of the ambiguity of the effect the other interdependence coefficients have on the propensity of firms to cluster arises from the nature of the model. To keep the analysis workable, the model considers a homogenous product and a highly concentrated market in which there are only four firms. In markets with numerous firms, a reduction in the costs of a single firm has only a limited impact on the demand for the other firms' product. However, in highly concentrated markets, the impact on demand is far greater. Similarly, the impact on competitors' demand increases as the product becomes more homogenous. Thus, in this model, the cost savings resulting from the choice to cluster are counteracted by the negative impact that strengthening a competitor/partner has on demand. This counteraction creates the ambiguity and illustrates a significant danger in establishing horizontal alliances - the potential transfer of competitive advantage to competitor/partners. As product differentiation and the number of competitors increase, however, the negative impact on a firm's demand of strengthening a competitor/partner decreases and, consequently, the propensity to cluster increases.

To summarize, this model demonstrates that, while in the limited case of a concentrated market with a homogenous product there may be some ambiguity, the propensity to cluster generally increases with the level of interdependence created by strategic alliances. Furthermore, as alliance clusters proliferate and firms form more alliances with one another, firm interdependence increases. Therefore, the propensity to cluster grows as the clusters themselves grow.

This section has identified two forces behind clustered alliance formation. First, existing alliances act as social networks which provide valuable information regarding potential

partners and, thus, reduce the uncertainty associated with partner selection. It is less risky to ally with an existing partner or with a partner's partner as information regarding the capabilities and trustworthiness of such firms is more readily available. Second, the interdependence created by existing alliances makes it more profitable to ally into clusters as the competitive advantage an existing partner (or a partner's partner) gains through a new alliance produces positive feedback to the firm making the partner selection choice.

These two forces suggest that there is a natural tendency for firms to cluster (there is always at least some uncertainty associated with new partner selection and interdependence created by existing alliances). Why, then, does the amorphous structure of alliance formation, not the clustered structure, prevail in some industries? The reason is that the most important factor in determining partner selection is the existence of complementary capabilities; firms choose to ally with firms whose assets best complement their own so the new alliance can produce the maximum amount of synergy.<sup>17</sup> Therefore, when alliance-created interdependence is low and prior knowledge of new partners' trustworthiness is less important, then the amorphous structure will prevail, as firms' desire to gain access to complementary capabilities will outweigh these factors. However, when interdependence is high and prior knowledge of partner trustworthiness is important, the clustered structure will prevail.

---

<sup>17</sup> Refer to Section 1.1.5 of Chapter 1 for a description and example of *complementary capabilities*.

### **2.3: Interdependence and the Willingness to Compete:**

As discussed above, the success of many alliances depends upon the success of their partner firms. This creates a certain level of interdependence among the alliance partners themselves. Furthermore, when interdependence is high, firms have a greater propensity to fortify their existing relationships and to establish alliance clusters. This, in turn, creates even greater interdependence among alliance partners.

How might the increasing interdependence created by alliance clusters affect competition among partners? If a firm's success becomes increasingly dependent upon the success of its partner, it might decide not to compete too rigorously against its partner/competitor, lest this, indirectly through its alliances, negatively affects its own profits. A simple model is introduced below which demonstrates how alliance-created interdependence affects partners' willingness to compete.

Other models have been developed which demonstrate the effect of strategic alliances on competition in a noncooperative setting. For example, Reynolds and Snapp develop a Cournot model in which firms hold partial equity interests in their competitors through joint ventures.<sup>18</sup> They find that partial equity interests among competitors can result in reduced output and higher prices, even in the absence of cooperation, and that the greater the equity interest among competitors, the greater the reduction in output and subsequent rise in price. These results are essentially the same as those from the model presented below (the size of the equity interest among competitors is analogous to the extent of interdependence created by alliances). The advantage of the following model in

---

<sup>18</sup>Reynolds, Robert J. and Snapp, Bruce R., "The Competitive Effects of Partial Equity Interests and Joint Ventures," *International Journal of Industrial Organization*, 1986, pp. 141-154.

the present context is that it easily relates the willingness to compete between alliance partners to their level of interdependence; this helps place the concept of interdependence into the framework of the clustered and amorphous structures of alliance formation that is developed throughout this chapter.

Consider a simple Cournot duopoly model with a homogenous product, linear inverse demand, and constant marginal costs. The profit functions for the two firms are as follows.

$$\Pi_1 = (\theta - dQ)q_1 - c_1q_1$$

$$\Pi_2 = (\theta - dQ)q_2 - c_2q_2$$

Where;

$\Pi_i$   $\equiv$  firm i's profit

$\theta$   $\equiv$  the intercept of the linear inverse demand function

$d$   $\equiv$  the slope of the linear inverse demand function

$q_i$   $\equiv$  firm i's output;  $Q = q_1 + q_2$

$c_i$   $\equiv$  firm i's constant marginal cost

$0 \leq \theta, d, q_i, c_i$ ;  $\theta > c_i$

The first-order conditions (reaction functions) are as follows:<sup>19</sup>

$$q_1 = \frac{\theta - c_1 - dq_2}{2d} \quad *$$

$$q_2 = \frac{\theta - c_2 - dq_1}{2d}$$

The Nash equilibrium for this game is as follows:

$$q_1 = \frac{\theta - 2c_1 + c_2}{3d}$$

$$q_2 = \frac{\theta - 2c_2 + c_1}{3d}$$

The sum of the two firms' outputs is as follows:

$$Q_A = q_1 + q_2$$

$$= \frac{2\theta - c_1 - c_2}{3d}$$

---

<sup>19</sup>The second-order condition requires that  $d > 0$ .

Now suppose the two firms form an alliance, and that the success of the alliance for each firm is a linear function of the profits of its partner. Then the profit functions for this duopoly are as follows.

$$\begin{aligned}\Pi_1 &= (\theta - dQ)q_1 - c_1q_1 + a\Pi_2 \\ &= (\theta - dQ)q_1 - c_1q_1 + a[(\theta - dQ)q_2 - c_2q_2]\end{aligned}$$

$$\begin{aligned}\Pi_2 &= (\theta - dQ)q_2 - c_2q_2 + b\Pi_1 \\ &= (\theta - dQ)q_2 - c_2q_2 + b[(\theta - dQ)q_1 - c_1q_1]\end{aligned}$$

$$0 \leq a, b \leq 1$$

The coefficients,  $a$  and  $b$ , represent the interdependence the alliance has created between the two firms. As  $a$  and  $b$  increase, the extent to which the profitability of the alliance to each firm and, hence, the profitability of the firm, itself, depends upon the profitability of the firm's partner.

The first-order conditions (reaction functions) for this model are as follows:<sup>20</sup>

$$\begin{aligned}q_1 &= \frac{\theta - c_1 - (1 + a)dq_2}{2d} \quad ** \\ q_2 &= \frac{\theta - c_2 - (1 + b)dq_1}{2d}\end{aligned}$$

The Nash equilibrium outputs for this second model are given by:

---

<sup>20</sup>The second-order condition for each equation requires that  $d > 0$ .



$$q_1 = \frac{(1-a)\theta + (1+a)c_2 - 2c_1}{(3-a-b-ab)d}$$

$$q_2 = \frac{(1-b)\theta + (1+b)c_1 - 2c_2}{(3-a-b-ab)d}$$

The sum of the outputs of the two firms is

$$Q_B = \frac{2\theta - (a+b)\theta + bc_1 + ac_2 - c_1 - c_2}{(3-a-b-ab)d}.$$

Comparing the two models, the difference between the total output from the model with the interdependent alliance and that from the original Cournot model is as follows:

$$Q_B - Q_A = \frac{-a\theta - b\theta + 2ab\theta + 2ac_2 + 2bc_1 - ac_1 - bc_2 - abc_1 - abc_2}{3d(3-a-b-ab)}$$

If it is assumed that the firms have the same marginal cost, so that  $c = c_1 = c_2$ , and that the level of dependence on their partner is the same for each firm, so that  $a = a = b$ , then this difference becomes:

$$Q_B - Q_A = \frac{2(a^2\theta - a\theta + ac - a^2c)}{3d(3-2a-a^2)} < 0$$

Thus, the effect of an alliance, the success of which depends upon the profitability of the partners, between two Cournot duopolists is a reduction in total output compared to the Cournot solution without an alliance. This reduction in total output results in a higher price. This result demonstrates that the interdependence created by alliances can reduce partners' willingness to compete against one another.

Taking the above difference and differentiating with respect to  $a$  yields the following:

$$\frac{\partial(Q_B - Q_A)}{\partial a} = 2 \frac{c - \theta}{(a + 3)^2 d} < 0$$

The coefficient,  $a$ , represents the level of interdependence created by the alliance. Thus, the willingness of firms to compete against their partners decreases as their interdependence increases.

A similar comparison can be made between the joint outputs of the Cournot duopolists with an alliance and the output of a multiplant monopolist or cartel. Using the same notation and assumptions as the previous models (with linear demand and constant marginal costs), the profit maximizing output for a monopolist's is given by:

$$Q_M = \frac{\theta - c}{2d}.$$

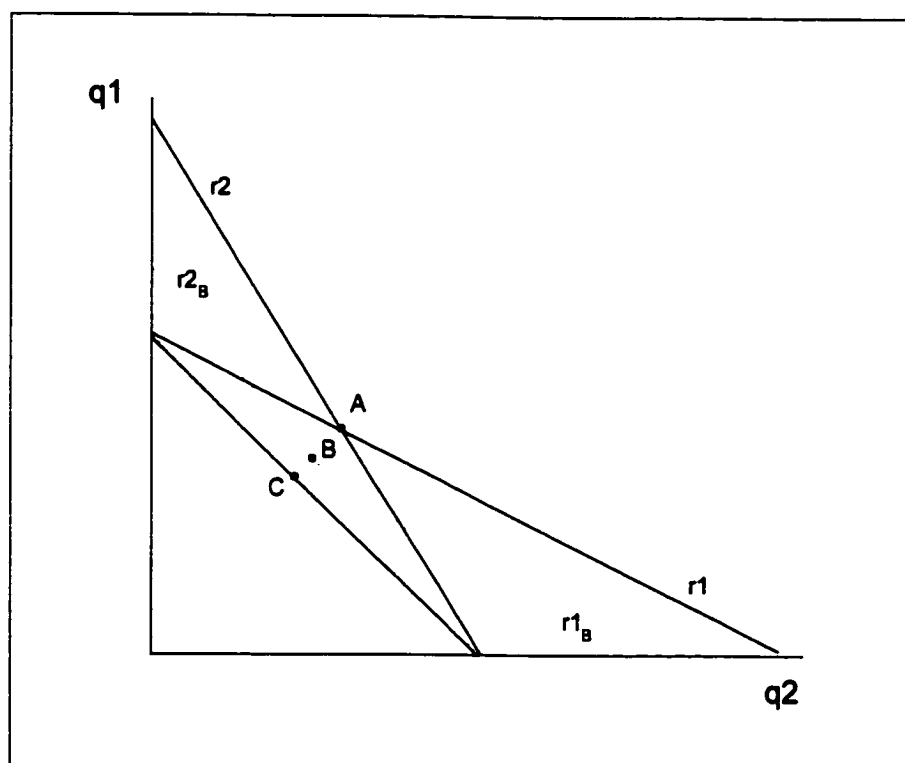
Assuming that the two firms have identical marginal costs, and comparing this output with the combined output for Cournot duopolists with an alliance reveals that

$$Q_M < Q_B.$$

Thus, while the alliance between the two Cournot duopolists reduces the combined output from the combined output with no alliance, total output is still greater than that produced by a monopolist or a cartel.

Figure 2.6 provides an illustration of the effect of alliance-created interdependence.

**Figure 2.6: The Effect of Alliance Interdependence on a Cournot Duopoly**



The reaction functions for the Cournot model with no alliance are represented by the black lines furthest away from the origin. These are derived from the equation set above marked with \*. Given these reaction functions, the firms' outputs converge to equilibrium at point A. The reaction functions for the model with the alliance-created interdependence are derived from the equation set marked with \*\*, and are shown with the dashed lines. Interdependence causes firm 1's choice of output level to fall more rapidly as firm 2's output increases and visa versa. This results in a lower equilibrium level at point B. Thus, the effect of the alliance-created interdependence is to reduce equilibrium total output which, in turn, results in a higher price. The willingness of partners to compete is

reduced. This result is derived from a noncooperative model; thus, the willingness to compete is reduced even in the absence of any attempt to fix prices or output.

The solid line passing through point C represents the possible divisions of outputs under the monopoly solution. These outputs are even lower than the outputs for the Cournot dupolists with an alliance. Thus, even though alliance-created interdependence reduces the firms' willingness to compete, the effect is not as great as the monopoly solution.

It has been demonstrated earlier that the tendency of firms to form alliance clusters increases with the level of interdependence the alliances create. Therefore, when the clustered structure of alliance formation is prevalent, the model suggests that the willingness of firms to compete against their partners will be low. Therefore, where the clustered structure prevails, competition will match cluster against cluster, rather than firm against firm. However, where the amorphous structure is prevalent, the interdependence created by alliances is typically lower and, thus, the willingness of firms to compete with their partners remains relatively high. Thus, in the amorphous structure, competition typically remains among partner firms.

The amorphous and clustered structures provide a framework for analysing the nature of strategic alliance formation in the overall assessment of a market's structure. The following two chapters describe how strategic alliances affect traditional elements of market structure -- concentration and entry barriers.

### **Chapter 3: Virtual Bigness**

There is currently a scarcity of research examining the impact of strategic alliances on other elements of market structure. Gomes-Casseres observes that the formation of alliance constellations tends to reduce the number of competitors in a market, effectively increasing market concentration. However, constellations of small firms can collectively acquire the capabilities to become effective competitors to dominant individual firms. He argues that, since dominant firms tend to shun alliances, the likely overall effect of alliances is to enhance rivalry.<sup>1</sup> These two chapters expand on this research by placing strategic alliances in the framework of centripetal (centralizing) and centrifugal (decentralizing) market forces.

The first part of this chapter introduces the concept of virtual bigness, which allows firms to obtain the advantages of large firms through their alliances while remaining small. The concept of virtual bigness is used to explain the recent proliferation of alliance activity. The second part of the chapter examines the conditions under which virtual bigness acts centrifugally and those where it acts centripetally. This provides a more detailed assessment of the impact of alliances on the evolution of market structure.

#### **3.1: Explaining the Proliferation of Alliances**

The past two decades have been characterized by an unprecedented acceleration of alliance activity. However, alliances have been used as a strategic tool for much longer; oil companies, for example, have used joint ventures for many years to spread the cost

---

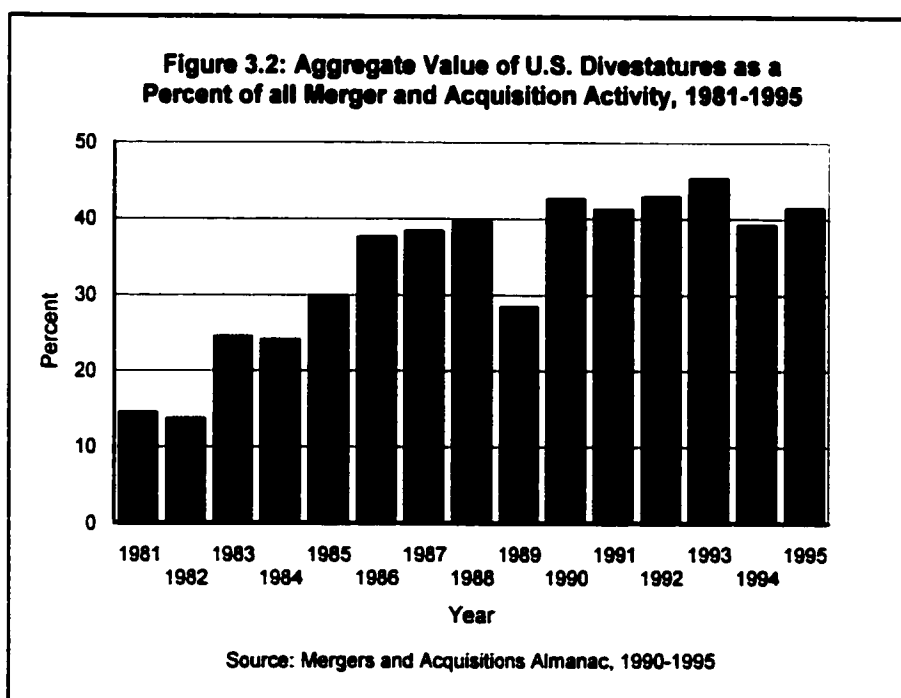
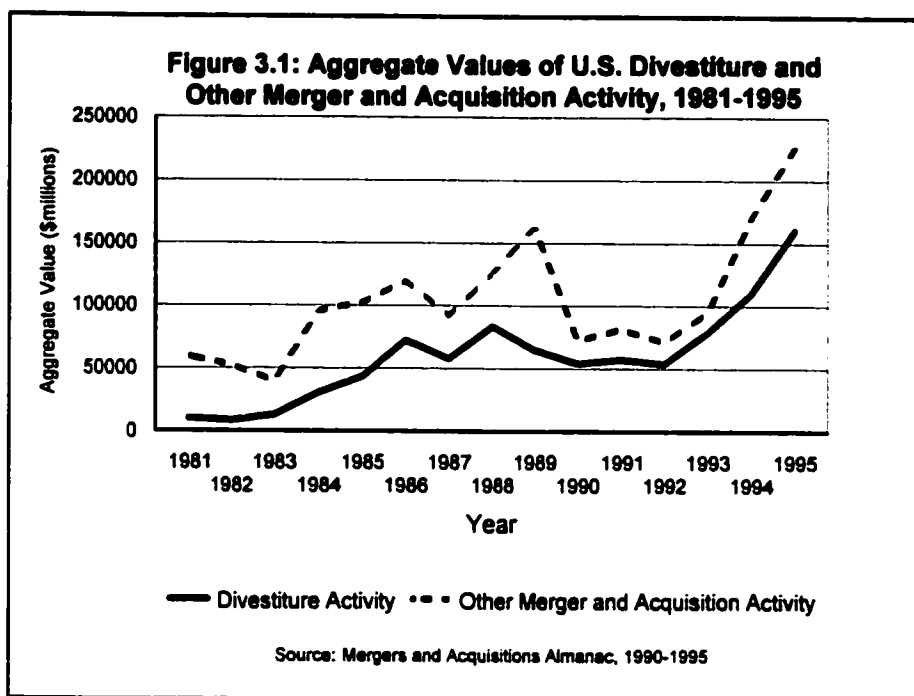
<sup>1</sup> Gomes-Casseres, Benjamin, *The Alliance Revolution: The New Shape of Business Rivalry*, Chapter 5, "Alliances and the Organization of Industry," Harvard University Press, Cambridge, Massachusetts, 1996.

and risk of oil exploration, and as early as 1971, Mitsubishi was producing the Dodge Colt for Chrysler.<sup>2</sup> Why, then, has widespread alliance activity proliferated only recently? The answer, in part, is that alliances are a strategic response to a pair of opposing sets of environmental forces: one which pulls firms towards smaller size, the other which pushes firms towards increased size and consolidation. The forces pushing firms to grow include globalization, information technology that requires greater economies of scale and scope, rising research and development costs, network effects, and market convergence. The forces pulling firms towards smallness include rapidly changing technology and market conditions which require firms to remain flexible and maintain specialized focuses.

Aggregate merger data provides evidence of the presence and strengthening effect of these two opposing forces. Much attention has been given to the recent proliferation of merger activity. Each new megamerger seems to confirm the belief that industry is rapidly consolidating as a response to environmental forces, driving firms towards increased size. However, a closer examination of the merger and acquisition data reveals that there is another force at work as well. Figure 3.1 separates the aggregate value of divestitures from the value of other mergers and acquisitions. While the rise in the value of mergers and acquisitions illustrates that firms are responding to a need for increased size, the simultaneous rise in the value of divestitures illustrates that an opposing force is also at work, pushing firms to sell off assets and become smaller. This centrifugal force is not insignificant; as Figure 3.2 illustrates, the aggregate value of divestitures as a percent of all merger and acquisition activity has increased from 14.6% in 1981 to 41.5% in 1995.

---

<sup>2</sup> "Foreign Invasion: Imports, Transplants Change Auto Industry Forever," *Ward's Auto World*, Vol. 32, 05-01-1996, p. 73.



Faced with these opposing forces, many firms increasingly have been using alliances to reach a middle ground, remaining relatively small, but acquiring, through their alliances,

the properties of larger organizations. Rather than becoming big in the true sense, either through merger or by internal growth, small firms are using alliances to obtain many large firm advantages and achieve *virtual bigness* instead. Thus, the rapid proliferation of alliance activity can be explained as a strategic response to the rise of opposing environmental forces which require firms to simultaneously possess the properties of both small and large organizations.

### **3.2: The Advantages of Smallness**

Two advantages of small firms are discussed below: specialization and flexibility. These are particularly relevant in today's dynamic economy. They represent centrifugal forces because they encourage firms to remain small or to shrink.

#### **3.2.1: Specialization**

One of the advantages of small firms is that they are able to maintain a specialized focus. This is particularly important in many high technology industries, where effective innovation often requires a high level of specialization. Among the principal characteristics of the modern economic environment are the rapid growth in the stock of scientific knowledge and the resulting pace of innovation. As fields of knowledge expand into arrays of subfields, firms, as well as individuals, must become increasingly specialized if they are to utilize this knowledge efficiently.<sup>3</sup> Small firms, which concentrate their efforts along individual lines of research, are more likely to acquire the

---

<sup>3</sup> North, Douglas, C., "The Adam Smith Address: Economic Theory in a Dynamic Economic World," *Business Economics*, Vol. 30, Jan.1, 1995, pp. 7-13.



high level of expertise required for innovation than large firms which operate in a variety of fields. Consequently, there has been a growing trend among firms involved in research-intensive industries towards divestiture of their non-core related businesses so they can focus on their core areas of expertise.<sup>4</sup>

Firms in research-intensive industries are not the only ones to benefit from a specialized focus; specialization can help firms acquire a high level of expertise in performing other business functions as well. Nike, for example, contracts out the bulk of its clothing and footwear production, choosing to specialize in the functions in which it excels: marketing and distribution.<sup>5</sup> Sara-Lee is following the same strategy, divesting its manufacturing facilities to focus on marketing (an ovenless cake company).<sup>6</sup> After years of pursuing a diversified strategy, PepsiCo is selling its restaurant chains (Taco Bell, KFC, and Pizza Hut) to follow Coke's lead and focus on its core business of selling soft drinks and packaged snacks.<sup>7</sup> These firms have chosen to make themselves smaller because they believe that a specialized focus will make their core operations more efficient. Bigger is not necessarily better.

---

<sup>4</sup> Hoskisson, Robert E. and Hitt, Michael A., *Downscoping: How to Tame the Diversified Firm*, Oxford University Press, New York, 1994.

Suarez-Villa, Luis, "The Structures of Cooperation: Downscaling, Outsourcing and the Networked Alliance," *Small Business Economics*, Vol. 10, pp. 5-16, 1998.

<sup>5</sup> Lee, Jeanne, "Comfort Stocks," *Fortune*, March 2, 1998, pp. 102-234.

<sup>6</sup> *Ibid.*

<sup>7</sup> Martin, Richard, "PepsiCo to Divest all Chain Holdings," *Nation's Restaurant News*, Feb. 3, 1997, pp. 1,4.

### **3.2.2: Flexibility**

Another advantage enjoyed by small firms is their ability to adapt quickly to a rapidly changing economic environment. This is particularly relevant today in an era of an unprecedented expansion in the stock of knowledge, rapidly changing technology and market conditions, and the pressures of globalization. If firms are to survive in such a dynamic marketplace, they must have the flexibility to effectively incorporate new knowledge and technology, and to quickly adjust their strategies to cope with the evolving economic environment.

Large firms generally are not conducive to change. They have a tendency to harbour bureaucracies which generate a vested interest in preserving the status quo. Co-ordinating activities becomes difficult in large organizations so they have to develop extensive infrastructures to process information which insulates numerous employees from the market. Even then, separate divisions within large firms can often move in different directions.<sup>8</sup>

Small businesses do not face these problems. Fewer employees and divisions make co-ordination of activities more effective so that the entire organization can respond quickly to change. As well, small businesses have a greater percentage of employees closer to the market, so that they are more aware of external change. These factors make small firms more flexible than large firms.

The American automobile industry provides a useful example to illustrate the flexibility of small firms versus the inflexibility of large ones. Almost two decades since

---

<sup>8</sup> Lawler, Edward, E., "Rethinking Organization Size," *Organizational Dynamics*, October, 1997.

it initially faced a serious threat from high-quality Japanese imports, General Motors is still trying to cope with this shock to its environment. After investing billions of dollars, GM's newer plants are even less efficient than its old ones, and GM remains considerably less productive than its smaller American and Japanese rivals.<sup>9</sup> Chrysler, on the other hand, has come back from the brink of bankruptcy to the point where it may now produce some of its cars at costs approximately equal to the most efficient Japanese automakers.<sup>10</sup> GM's huge bureaucracy and numerous divisions have made it too inflexible to adapt to the threat of foreign competition, while Chrysler's relatively small size has allowed it to change much more rapidly to become an efficient competitor.

### **3.3: The Advantages of Bigness and How They Can Be Realized Through Alliances**

While increased flexibility and specialization are sources of competitive advantage for small firms that are particularly relevant in the modern marketplace, there are still numerous benefits of being big. These advantages of bigness represent centripetal forces as they encourage firms to grow or maintain a large size. Many of these advantages, however, can be obtained by small firms through strategic alliances. Thus, individual firms do not need to be truly big to realize the benefits of bigness. Rather, small firms can become "virtually big" by establishing a network of alliances.

---

<sup>9</sup> Adams, Walter and Brock, James, "Automobiles," Adams and Brock, eds., *The Structure of American Industry*, Prentice-Hall Inc., 1995, p. 82.

<sup>10</sup>Ibid.

### **3.3.1: Globalization**

As international trade and investment has become more liberalized, competing in foreign markets has become a key strategy for firms in many industries. The traditional means of gaining access to foreign markets -- foreign direct investment (FDI) and export -- favour large firms. FDI generally requires a large capital outlay that is beyond the resources of most small firms, while to export effectively, firms may need to generate a high volume of sales so that transportation costs can be allocated over a large quantity. Even in the absence of FDI, firms that export still may need to make an extensive investment in the foreign market to finance distribution and marketing operations. The high cost of export and FDI make these traditional methods of globalization beyond the reach of most small firms.

A third method of globalization, forming alliances with foreign partners, makes foreign market operation more accessible to small firms. A foreign partner can provide small firms with access to existing sales, marketing, and distribution operations. Capital expenditures can be shared so that investment (such as a joint production facility) becomes more affordable. In addition, a foreign partner can provide a small firm with the intimate knowledge of local customs and regulations required to operate in many foreign markets. Globalization is no longer a strategy reserved for large firms; strategic alliances can open foreign markets to small businesses as well.<sup>11</sup>

---

<sup>11</sup>For examples of how alliances allow small firms to enter foreign markets, refer to Chapter 4, *The Impact of Strategic Alliances on Barriers to Entry*.

### 3.3.2: Economies of Scale

Economies of scale refer to decreasing per unit costs as plant or firm size increases. In industries where economies of scale are extensive, firms have a natural tendency to be large because such size is required for efficient operation. Economies of scale are particularly important in many high tech industries, such as computer hardware and software, pharmaceuticals, and telecommunications equipment, where there are huge up-front fixed costs and very small subsequent marginal costs.<sup>12</sup> Developing new software, for example, may cost millions of dollars up front, but the subsequent marginal cost of each unit sold may only be a couple of dollars for the price of the disks (or almost nothing if the software is distributed over the internet). Thus, large firms benefit from extensive economies of scale, because large market shares are needed to achieve low average costs.

Strategic alliances, however, can enable small firms to take advantage of economies of scale. Collaboration with other organizations can provide small firms with the financial resources to finance large up-front fixed costs as well as the distribution networks and marketing savvy required to achieve large market shares.

The reduced instruction-set computing (RISC) industry provides an example of how alliances can help small firms achieve the economies of scale they need to be competitive.<sup>13</sup> Mips Computer Systems was a small firm that, with the help of alliances,

---

<sup>12</sup>Arthur, W. Brian, "Increasing Returns and the New World of Business," *Harvard Business Review*, July-August, 1996, pp.100-109.

<sup>13</sup> RISC is a type of computing that seeks to eliminate the extraneous instructions involved in the more traditional CISC (complex instruction set computing). As such, it has the potential to be a more efficient and faster of executing computer commands.

has been able to successfully compete with much larger companies including IBM and Hewlett-Packard. Mips was an innovator in the RISC field in the late 1980's, but while it remained a small company, production and sale of the RISC chips required large scale operations. Therefore, Mips created a network of alliances to help it achieve the scale it required. Some of its allies provided financial investment which could then be used to fund large scale development and production. Other firms received licenses to use Mips' RISC technology, or they made agreements to purchase its chips; such deals helped Mips achieve the market share required to realize economies of scale.<sup>14</sup> As a result, in 1992, the Mips alliance network shipped more RISC chips than either IBM or Hewlett-Packard.<sup>15</sup> Alliances allowed Mips, a small firm, to realize the economies of scale typically enjoyed by large firms.<sup>16</sup>

---

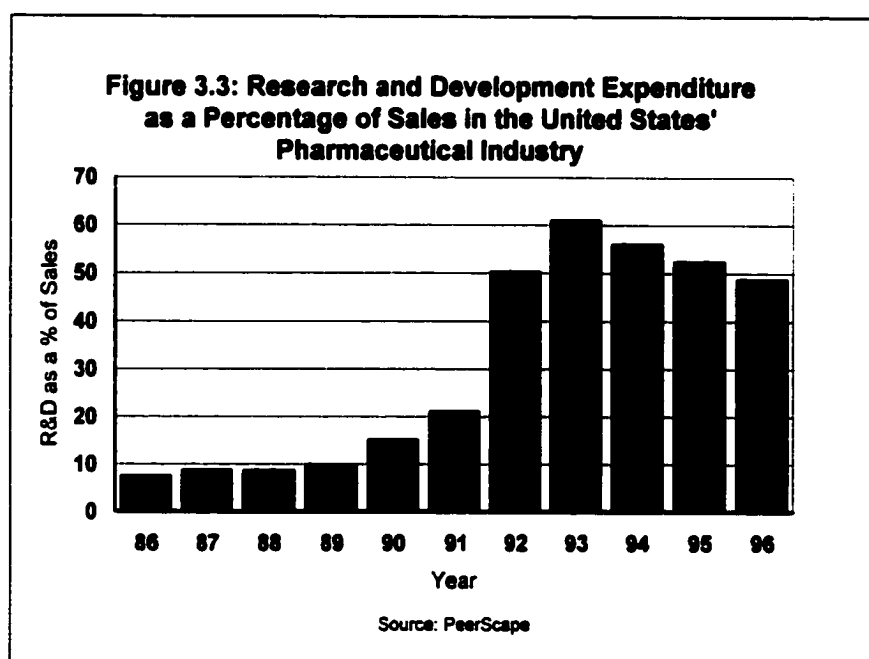
<sup>14</sup>Gomes-Casseres, Benjamin, "Alliance Strategies of Small Firms," *Small Business Economics*, Vol. 9, 1997, pp. 33-44.

<sup>15</sup> *Ibid.* p. 39.

<sup>16</sup> Mips has since been purchased by Silicon Graphics. It has fallen on harder times, but remains a competitor in the RISC market.

### 3.3.3: Research and Development

A particular area where economies of scale play an important role with respect to alliances is research and development (R&D). In many high technology industries, a firm's success is dependent on its ability to introduce new products to the market, while the R&D expenses of such innovation is escalating. In the pharmaceutical industry, for example, R&D as a percentage of sales has risen from 7.7% in 1986 to 48.9% in 1996. Figure 3.3 illustrates the rapid acceleration of R&D spending in the pharmaceutical industry.



On an absolute basis, R&D spending among major US pharmaceutical companies has risen from \$4.6 billion in 1986, to \$71.1 billion in 1996.<sup>17</sup>

---

<sup>17</sup> Data from the Peerscape commercial website: [www.peerscape.com](http://www.peerscape.com)

The huge expense of large-scale R&D, such as exists in the pharmaceutical industry, favours large firms.<sup>18</sup> Large firms have easier access to the capital required to establish large-scale R&D facilities. Their broader market base allows them to allocate their fixed R&D expenditures over a greater volume of sales. Additionally, large firms generally have more diversified portfolios of products, so their exposure to the risk of any one research project is substantially reduced. For these reasons, large firms have an advantage over small firms in many R&D intensive industries.

Small firms, however, can overcome much of this disadvantage through alliances. Alliances can help small firms acquire the capital they need to finance large-scale R&D. Research and development joint ventures allow small firms to, not only share the expense, but also to assume only a portion of the risk of developing new products. Thus, in the pharmaceutical industry, small businesses are increasingly using alliances to help them realize their research and development goals.<sup>19</sup> These alliances have allowed small firms to survive in a market where enormous R&D requirements give large firms a definite competitive advantage.<sup>20</sup>

### **3.3.4: Network Effects and Increasing Returns**

Another advantage of large firms is that they have the ability to take advantage of network effects and increasing returns. Many high-tech products become more valuable

---

<sup>18</sup> Indeed, the growth of R&D expenditures is certainly one of the major drivers behind the recent consolidation in the pharmaceutical industry.

<sup>19</sup> Powell, Walter, W., "Learning from Collaboration: Knowledge and Networks in the Biotechnology and Pharmaceutical Industries," *California Management Review*, Spring 1998, pp. 233-236.

<sup>20</sup> The effect of strategic alliances on innovative activity goes well beyond the financing of R&D.



as the number of users increases. Computer operating systems, for example, need to be compatible with each other so that users can run the same programs and share information efficiently. As more of a particular operating system that is sold, more people can share programs and information, and, thus, the operating system increases in value with each new unit sold; it experiences a network effect.<sup>21</sup> Network effects can result in demand curves that are continuously shifting to the right as greater quantities of the product are sold (the greater the quantity that has been sold, the greater the price users are willing to pay for the next unit). When network effects, along with economies of scale persist, products can experience increasing returns to scale (marginal returns increase with output).

Increasing returns favour large firms -- the greater a firm's output, the more advantage it can derive from economies of scale and network effects. In increasing returns industries, as long as increasing returns persist, there is no profit-maximizing level of output. Thus, large firms' products that achieve high market shares can quickly evolve into industry standards, creating monopolies (i.e. Microsoft's Windows).<sup>22</sup>

Alliances can help small firms realize increasing returns by enabling them to achieve the required market shares. An example is the Java Alliance, which includes Sun Microsystems, Oracle, and Netscape, along with other partners. Java has the potential to compete directly with Microsoft's PC-based operating systems, as it allows users to download and run applications directly from network servers.<sup>23</sup> However, if Java is to

---

<sup>21</sup> Arthur, W. Brian, *op. cit.* pp. 101-104.

<sup>22</sup> Ibid.

<sup>23</sup> The beauty of Java is that it is an open standard that will allow numerous competitors the opportunity to write competing java-based applications that can be run on any computer terminal.

compete with Windows, it must attract the numerous programmers and users needed to experience significant network effects. The combined influence of the partners of the Java Alliance is encouraging programmers to write Java-based applications, which should help attract the critical mass of users needed for Java to become a viable alternative to Microsoft's Windows.<sup>24</sup> Thus, by forming a network of alliances, a relatively small firm such as Netscape can benefit from increasing returns and compete in a market with a giant like Microsoft.

### **3.3.5: Convergence and Diversification**

Increasing returns and network effects are characteristics of the dynamic information economy that benefit large firms; another is convergence. Convergence refers to the union of once distinct technologies and markets. Convergence can result in the joining of two or more markets into one (telephone and cable technologies, for example, are converging into a single voice and data communications market), or it can create entirely new markets while leaving the original markets intact.

An example of a new market that has been created by convergence is multimedia. Multimedia products integrate voice, data, and video into one device that provides visual and audio sensations. Each of these sensations can be interactive to make users feel like being part of the story or information.<sup>25</sup> The creation of such products requires knowledge of a number of fields. The development of an interactive CD-ROM, for example, requires

---

<sup>24</sup> Bartholomew, Doug, "Micro Monopoly: Game Over for Microsoft," *Industry Week*, Apr. 20, 1998, pp. 32-40.

<sup>25</sup> Carlson, Randall L., *The Information Superhighway: Strategic Alliances in Telecommunications and Multimedia*, p.32.

not only programming expertise, but also the ability to create visually entertaining stories. Thus, the interactive CD-ROM market has been created by the convergence of the software and entertainment industries.

Convergence is a centripetal market force, as it encourages firms to diversify so that they can acquire all of the skills required to compete in converging markets. Thus, convergence provides large, diversified firms with an advantage over small, focused businesses.

Alliances can help small firms overcome their disadvantage and exploit convergence. Each partner in such alliances can contribute expertise in one of the converging technologies. By joining together, a number of small firms can obtain the same level of diversification as a large firm. This enables small firms to compete in markets created by convergence, while still retaining a focus on their core competencies.

There are an abundance of such alliances in the multimedia industry. For example, 3DO, a start-up company, has developed CD-ROM technology that allows users to interact with video. It has alliance partners, such as Matsushita and Goldstar, that incorporate 3DO's technology into products such as video games, digital video disk players, and interactive television set-top boxes<sup>26</sup> Other allies have developed games that run on 3DO's technology.<sup>27</sup> While 3DO lacks the experience and resources to produce consumer electronics and entertaining software, it is able to introduce its technology into these markets through its network of alliances with firms which are skilled in these fields.

---

<sup>26</sup> Williams, Martyn, "Matsushita Licenses 3DO Video Technology," Newsbytes News Networks, Oct. 26, 1995.

<sup>27</sup> Carlson, Randall, L., Op. Cit. p.37.

Thus, a small firm, such as 3DO, can compete in a market with video game giants Sega and Nintendo.

Another typical convergence alliance has recently been established between Mindscape and National Geographic. Mindscape is a developer of print creativity software. To make its software attractive to consumers, Mindscape needs its customers to have access to high quality images. Thus, it is co-publishing a series of CD-ROMs with National Geographic that contain thousands of National Geographic's award-winning photos. These images can be viewed and manipulated using Mindscape's software.<sup>28</sup> This alliance is a response to the convergence of the markets for high-quality images and print creativity software. It allows Mindscape to remain competitive without having to acquire or produce its own photographs. This allows it to retain its specialized focus of developing print creativity software.

For many firms, alliances such as those discussed above are the solution to the problem of technological forces which pull them in opposite directions. On one hand, the rapid expansion of technology requires firms to become specialized so that they can acquire the competence to keep abreast of rapid developments. On the other hand, the convergence of many technologies requires that firms diversify into a number of fields so that they can unite the technologies and exploit their convergence. Strategic alliances allow firms to pursue both strategies; a small firm can retain its specialized focus, while its alliances helps it achieve the diversification needed to unite the converging technologies.

---

<sup>28</sup> "Mindscape Announces Breakthrough Print Creativity Software Line," *Business Wire*, Sept., 3, 1997.

### **3.4: Virtual Bigness: Centripetal or Centrifugal?**

The preceding discussion has shown how alliances can help small firms realize the benefits of bigness while retaining the advantages of being small. While a small firm engaged in numerous alliances retains its individual identity, a network of alliances can make a small firm *virtually* big. How does virtual bigness affect the evolution of market structure; is virtual bigness a centrifugal or centripetal market force?

#### **3.4.1: Clustered Alliance Formation**

The centripetal nature of virtual bigness depends considerably upon the pattern of alliance formation in the industry being considered. In industries where alliance formation is amorphous, alliance partners, while co-operating on various non-market activities, typically remain competitors in the market.<sup>29</sup> These alliances do not directly reduce the number of competitors in an industry. If, however, the clustered alliance structure, where partners typically do not compete against one another, predominates, then alliance clusters can directly reduce the number of real or potential competitors.

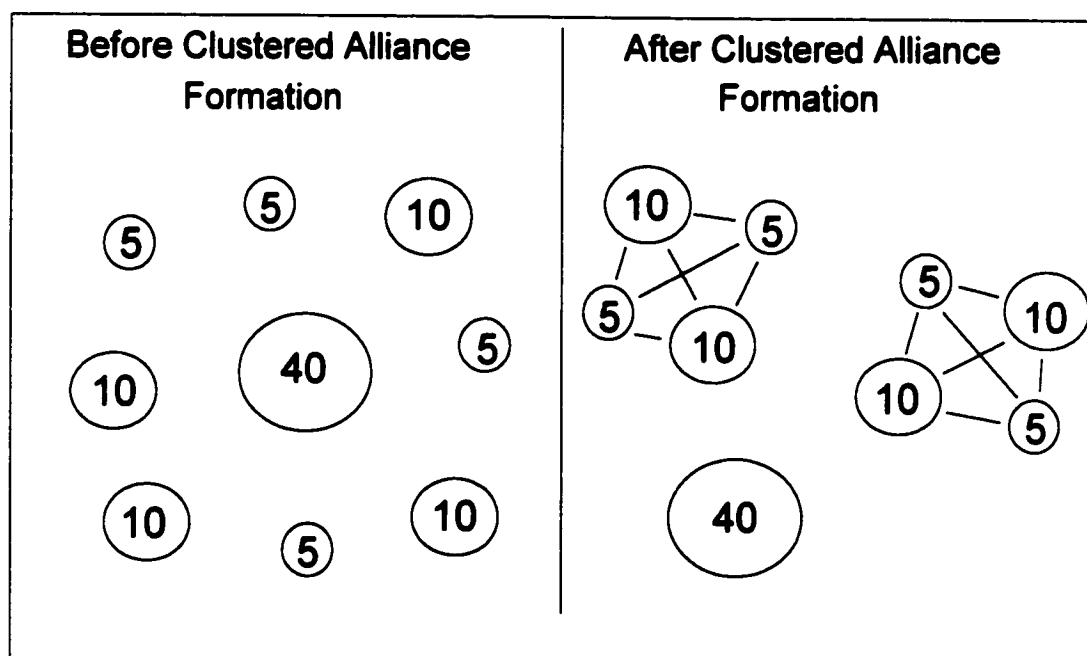
This reduction in the number of competing entities, however, does not necessarily translate into a consolidation of market power. Dominant firms typically do not need to become virtually big through strategic alliances; they typically are already big enough in an actual sense. Thus, given the above discussion of virtual bigness, we would expect that relatively small firms to be more alliance active than large firms. Gomes-Casseres has observed that, in industry after industry, dominant firms, unwilling to concede partial

---

<sup>29</sup> See above.

control in their area of dominance, tend to avoid alliances, while their weaker competitors use them extensively.<sup>30</sup> By forming an alliance cluster, a group of such relatively weak competitors can jointly obtain the resources to effectively compete against a dominant firm. Thus, in many cases, clustered alliance formation, while reducing the number of independently competing entities, actually intensifies market competitiveness.<sup>31</sup> Figure 3.4 helps clarify how this may arise.

**Figure 3.4: A Pro-Competitive Example of Clustered Alliance Formation**



The image on the left shows the market shares of firms in a hypothetical industry. Given the fragmented distribution of market shares of the rest of the firms, it is possible for the firm with the 40% share to wield considerable market power. The image on the right shows the same industry after the smaller firms have consolidated into two alliance

<sup>30</sup> Gomes-Casseres, Benjamin, *The Alliance Revolution: The New Shape of Business Rivalry*, Harvard University Press, Cambridge, Massachusetts, 1996, pp. 39-47.

<sup>31</sup> *Ibid.*

clusters. Competing independently, the small firms would have a difficult time challenging the large firm's dominance. However, through their alliance clusters, they can jointly obtain the scale and resources to effectively compete with the large single firm. Although the clustered alliances represent a partial consolidation, the hypothetical industry has become more competitive. A good example of such a situation is the Java alliance discussed above in which Sun Microsystems, Oracle, Netscape, and other partners have joined forces to develop Java into a viable alternative to Microsoft's dominant Windows operating system.

Thus, whether clustered alliance formation is centripetal or centrifugal depends upon the pre-existing market structure and upon how the clusters evolve. Clustered alliance formation can directly reduce the number of real or potential competitors in a competitive industry; in such cases, clustered alliance formation is centripetal. However, if an industry has a dominant firm, the formation of alliance clusters among the remaining competitors can act centrifugally by creating effective competitors for the dominant firm. Given that small firms benefit more from virtual bigness, and that dominant firms are reluctant to share control in their field of dominance, clustered alliance formation will often enhance competition.

### **3.5: Alliances as Merger Alternatives**

*Virtual bigness* implies that firms do not become large in a real sense; alliances allow small firms to realize the benefits of large firms, but they remain small firms. Without strategic alliances as an instrument for achieving virtual bigness, small firms would be forced to pursue alternative strategies for adapting to environmental factors

favouring large firms; they would be forced into internal growth or mergers -- to become big in a real sense -- in order to survive. However, firms can choose to become virtually big instead, using alliances as substitutes for internal growth or mergers. The relationship between alliances and mergers is significant in that alliances that replace potential mergers act centrifugally, working to prevent the increased concentration that mergers would otherwise create.

Alliances are suitable alternatives to mergers because they provide firms with similar benefits. As illustrated in the discussion of virtual bigness above, alliances can provide firms with capital for expansion and research and development, increased size to realize economies of scale and network effects, access to new geographic and product markets, access to new technology, diversification, and synergy through combining complementary assets and expertise. These are the same benefits which firms seek to achieve through mergers.

Alliances have certain advantages over mergers. While they provide firms with the same benefits as mergers, alliances allow firms to remain relatively independent and small. This is particularly important in an age where effective research often requires a specialized focus and a dynamic environment favours flexibility. An even more significant advantage of alliances over mergers is that alliances are far more easily reversed. Recent studies have shown that, due to the huge premiums acquiring firms often pay for their targets and the difficulties involved in combining diverse corporate cultures, a majority of mergers fail to recuperate their costs.<sup>32</sup> Alliances face similar problems with

---

<sup>32</sup> Grubb, Thomas M. and Lamb, Robert B., "Exploiting Opportunities when your Rivals Merge," *Across the Board*, Volume 36, Issue 1, Jan, 1999, pp. 18-22.

Tully, Shawn, Gunn, Eileen P., "Megamergers: Premium Priced," *Fortune*,



combining corporate cultures; however, while it is difficult and costly to reverse an unsuccessful merger, if an alliance proves to be unprofitable, it can be terminated relatively easily. Such flexibility often makes alliances an attractive strategic alternative to mergers.

Nowhere is the attraction of strategic alliances over mergers more evident than in dynamic, research-intensive industries such as biotechnology. The biotechnology industry consists of hundreds of firms, most of which are small start-ups. Many of these small firms have proven to be effective researchers, but they lack the financial resources and expertise to move from basic research to product development and distribution.<sup>33</sup> One strategy for solving this problem is to merge with other firms, specifically pharmaceuticals which possess resources and expertise the biotechs require. However, biotech research is relatively close to basic science, and this favours small, specialized firms.<sup>34</sup> Thus, biotechs have increasingly turned to alliances to obtain the resources they need to complement their own so they can produce and market saleable products. Many of these alliances have been with established pharmaceuticals which possess the experience and resources the biotechs lack.<sup>35</sup> Figure 3.5 illustrates the preference of

---

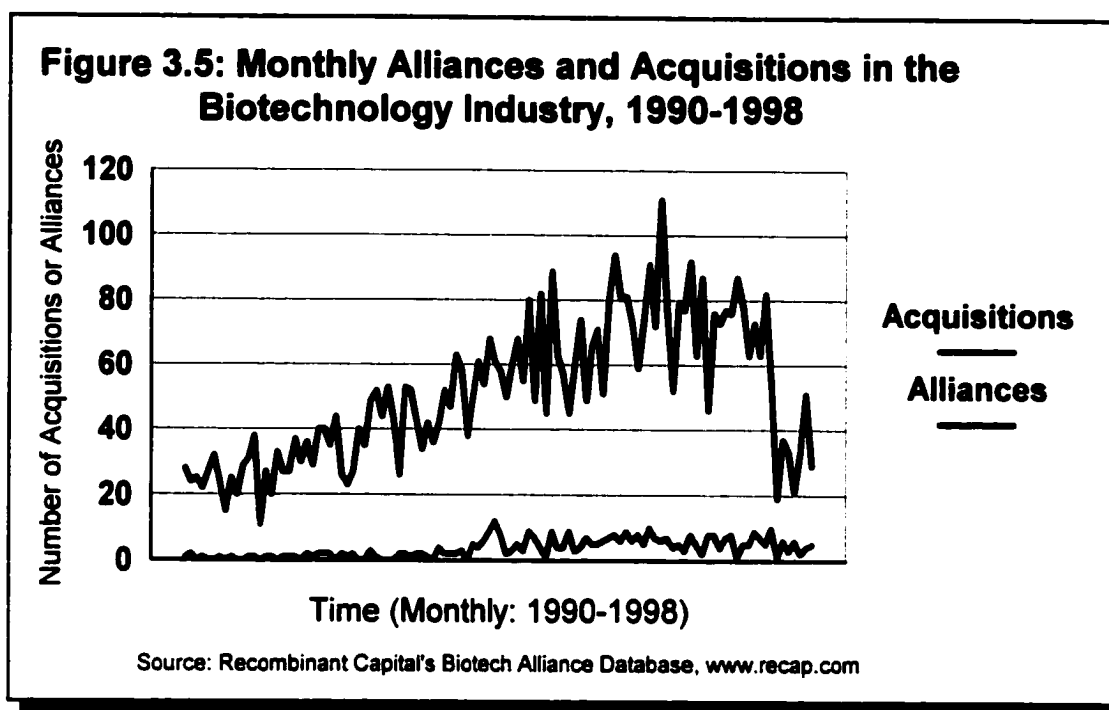
01-11-1999, pp. 99.

<sup>33</sup> Powell, Walter W., Koput, Kenneth W., and Smith-Doerr, Laurel, "Interorganizational Collaboration and the Locus of Innovation: Networks of Learning in Biotechnology," *Administrative Science Quarterly*, March, 1996, pp. 123-124.

<sup>34</sup> Ibid.

<sup>35</sup> Ibid.

alliances over acquisitions as a strategy for obtaining complementary resources in the biotechnology industry.<sup>36</sup>



The availability of alliances as a strategic alternative to mergers has allowed many biotechs to achieve the benefits of bigness while still remaining relatively small and independent. In this case, virtual bigness is acting as a centrifugal market force, because it is preventing the consolidation that might otherwise occur through mergers.

Further evidence of the strategic use of alliances as alternatives to mergers comes from the direct-marketing industry. The direct-marketing industry is currently undergoing considerable consolidation. Gruppo, Levy, and Capell Inc., an investment banking firm which focuses on the direct-marketing industry, tracked 213 direct-marketing mergers and acquisitions in the first quarter of 1998 versus 107 in the first quarter of 1997, a 99% increase. The consolidation is being driven by the increasing costs of technology, and by

<sup>36</sup> The data include acquisitions and alliances between biotechs and pharmaceuticals.

clients' desire for their direct-marketing firms to provide a broad range of services.<sup>37</sup>

Small and medium-sized companies, which need to strategically respond to these centripetal forces, are turning to strategic alliances. Colin Lippincott, Vice President of direct-marketer, Polk Co. comments, "With technology as expensive as it is, partnerships are a way of getting use of it without investing large amounts of capital or being acquired by another company."<sup>38</sup> This statement clearly demonstrates the strategic use of alliances as an alternative to mergers by direct-marketers. As a result, Gruppo, Levey, and Capell Inc. report that direct-marketing strategic alliances have increased from 65 in the first quarter of 1997 to 120 in the first quarter of 1998.<sup>39</sup> Alliances in the direct-marketing industry are enabling smaller firms to meet the challenges of consolidation, while still retaining their independence. Thus, because these firms are able to achieve virtual bigness through alliances, they can prevent the increased concentration that would otherwise have occurred through mergers; in this context, virtual bigness is acting centrifugally.

### **3.6: Conclusion**

In many modern markets, firms are caught in an evolving environment that requires them to possess, simultaneously, the properties of both small and large organizations. Strategic alliances enable firms to bridge this gap by achieving virtual bigness. That is, they provide small firms with the characteristics of large organizations, while still allowing them to remain relatively small and independent.

---

<sup>37</sup> Briomes, Maricris G., "DM Industry: M&A Leaves Small Firms Reassessing," *Marketing News*, Volume 30, Issue 17, Aug. 17, 1998, pp.1, 18.

<sup>38</sup> Ibid.

<sup>39</sup> Ibid.

The impact of virtual bigness on the evolution of market structure depends upon the pattern of alliance formation in the industry under consideration. In markets where alliance formation is clustered, virtual bigness reduces the number of competing entities, and can act either centripetally or centrifugally depending on whether the alliance clusters consolidate market power or create effective competitors for dominant firms. In markets where alliance formation is amorphous, however, alliances typically do not reduce the number of competitors, and virtual bigness induces firms to choose alliances as strategic alternatives to mergers. By preventing the increased concentration that would otherwise occur through mergers, virtual bigness acts as a centrifugal market force. Thus, the impact of virtual bigness on market structure is industry specific, and largely depends on the structure of alliance formation. Where this chapter has examined the effect of strategic alliances and virtual bigness on market concentration, the following chapter examines the effect of alliances on another element of market structure, barriers to entry.

## **Chapter 4: The Impact of Strategic Alliances on Barriers to Entry**

An entry barrier is any factor which inhibits new firms from entering into a market (often defined as a competitive advantage which an incumbent enjoys over a potential entrant derived solely from being an incumbent). Entry barriers are a key ingredient in analysing a market's structure and competitiveness.<sup>1</sup> High barriers to entry facilitate dominant firms to maintain their market power, as they will face little or no competition from potential entrants. Low barriers, on the other hand, allow new firms to enter markets where there are opportunities for profit, reducing concentration and providing competition for dominant firms. In addition, when entry barriers are low, the mere threat of potential competition from outsiders limits the market power of firms with large market shares, as they refrain from raising prices so as not to attract new competitors. Thus, high entry barriers, because of their centralizing nature, are a centripetal force, supporting concentration and preserving market dominance, while any factor that lowers entry barriers is a centrifugal market force.

This chapter continues the examination of the effect of strategic alliances on traditional elements of market structure, focusing on their effect on entry barriers. Gomes-Casseres briefly examines the impact of alliances on entry. He describes the "paradox of barriers to collaboration:" alliances can enhance entry by helping firms acquire the required capabilities, but, widespread alliance formation can block entry by foreclosing further opportunities for sharing capabilities.<sup>2</sup> This chapter provides a more

---

<sup>1</sup> Joe S. Bain introduced the concept of entry barriers and their effect on market power in *Barriers to New Competition* (Harvard University Press, 1956).

<sup>2</sup> Gomes-Casseres, Benjamin, *The Alliance Revolution: The New Shape of Business Rivalry*, Chapter 5, "Alliances and the Organization of Industry," Harvard University Press, Cambridge, Massachusetts, 1996.

detailed examination of the effects of alliances entry and, again, places alliances into the framework of centrifugal and centripetal market forces. It will be shown that alliances can have both centrifugal and centripetal effects with respect to entry. Alliances can both facilitate entry, and become, themselves, formidable entry barriers.

#### **4.1: Centrifugal Effects of Alliances with Respect to Entry**

##### **4.1.1: Strategic Alliances and Geographic Entry**

Strategic alliances are often used as a means of securing entry into new geographic markets. Such alliances may take the form of a foreign firm from a developed country teaming up with a domestic firm from a developing country. The foreign firm may face entry barriers in terms of a limited knowledge of local customs, market practices, and regulations (including restrictions on foreign operations), which can be provided by the domestic firm. Similarly, the domestic firm may lack the capital or technological knowledge to become an effective competitor; these can be provided by the foreign firm. Thus, the last decade has witnessed a multitude of alliances between foreign firms from North America, Western Europe, and Japan and domestic firms from developing countries (particularly in markets such as China, India, and Eastern Europe where significant growth opportunities are perceived).

The use of alliances to assist foreign market entry is not limited to developing countries, however. Alliances are often employed as a means of entering into developed foreign markets as well. The breakfast cereal market provides a useful example. While General Mills has been a successful competitor in North America, it was unable to get

much of a foothold in Europe, where Kellogg's has long been the dominant player. Therefore, in 1989, General Mills formed an alliance with Nestlé called Cereal Partners Worldwide. General Mills provided brand name products such as Cheerios, while Nestlé contributed market experience and a wide-spanning distribution system. The combined resources of the two firms has allowed Cereal Partners Worldwide to quickly become a viable competitor to Kellogg's in a number of international markets.<sup>3</sup>

A better-known example of how alliances assist in foreign entry into developed markets is NUMMI -- New United Motor Manufacturing Inc. -- an automaking joint venture between General Motors and Toyota. In the early 1980's, Toyota was anxious to avoid hefty tariffs and to learn whether it could apply its lean production techniques using American labour, while General Motors was interested in learning Toyota's manufacturing methods, which set the industry standard for productivity and quality control.<sup>4</sup> Thus, in 1984, they established NUMMI to jointly produce Chevy Novas (now called Chevy Prizms) and Toyota Corollas in Fremont, California. NUMMI has been a success; the information Toyota acquired from the joint venture has allowed Toyota to expand its North American production through other transplant facilities, further lowering the barriers caused by restrictive import restraints.<sup>5</sup>

---

<sup>3</sup> Knowlton, Christopher, "Competition: Europe Cooks up a Cereal Brawl," *Fortune*, June 3, 1991, p. 175.

<sup>4</sup> The term, *lean production*, refers to a manufacturing approach pioneered by Toyota that strives to eliminate unnecessary steps in the production process, align all steps in an activity in a continuous flow, recombine labor into cross-functional teams dedicated to that activity, and continually strive for improvement. Lean production can enable companies to develop, produce and distribute products more efficiently while becoming more flexible and responsive to customer desires. -- Womack, James P. and Jones, Daniel T, "From Lean Production to the Lean Enterprise." , *Harvard Business Review*, 03-01-1994, p 93.

<sup>5</sup> Womack, James P., Jones, Daniel T., and Roos, Daniel, *The Machine that Changed the*

The above two examples illustrate how alliances can assist firms' entry into new geographic markets. Foreign entry into a domestic market represents a centrifugal market force as it reduces concentration, limits the power of large domestic firms, and enhances consumer choice.

#### **4.1.2: Vertical Alliances and Geographic Entry**

Vertical alliances can facilitate the entry of suppliers when manufacturers enter new geographic markets; this is what occurred when the Japanese automakers established their transplant facilities in the United States. The Japanese automakers have long-standing relationships with their suppliers. These relationships go well beyond arms-length transactions; close cooperation between automobile suppliers and assemblers with respect to market information, production, and quality control are key ingredients in the Japanese automakers' lean-manufacturing techniques. When the Japanese automakers set up their transplant facilities, they needed suppliers who were equipped to meet the demands of lean-production. Their long-term alliances with Japanese automakers provided Japanese suppliers with a competitive advantage over their U.S. counterparts who were, themselves, trying to win contracts supplying the transplant facilities. This competitive advantage encouraged numerous Japanese suppliers to enter into the North American market. Once established, they were in a much better position to go after business from the American automakers. The end result was an increase in the number of players in the North American auto parts industry.<sup>6</sup>

---

*World*, pp. 82-86. NUMMI will be discussed in greater detail in the case study of alliances in the automobile industry.

<sup>6</sup> Banerji, Kumal and Sambharya, Rakesh B., "Vertical Keiretsu and International Market



#### **4.1.3: Strategic Alliances and Entry into New Product Markets**

Strategic alliances can expedite entry into new product markets by allowing firms to pool their resources so that they can, collectively, acquire the capabilities needed to become effective competitors. Thus, an alliance of two or more firms might be able to enter a new market, where they would have been unable to do so on their own.

One example of such an alliance involves two Canadian high-tech firms - Newbridge Networks Corp. and Com Dev International Ltd. In August of 1997, the two firms formed a joint venture, Spacebridge Networks Corp., which will produce equipment for satellite networks. Com Dev makes space and ground-based wireless communications products, while Newbridge manufactures networking equipment. While neither firm possessed the complete array of expertise to go it alone, by pooling resources and combining knowledge, Spacebridge was able to enter into the market for low-orbiting satellite networks.<sup>7</sup>

Another interesting alliance exists in the Alberta gas-pipeline industry. A consortium of eighteen Alberta gas suppliers (accounting for 25% of industry production) is forming an alliance to construct a pipeline to transport gas to market. The suppliers contend that the existing two pipelines are limiting capacity, resulting in higher transport costs; this ultimately leads to a smaller Alberta gas sector. The goal of the alliance is to introduce more competition into the pipeline oligopsony in an attempt to lower prices. In

---

Entry: The Case of the Japanese Automobile Ancillary Industry," *Journal of International Business Studies*, March 1996, pp. 89-114.

<sup>7</sup> "Newbridge, Com Dev in Satellite Joint Venture," *Financial Post Daily*, August 15, 1997, p. 5.

order to achieve the economies of scale required for the efficient shipment of gas, the pipeline requires a large capital investment. While none of the individual gas suppliers can afford such an investment, by pooling their funds through an alliance, they are able to enter into the pipeline market, introducing new competition.<sup>8</sup>

As the above examples illustrate, strategic alliances can facilitate entry by providing firms with resources they would not have otherwise possessed; these resources allow new entrants to become effective competitors.

## **4.2: Centripetal Effects of Alliances with Respect to Entry**

### **4.2.1: Alliance-Created Entry Barriers**

While strategic alliances can help firms overcome entry barriers, they can, in time, work in the opposite direction, increasing barriers to entry. If the established firms in an industry are each engaged in an alliance, a new entrant must match the resources and capabilities of the entire alliance if it is to compete effectively.<sup>9</sup> The potential entrant can try to acquire these resources on its own, or it can search for a suitable alliance partner (who may or may not be available). When incumbents are engaged in complex arrangements of alliances, the difficulties for the potential entrant are magnified. This is particularly true in industries where the clustered structure of alliance formation is

---

<sup>8</sup> “The Revolt of the Gas producers: A New Suppliers’ Consortium Aims to bypass Traditional Pipeline Companies,” *Western Report*, v. 11(38), October 14, 1996, pp. 13, 15.

<sup>9</sup> Gomes-Casseres, Benjamin, *The Alliance Revolution: The New Shape of Business Rivalry*, pp. 190-193.

predominant, as entry into an alliance cluster often requires the consent of multiple firms rather than just one. Thus, alliances can become formidable entry barriers.

Here, the timing of alliance formation is critical. In the early stages of alliance formation within an industry, alliances help potential entrants match the resources of incumbents, thus facilitating entry. As the industry's alliance network grows, however, the resources and relationships required for effective entry multiply, creating formidable entry barriers. The biotechnology industry provides an insightful example. In its infancy, the biotechnology industry was populated by numerous small start-ups ("dedicated biotechnology firms" or DBF's in industry parlance). While these start-ups possessed the required scientific knowledge, they lacked expertise in manufacturing, marketing, and distribution, and were short on the capital required to fund costly research. Established pharmaceutical firms were sought as partners to provide the organizational capabilities the small biotech firms were lacking. These alliances furnished the pharmaceuticals with the knowledge required to establish their own, in-house biotech programs.<sup>10</sup> Thus, alliances played a significant role in the pharmaceuticals' entry into the biotechnology industry. Now, however, pharmaceuticals and DBF's coexist among a complex web of alliances. Effective entry thus requires firms to form their own networks of alliances, and suitable partners may not be available. The complex web of alliances that now exists in the biotech industry has become, itself, a significant entry barrier.<sup>11</sup>

---

<sup>10</sup>Powell, Walter W., "Learning from Collaboration: Knowledge and Networks on the Biotechnology and Pharmaceutical Industries," *California Management Review*, Spring 1998, V.40 Issue 3, pp. 228-234,

<sup>11</sup>This does not necessarily mean that, all things considered, the biotech alliances are a centripetal structural element (in fact, they play an important role in innovation and the diffusion of knowledge within the industry), but only that they have made entry much more difficult.

#### **4.2.2: The Elimination of Potential Entrants**

In section 4.1, it was shown how alliances can help firms obtain the resources required for effective entry. However, if each of the allied firms already possesses these required resources independently of collaboration, a strategic alliance may limit entry by allowing two or more potential entrants to link up and enter the market as a single entity. In such situations, the number of players in the industry increases by only one, rather than by two or more if the alliance partners had entered the market on their own.

Additionally, there are times when firms possess the resources to effectively enter a market independently, but, instead, choose to join existing strategic alliances as new partners. If the activity of the alliance is kept separate from the selling of the product (each partner markets and sells its product independently), a new competitor will be introduced into the market. (This is common in many research and development joint ventures, where alliance partners typically take the outcomes of the research and apply it to their own products. The partners co-operate in the research function, but their products compete against one another in the market.) However, if an alliance's activities include the producing and selling of a fairly standardized product, the inclusion of a potential entrant in a pre-existing alliance can often limit entry. For example, Dow Chemical had long been expected to enter into the polypropylene market. When it did so, in 1996, Dow joined a Shell-Montedison joint venture, Montell, that was already the world's largest polypropylene producer.<sup>12</sup> A firm with Dow's resources could certainly have provided

---

<sup>12</sup>Alperowicz, Natasha, "Dow to Link Up with Montell in Polypropyne Venture," *Chemical Week*, May 29, 1996, p.7.

vigorous competition for Montell; however, Dow's inclusion in this already existing joint venture effectively eliminated it as a significant competitor.

#### **4.2.3: Alliances and Artificial Entry Barriers**

Finally, strategic alliances can provide groups of incumbents with opportunities to raise artificial barriers to entry. This can happen when membership in an alliance that is controlled by an industry's incumbents becomes a necessity for competing in that industry. Such a situation has occurred in the Canadian financial services industry. In 1995, the Canadian Competition Bureau charged the Interac alliance -- the network of automated teller machines (ATM's) and direct payment debit-card systems run by Canada's big banks, trust companies, and credit unions -- with abusing their "joint dominant position" by preventing retailers and other financial institutions from taking advantage of the system. Along with other non-competitive activities, the Interac alliance created an entry barrier into the ATM market by charging prohibitive entrance fees to financial institutions that wanted to join.<sup>13</sup> Providing customers with access to ATM's has become an essential part of the financial services industry. By preventing newcomers from joining their network, the Interac alliance helped to protect its members from external competition.

---

<sup>13</sup>"Banks Interac Grip Broken," *Financial Post Daily*, Dec. 15, 1995, pp.1,2.

### **4.3: Conclusion**

In summary, alliances can have both a centripetal and a centrifugal effect on market structure with respect to entry. There are three key elements in determining how new alliances will affect entry barriers in an industry, viz. (1) whether the alliances involve potential entrants or incumbents, (2) the extent of the alliance formation, and (3) whether a clustered alliance structure is prevalent. While alliances can aid entry by helping outsiders obtain the resources needed to compete effectively, alliances among incumbents force potential entrants to obtain the resources of a number of firms (either internally, or through their own series of alliances), and so become formidable entry barriers themselves. The greater the extent of alliance formation in an industry, the more difficult entry generally becomes, as potential entrants must obtain an ever more diverse set of capabilities to compete with the interrelated incumbents. If acquiring these capabilities realistically involves establishing alliances, and if firms in the industry have already joined into distinct alliance clusters, these existing alliances will make entry by new firms more difficult, as joining a cluster often requires the consent of multiple partners rather than just one. These factors determine whether alliance formation is likely to enhance or inhibit entry.

Entry can be either enhanced or inhibited when new partners join existing alliances. If the alliance is not involved with the selling function, and provides the new partner with the resources it needs to compete, then entry will be promoted. If, on the other hand, the alliance is involved in the production and selling of the product, and if the newcomer could have entered the market on its own, a potential competitor will have been eliminated.

**In general, no conclusive statement can be made in assessing whether strategic alliances are a centripetal (i.e., they raise entry barriers) or a centrifugal market force with respect to entry. Each alliance and industry must be considered on a case by case basis, considering the factors discussed above.**

## Chapter 5: Strategic Alliances and Innovation

... in capitalist reality as distinguished from its textbook picture, it is not that kind of competition (competition within a rigid pattern of invariant conditions, particularly price competition) which counts, but the competition from the new commodity, the new technology, the new source of supply, the new type of organization ... -- competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the outputs of existing firms but at their foundations and their very lives. This kind of competition is as much more effective than the other as a bombardment is in comparison with forcing a door, and so much more important that it becomes a matter of comparative indifference whether competition in the ordinary sense functions more or less promptly.<sup>1</sup> -- Joseph Schumpeter

### 5.1: Virtual Bigness and Innovation

There is little doubt regarding the importance of innovation towards economic prosperity; many studies have found that innovation accounts for a major share of economic growth (if not the major share).<sup>2</sup> Given its contribution to economic well-being, the benefits of enhanced innovative abilities of firms and markets can quickly exceed any associated costs to static efficiency.<sup>3</sup>

The goals of innovative efficiency and static allocative efficiency, however, are not necessarily mutually exclusive -- competitive markets are often conducive to both.

While earlier research found a somewhat ambiguous relationship between firm size and

---

<sup>1</sup> Schumpeter, Joseph A., *Capitalism, Socialism, and Democracy*, Harper and Brothers Publishers, New York, 1942, pp. 84-85.

<sup>2</sup> Federal Trade Commission Report, *Anticipating the 21st Century: Competition Policy in the New High-Tech, Global Marketplace, Chapter 6: Innovation Intellectual Property, and Competition*, 1996, p.1.

<sup>3</sup> This chapter discusses innovation from the perspective of proprietary research and information. This is not to deny that, in some instances, public research can have certain advantages over proprietary research, particularly with respect to the diffusion of new knowledge. Alliances are established by firms whose profit motive gives them an incentive to maintain ownership over new knowledge they create; hence the focus on proprietary research.



innovation,<sup>4</sup> more recent empirical work has established that, contrary to popular belief, industry innovation generally decreases as firm size rises, and that innovative activity is hindered in concentrated markets.<sup>5</sup>

There are numerous explanations for the innovative success of small firms and unconcentrated markets. Small firms have less bureaucracy, and possess more rapid and effective internal communication and decision-making chains; these provide small firms with the flexibility to respond quickly to changing market conditions and technological opportunities. They have specialized focuses, which allow them to become technological leaders in their chosen fields, and help them discover and exploit niche market opportunities. Researchers in small firms tend to be more motivated, as they generally receive greater personal rewards for their efforts.<sup>6</sup> Competition provides a key stimulant for innovative effort, as firms in competitive markets are motivated by the potential gains of achieving a technological advantage over competitors or of being the first to market with a new process or product. The threat of falling behind competitors in technology races can be an even stronger incentive to innovate. As a business witness to the FTC's hearings on Competition Policy on the New High-Tech Global Marketplace described:

(In the absence of intellectual property protection) the only significant protection would be to continue to move so rapidly to introduce new, faster and less expensive products that no competitor could keep up. ... Clearly, the customer is best served by encouraging a regime within which

---

<sup>4</sup> Scherer, F. M., *Industrial Market Structure and Economic Performance*, Houghton Mifflin Company, Boston, 1990. pp. 644-660.

<sup>5</sup> Acs, Zoltan J. and Audretsch, David B., "Innovation in Large and Small Firms: An Empirical Analysis," *The American Economic Review*, Vol. 78, No. 4, Sept. 1988, pp. 678-690; Acs, Zoltan J. and Audretsch, David B., *Innovation and Small Firms*, The MIT Press, Cambridge Massachusetts, 1990, pp. 37-77.

<sup>6</sup> Vossen, Robert W., "Relative Strengths and Weaknesses of Small Firms in Innovation," *International Small Business Journal*, 16, 3, pp. 88-94.

the best defence of any company is to run faster than any of its competitors. The result of such a corporate paradigm is newer, faster, better, cheaper products on a regular basis.<sup>7</sup>

Thus, the environment best suited to nurturing innovation generally consists of small firms and unconcentrated, competitive markets.

Strategic alliances can foster innovation when they act centrifugally to limit concentration and support the survival of small firms. Alliances promote the survival of small firms by creating virtual bigness, where small firms can realize the advantages enjoyed by large firms while remaining small.<sup>8</sup> Even in markets where there are strong centripetal forces, such as rising R&D costs, alliances can help small firms thrive and markets remain unconcentrated. As small firms and unconcentrated markets tend to be more innovative, alliances that promote small firms' survival also, indirectly, promote innovation.

This is true even in industries where small firms have an innovative disadvantage. Acs and Audretsch found that small firms have an innovative disadvantage in industries that involve significant capital, R&D, and advertising expenditures.<sup>9</sup> The likely cause of this disadvantage is that small firms often lack the resources to finance large-scale research operations or to produce, distribute, and market their innovations. By allowing groups of firms to pool their resources, strategic alliances can provide the funding and

---

<sup>7</sup> Federal Trade Commission Staff Report, *Anticipating the 21st Century: Competition Policy in the New High-Tech, Global Marketplace, Chapter 6: Innovation Intellectual Property, and Competition*, 1996, pp.12-13. Indeed, the business testimony of the hearings was unanimous in its conviction that competition provides a key incentive for innovation.

<sup>8</sup> See Chapter 3, "Strategic Alliances and Virtual Bigness."

<sup>9</sup> Acs, Zoltan J. and Audretsch, David B., *Innovation and Small Firms*, The MIT Press, Cambridge Massachusetts, 1990, pp. 37-77.

capabilities individual small firms may lack. Therefore, even in those industries where they would appear to have an innovative disadvantage, small firms can become as innovative as large firms (or even more innovative) by forming alliances to collectively obtain the resources of large firms; virtual bigness fosters innovation.

## **5.2: Pooled Research Efforts and Duplication**

Strategic alliances enable firms to co-ordinate their research efforts, allowing them to share costs, reduce individual exposure to risk, and avoid potentially wasteful duplication. Avoiding such duplication saves industry-wide resources, and can increase the pace of technological development, as groups of firms, rather than individual firms, share ideas and direct their efforts towards common innovative goals.

An example of such an alliance is the Ultralight Steel Autobody Initiative, a joint venture comprised of thirty-three steel producers from fifteen countries. The goal of the alliance is to design and produce a lightweight, high-strength steel auto shell. This will allow the alliance's partners to adapt to automakers' demands for lighter autobodies and respond to competition in the autobody market from the aluminium and plastics industries. The alliance has been relatively successful thus far, producing a concept shell that is 35% lighter, 14% less expensive, and improves rigidity by 132%.<sup>10</sup> The Ultralight Steel Autobody Initiative has enabled its partners to share costs and technology and avoid duplicating their research efforts.

While joint ventures such as the Ultralight Steel Autobody Initiative typically produce more efficient innovative activity, alliances that eliminate duplication completely

---

<sup>10</sup> "Ultralight Steel Project Tests Industry's Mettle," *Plant*, v. 55(16), Nov. 11, 1996, pp. 16-18.

can have a negative impact on innovation. As discussed above, competition among firms to be the first to bring a new technology to the market acts as a powerful incentive to innovate. If a number of competitors share the innovations developed through cooperative research, no single firm will be able to gain a competitive advantage over the others through innovation. The elimination of potential winners and losers significantly reduces competitors incentive to innovate.

Additionally, duplication allows competing firms to pursue a variety of research paths. Innovation is a risky process, and there is no guarantee that the line of research chosen by an alliance will result in the development of the best technology, or that it will prove fruitful at all. Competition and variety among innovators increases the likelihood that at least one of the research paths will be successful. Thus, with respect to joint research, the ideal situation for an industry is likely one where alliances eliminate unnecessary duplication, but still leave enough competition among firms or alliance clusters to provide an adequate variety of research paths and to give them incentives to win technology races.

### **5.3: Knowledge Transfer**

The diffusion of knowledge is an important element of innovation. The transfer of knowledge allows individuals and organizations use the earlier acquisition of knowledge by others as a stepping stone for their own research, and it helps to avoid the wasteful duplication of research efforts. Indeed, one of the main goals of patent grants is to promote the diffusion of knowledge by requiring the publication of detailed specifications

of new technologies. Publication, however, is unable to promote the diffusion of all types of knowledge useful to firms.

Firm knowledge is typically classified into two types: codified and tacit. Codified knowledge is that which can be easily reproduced either verbally or through writing, such as product designs or specifications. In contrast, tacit knowledge is that which is embedded in the experiences of the firm that possesses it. It is typically developed over long periods of “learning-by-doing.” Thus, tacit knowledge is difficult to communicate verbally or in writing.<sup>11</sup> Codified knowledge is easily transferred from firm to firm;<sup>12</sup> it is spread through publication, and can be acquired through simple purchases or licensing agreements. Tacit knowledge, however, does not transfer so easily; yet it can be just as important as codified knowledge in helping firms remain at the forefront of technology.

Strategic alliances are an important vehicle for facilitating the transfer of tacit knowledge. An example of a well-known alliance which has proved successful in transferring tacit knowledge is General Motors’ and Toyota’s NUMMI (New United Motor Manufacturing Inc.) joint venture. In the early 1980’s, Toyota was anxious to learn whether it could apply its lean-production techniques using North American labour, while General Motors was interested in learning Toyota’s manufacturing methods.<sup>13</sup> Neither of the two firms’ knowledge requirements lead itself to easy transfer, as they were engraved in the other firms’ experiences and culture. Thus, in 1984, they established NUMMI to jointly produce the Chevy Nova (now called Chevy Prizm) and the Toyota Corolla in

---

<sup>11</sup>Dutta, Shartanu and Weiss, Allen M., “The Relationship Between a Firm’s Level of Technological Innovativeness and Its Pattern of Partnership Agreements,” *Management Science*, Vol. 43, No. 3, March 1997, p. 345.

<sup>12</sup> *Ibid.*

<sup>13</sup> Refer to Chapter 4, page 75 for a definition of lean production.

Fremont, California. With the knowledge acquired through NUMMI, Toyota has been able to expand its North American operations, building successful assembly plants in Kentucky, Indiana, and Ontario.<sup>14</sup>

For GM, learning Toyota's lean-production methods was more difficult (because the knowledge was more tacit), but still relatively successful. As part of the joint venture agreement, GM is allowed to assign sixteen managers to NUMMI for two-year terms, after which they are rotated back into GM where they can apply what they have learned to GM's other plants. This type of continuous interaction was necessary for GM managers to absorb the tacit elements of lean production and spread this knowledge throughout their organization.<sup>15</sup> This has allowed GM to adopt many of Toyota's lean-production techniques throughout its global operations, particularly in its successful Saturn division.<sup>16</sup> Without long-term alliances such as NUMMI, obtaining the tacit knowledge they needed to improve their productive efficiency and quality would have been considerably more difficult for GM and the other American automakers.

#### **5.4: The Appropriation of Research Costs**

Strategic alliances help foster innovation by helping small, research-intensive firms appropriate their research costs. Small firms may possess the knowledge required to make initial technological discoveries, but they often lack the experience and resources needed to develop their initial discovery into a useable product, negotiate clinical trials and

---

<sup>14</sup> Inkpen, Andrew, "Learning and Knowledge Acquisition through International Strategic Alliances," *Academy of Management Executive*, Vol. 12, No. 4, 1998, pp. 69-80.

<sup>15</sup> *Ibid.*

<sup>16</sup> Womack, James P., Jones, Daniel T., and Roos, Daniel, *The Machine that Changed the World*, New York, Harper Perennial, 1990, pp.82-84.

government regulations, and market and distribute their innovations. Without a means of overcoming these foreseeable obstacles and recovering their expenses, small firms will have little incentive to incur the initial costs of research. Alliances, however, can provide such firms with the capabilities and resources they need to overcome these obstacles.

The biotechnology industry provides a useful example of how strategic alliances help small firms appropriate their research expenses. There are over 1,300 biotech companies in the United States alone. Of these, only very few (as few as three up to 1997) have been able to get a product to market under their own labels.<sup>17</sup> Moving from basic research to product development in biotechnology is costly and time consuming (it takes ten to twelve years to bring a drug from discovery to doctors' prescription),<sup>18</sup> and it also demands expertise in conducting extensive clinical trials and securing federal regulatory approval.<sup>19</sup> These capabilities are beyond the reach of most biotechs. However, large pharmaceutical companies, which have been unable to foster internally the type of research environment best suited for biotech discovery (a process much closer to basic science than they are accustomed), possess the financing and expertise the biotechs lack, and also control worldwide marketing channels.<sup>20</sup> The solution has been the development of alliances, with the biotechs providing research prowess and technological breakthroughs, and the pharmaceuticals contributing financing, marketing, and clinical and regulatory experience. These alliances provide the small biotechs with a means of

---

<sup>17</sup>Stevens, Tim, "The Gene Machine," *Industry Week*, Vol. 246, 08-18-1997, pp. 168-172.

<sup>18</sup>*Ibid.*

<sup>19</sup>Powell, Walter W., Koput, Kenneth W., and Smith-Doerr, Laurel, "Interorganizational Collaboration and the Locus of Innovation: Networks of Learning in Biotechnology," *Administrative Science Quarterly*, 41(1996), pp. 116-145.

<sup>20</sup> *Ibid.*

recovering their initial research costs. Without the availability of such collaborations, the biotechs would conclude that their research efforts eventually would prove financially fruitless, leaving them with little incentive to innovate in the first place. Fortunately, biotech firms have been able to establish alliances with pharmaceuticals, which has enabled them to bring numerous highly valuable drugs to the market.<sup>21</sup>

An example of such an alliance is Eli Lilly's and Genentech's groundbreaking agreement to develop recombinant human insulin. In the mid 1970's, pharmaceutical company Eli Lilly was a leading supplier of insulin which, at the time, was being purified from pig glands. Projections showed that insulin demand would surpass the available material for insulin production by 1992. In response, Lilly offered a contract to the winner of a race to clone human insulin. Genentech won the race, and established an alliance with Lilly to develop the genetically engineered insulin ("Humulin") into a pharmaceutical product.<sup>22</sup> Today, most diabetics are prescribed genetically engineered insulin, and Humulin is used daily by more than four million diabetics worldwide.<sup>23</sup> This alliance set a standard for future innovation in the biotechnology industry. The prospect of establishing relationships with a large pharmaceutical firms (which have the resources and experience to transform their discoveries into lucrative products) has given biotechs a strong incentive to invest in research and innovate. Additionally, it allows small firms to maintain their independence and their research-intensive focuses, so that they can remain effective innovators.

---

<sup>21</sup> Stevens, Tim, "The Gene Machine," *Industry Week*, Vol. 246, 08-18-1997, pp. 168-172.

<sup>22</sup> Edwards, Mark and Hamilton, Joan, "Ten Deals that Changed Biotechnology," *Signals* (published by Recombinant Capital Inc.), Nov. 11, 1998 ([www.signalsmag.com](http://www.signalsmag.com)).

<sup>23</sup> Eli Lilly website, [www.lilly.com](http://www.lilly.com).



### **5.5: Strategic Alliances and the Free-Rider Problem**

In addition to helping innovators overcome the obstacles they face in developing and marketing their discoveries, alliances can help protect innovators from free-riders. Once a firm introduces a new discovery to the market, it often can be imitated quickly by competitors. The potential for such competition from free-riders reduces the returns likely to be recovered by the innovating firm, diminishing its incentive to innovate. The result is a sub-optimal level of innovative activity. This is the argument used to justify patents, copyrights, and other intellectual property rights, which attempt to provide innovators with protection from free-riders. However, studies show that, in many industries, patents are limited in their ability to protect innovations from imitation.<sup>24</sup> Competitors are often able to reverse-engineer new products and “design around” an innovator’s patents. In such situations, once the innovation becomes known, the innovator’s success will depend on its ability to compete in manufacturing and other non-innovation processes. However, given their typical need to maintain a specialized focus, innovators often lack such capabilities.<sup>25</sup> Therefore, they will be unlikely to compete in the very markets their innovations helped to create. The solution for such firms is the maintenance of alliances with partners who have world-class expertise in non-innovative functions (such firms are attracted to innovators - as opposed to imitators - by the opportunity of realizing

---

<sup>24</sup>Federal Trade Commission Report, *Anticipating the 21st Century: Competition Policy in the New High-Tech, Global Marketplace, Chapter 6: Innovation Intellectual Property, and Competition*, 1996, pp. 5-10; Jorde, Thomas M. and Teece, David J., “Innovation and Cooperation, Implications for Competition and Antitrust,” *Journal of Economic Perspectives*, Volume 4, Number 3, Summer 1990, pp. 147-149.

<sup>25</sup>See Chapter 3, *Virtual Bigness*.

first-mover advantages). By supplying innovators with access to superior manufacturing and marketing expertise, alliances can provide an effective defence against free-riders, allowing innovators to appropriate their research costs and maintain their incentive to innovate.<sup>26</sup>

Additionally, alliances can help overcome the free-rider problem by partially internalizing the spillover benefits innovation provides free-riders. This externality problem can be overcome by internalizing the spillover through a merger between the innovator and the free-rider. While such a merger can eliminate the free-rider problem, it can create other problems resulting from reduced competition. A compromising solution is a research joint venture in which firms cooperate in innovation but remain competitors in the product market. A model by D'Aspremont and Jacquemin provides an example which illustrates that, when spillovers are significant, co-operative research and development, along with competition in the output market, is greater than competitive research and development. Furthermore, the model finds that cooperative research with competition in the product market is more profitable than competitive research, so firms have a natural incentive to establish such R&D joint ventures.<sup>27</sup> Thus, research alliances can help promote a more efficient level of innovation by internalizing R&D externalities, while retaining competition in the product market.

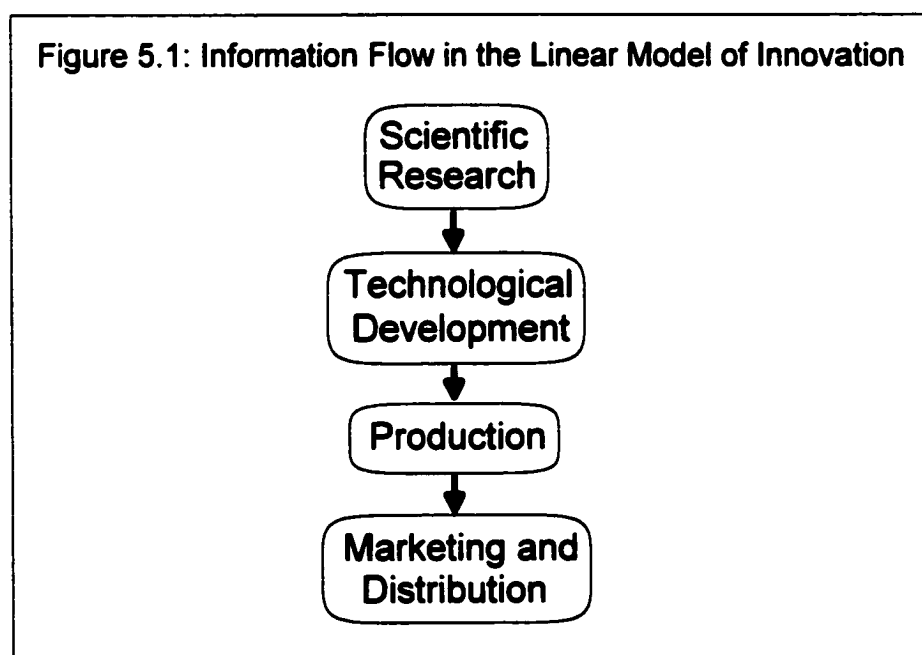
---

<sup>26</sup>Jorde, Thomas M. and Teece, David J., "Innovation and Cooperation, Implications for Competition and Antitrust," *Journal of Economic Perspectives*, Volume 4, Number 3, Summer 1990, pp. 147-149; Jorde, Thomas M. and Teece, David J., "Rule of Reason Analysis of Horizontal Arrangements: Agreements Designed to Advance Innovation and Commercialize Technology," Comments made to the *FTC Joint Venture Hearings*.

<sup>27</sup>D'Aspremont, Claude and Jacquemin, Alexis, "Cooperative and Noncooperative R&D in Duopoly with Spillovers," *American Economic Review*, Dec. 1988, pp. 1133-1137.

### 5.6: The Simultaneous Model of Innovation

Until recently, innovation was widely regarded as a linear process consisting of a sequence of stages: scientific research produced new knowledge, which lead to invention; engineering development then transformed this invention into a useable process or product; this was followed by the diffusion stage, where the completed product spread throughout the market, and was adopted by consumers.<sup>28</sup> Figure 5.1 illustrates the flow of information in the linear model.



In this linear model, the primary constraint on innovation was the extent of research and development.<sup>29</sup> As discussed above, strategic alliances can help stimulate such innovative effort: pooling resources through alliances helps lower the cost and risk of R&D for

<sup>28</sup>Smith, Keith, "New Directions in Research and Technology Policy: Identifying the Key Issues," STEP (Studies in Technology, Innovation, and Economic Policy) Group Report, Oslo, May 1994.

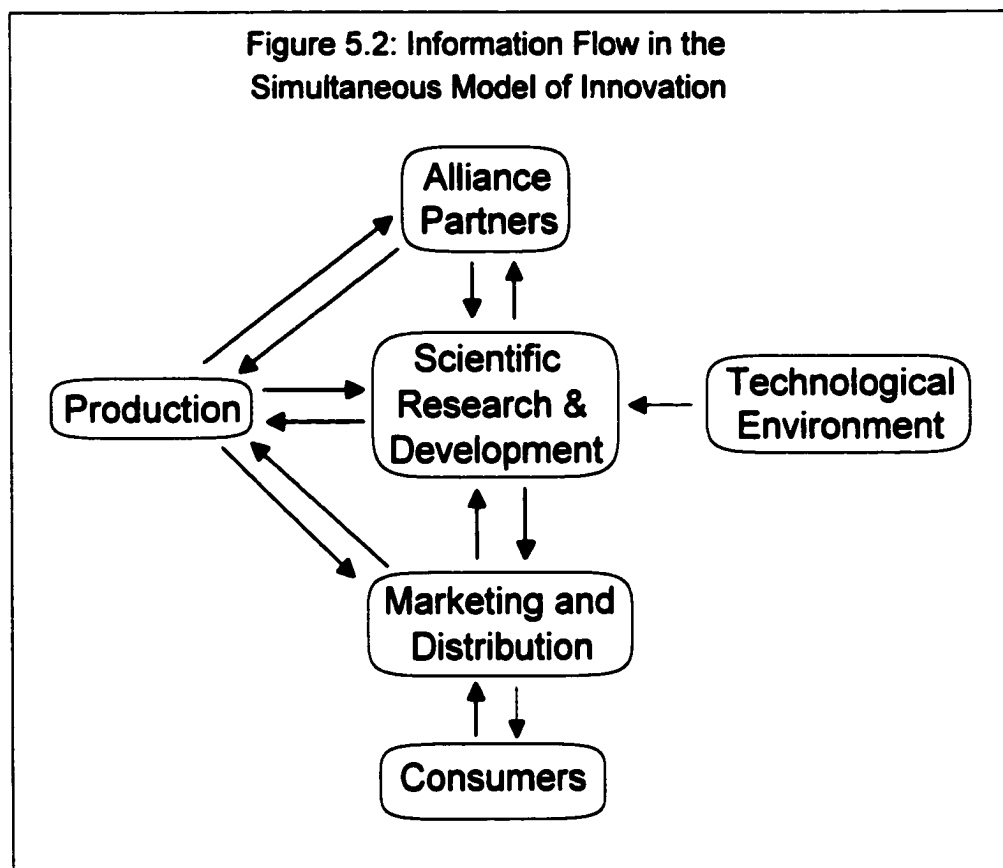
<sup>29</sup> *Ibid.*

individual firms; alliances with experienced manufacturers and marketers can help innovators bring their discoveries to the market quickly to appropriate research costs, promoting R&D effort.

While strategic alliances play an important role in fostering innovation under the linear model, they become even more significant under the modern view of innovation -- the simultaneous model. The simultaneous model views innovation as an interactive social process, where firms use their capabilities -- research, development, manufacturing, financial, etc. -- to respond to market opportunities. Innovation is a continuous, rather than intermittent process, which requires coordination and feedback mechanisms among firms' capabilities, as well as interactions between firms and their external environments.<sup>30</sup> Figure 5.2 illustrates the flow of information in the simultaneous model.

---

<sup>30</sup> *Ibid*; Jorde, Thomas M. and Teece, David J., "Innovation and Cooperation, Implications for Competition and Antitrust," *Journal of Economic Perspectives*, Volume 4, Number 3, Summer 1990, pp. 141-146.



The problem firms face in innovating, according to the simultaneous model, is to acquire and coordinate the technological capabilities which will enable it to gain a competitive advantage in responding to market needs.<sup>31</sup> While R&D is one way to acquire such capabilities, it is not the only way.<sup>32</sup> In particular, strategic alliances allow firms to coordinate their individual knowledge competencies. Alliances enhance innovation and learning by promoting a type of “interorganizational brainstorming.” Just as individuals often generate new ideas and learn best by interacting with others in group settings, so, too, do firms. Networks of alliances provide such interactive settings, where individual

<sup>31</sup> Smith, Keith, “New Directions in Research and Technology Policy: Identifying the Key Issues,” STEP (Studies in Technology, Innovation, and Economic Policy) Group Report, Oslo, May 1994.

<sup>32</sup> Thus, the simultaneous model recognizes that innovation does not require research.

firms each contribute complementary experience and knowledge capabilities to the solution of common problems.<sup>33</sup>

Alliances among firms with complementary knowledge are especially significant for innovation given firms' need to retain specialized focuses. As the volume of scientific knowledge expands rapidly in many high-tech industries, it becomes impossible for firms to maintain a high level of expertise throughout the product spectrum. Therefore, they are forced to specialize, concentrating on a limited number of subfields, where they can acquire and retain the expertise needed to stay at the cutting edge of technology.<sup>34</sup>

However, such specialization limits firms' fields of vision, and they may not be able to recognize opportunities that combine their specialized area of expertise with others.<sup>35</sup>

Alliances enable firms to interact with each other so that they can exploit these opportunities by expanding their fields of vision, yet still retain their specialized focuses.

Two further observations must be made regarding the nature of alliances as a response to firms' innovation needs. Firstly, given the continuous nature of innovation, it is often desirable for alliances to be flexible, ongoing affairs. Extending an alliance's function beyond a single, strictly-defined goal to a more continuous relationship, helps firms maintain expanded fields of vision, so that they can identify market opportunities and adapt to new technologies in complementary fields. Secondly, given the need for continuous feedback mechanisms, it can be beneficial to expand research and

---

<sup>33</sup> Jorde, Thomas M. and Teece, David J., "Innovation and Cooperation, Implications for Competition and Antitrust," *Journal of Economic Perspectives*, Volume 4, Number 3, Summer 1990, pp. 142-146.

<sup>34</sup> See Chapter 3, "Strategic Alliances and Virtual Bigness."

<sup>35</sup> Smith, Keith, "New Directions in Research and Technology Policy: Identifying the Key Issues," STEP (Studies in Technology, Innovation, and Economic Policy) Group Report, Oslo, May 1994.

development joint ventures into production and marketing activities as well. Maintaining such vertical linkages provides the research branch of the venture with the continuous feedback it needs to adapt innovation towards manufacturing and market needs.<sup>36</sup>

### **5.7: Conclusion**

With a few exceptions -- the potential for a reduction in the variety of research alternatives and in firms' incentives to win technology races -- strategic alliances greatly foster innovation. Alliances enable small, specialized, research-intensive firms to survive and appropriate their innovation costs; they allow firms to pool their research efforts so that they can diffuse cost and risk and eliminate wasteful duplication; they help innovators cope with the free-rider problem; they provide firms with the long-term mechanisms they need to obtain tacit knowledge; and they help maintain the continuous feedback and intercorporate brainstorming mechanisms that innovation requires.

In the first section of this chapter, it was discussed how the centrifugal nature of many alliances helps small firms survive, and thus indirectly supports innovation. The reverse of this relationship is also true -- innovation is, itself, a centrifugal force. Innovation accelerates the decline of dominant firms as new technologies replace the old in what Schumpeter labelled the "gales of creative destruction."<sup>37</sup> This means that if dominant firms do not continue to innovate, they will be replaced by new firms with

---

<sup>36</sup> Jorde, Thomas M. and Teece, David J., "Innovation and Cooperation, Implications for Competition and Antitrust," *Journal of Economic Perspectives*, Volume 4, Number 3, Summer 1990, pp. 142-146.

<sup>37</sup> Schumpeter, Joseph A., *Capitalism, Socialism, and Democracy*, Harper and Brothers Publishers, New York, 1942, pp. 81-86.

superior products.<sup>38</sup> The greater the pace of innovation, the faster such dominant firms will decline.<sup>39</sup> Thus, their ability to promote innovation is another means in which strategic alliances act as a centrifugal force.

---

<sup>38</sup> Assuming they can't use their dominance to suppress innovation.

<sup>39</sup> Compare, for example, the difference between the rates of the decline of U.S. Steel with the decline of IBM in the personal computer market.



## **Chapter 6: Strategic Alliances in the Automobile Industry:**

In 1982, General Motors and Toyota announced the creation of NUMMI (New United Motor Manufacturing Incorporated), a joint production venture in a formerly closed GM plant in Fremont, California. General Motor's objective with NUMMI was to use the joint venture as a vehicle for learning Japanese lean-manufacturing techniques. Toyota, on the other hand, wanted to discover whether they could apply their lean-manufacturing techniques in the United States using American labour; thus, NUMMI could act as a proving-ground for establishing future transplant production facilities.

Given the unprecedented linking of the world's largest and third largest automakers, the NUMMI announcement sparked considerable debate. The Federal Trade Commission eventually voted to permit the joint venture on grounds that the benefits of helping GM become more competitive by learning lean-production would outweigh the potential anticompetitive risks associated with NUMMI.<sup>1</sup> Nevertheless, many reservations regarding these potential anticompetitive effects remained. As Adams and Brock discuss:

Does it (NUMMI and subsequent American-Japanese automobile joint ventures) not inevitably lead to a substantial lessening of competition between U.S. carmakers and their primary -- often only -- rivals? Does it not portend an intricate community of interests in which cooperation, not competition, is the rule? Does it not contain the seeds for a cartelization of the automobile industry?<sup>2</sup>

Since the formation of NUMMI, there has been a steady increase in the use of joint ventures and other types of strategic alliances throughout the automobile industry.

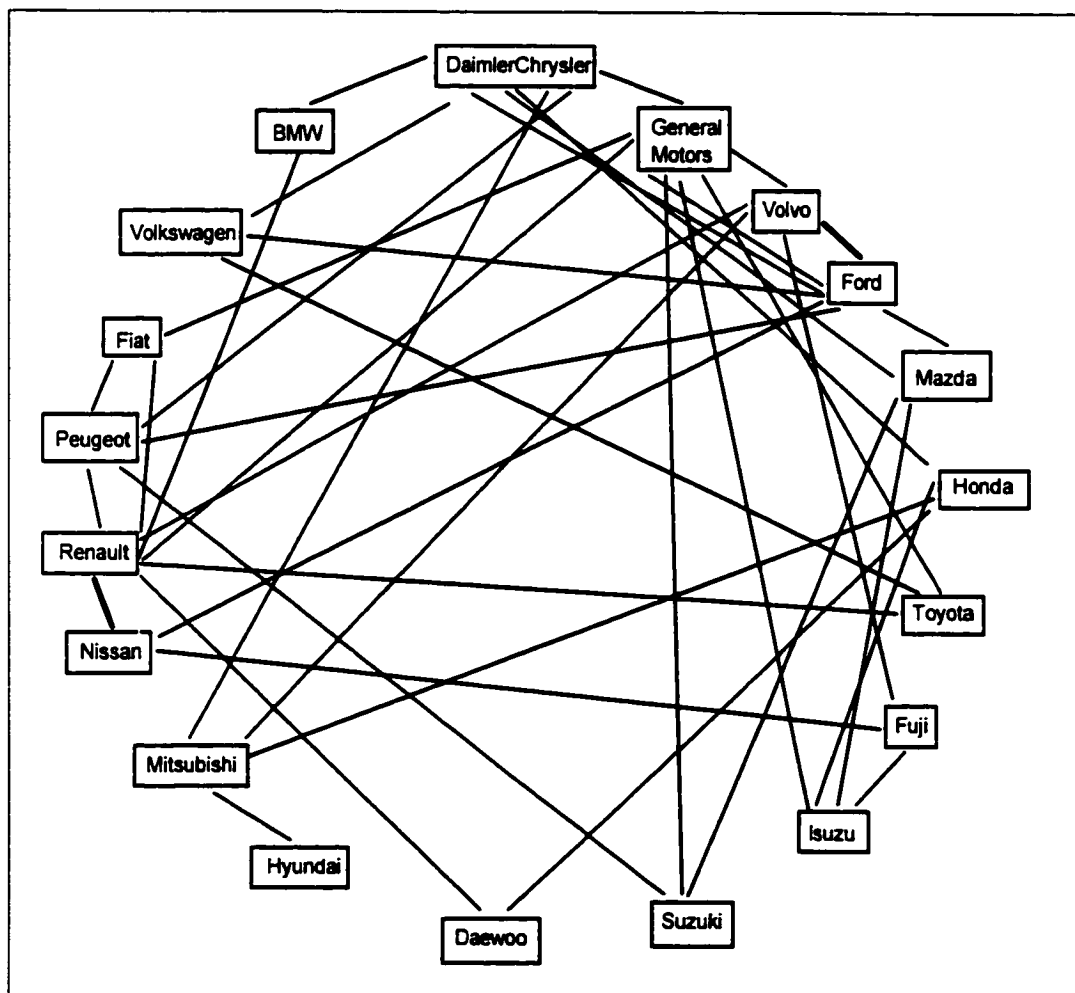
---

<sup>1</sup> Adams, Walter and Brock, James, *The Bigness Complex*, Pantheon Books, New York, 1986, pp. 167-170.

<sup>2</sup> *Ibid*, p.170.

The number of cooperative relationships between U.S., Japanese, and European automakers quadrupled between 1985 and 1994, from 36 to 121 cases.<sup>3</sup> This remarkable proliferation of alliances has resulted in the current situation, where the world's major automakers are connected by an increasingly-complex web of relationships. Figure 6.1 below depicts the most significant alliances among the world's major automakers. It illustrates the extent and complexity of alliance formation in the global automobile industry.

**Figure 6.1: Horizontal Alliances of the World's Major Automakers**



<sup>3</sup> Japanese Automobile Manufacture's Association Website, [http://www.japanauto.com/library/brochures/globe/global\\_02.html](http://www.japanauto.com/library/brochures/globe/global_02.html), Sept. 4, 1999.

In a relatively concentrated market, where almost all of the major players are linked to one another -- either directly or indirectly -- anticompetitive concerns with automobile alliances, such as those expressed by Adams and Brock above, gain increasing significance. This chapter will examine the implications of the widespread use of strategic alliances in the automobile industry on market structure and conduct. It will argue that, despite concerns, given the structure of automobile alliance formation and the nature of these relationships, the benefits of automobile alliances generally outweigh their anticompetitive risks.

### **6.1: The Structure of the World Automobile Industry**

Perhaps the most significant development in the automobile industry over the past two decades has been its globalization. The reduction of tariffs and other barriers have greatly increased worldwide automotive trade. This, along with a rapid increase in foreign direct investment, has transformed the world automobile industry from a group of segregated regional markets into a more unified market.<sup>4</sup> Table 6.1 lists the world's ten largest automakers along with unit production for each.

---

<sup>4</sup> See below.

**Table 6.1: Worldwide Production of Motor Vehicles of the Largest Automakers, 1999**

<b>Automaker</b>	<b>Worldwide Production (millions of vehicles)</b>
General Motors	8.3
Ford	7.2
Toyota	5.4
Volkswagen	4.9
DaimlerChrysler	4.8
Renault/Nissan <sup>1</sup>	4.7
Fiat	2.6
Peugeot	2.5
Honda	2.4
Hyundai	2.1
Suzuki	1.9
Mitsubishi	1.7

<sup>1</sup> Renault purchased 36.8% (considered a controlling share in Japan) of Nissan Motor in 1999.

Source: Automotive News 2000 Market Databook

Given 1999 worldwide production of 56,285,888 units, these twelve automakers accounted for 86.1% of the world market. The four-firm concentration ratio was 45.8%, with the largest firm possessing only 15% of the world market.

While globalization has created a more unified automobile industry, the transformation towards a single, global market remains incomplete; regional differences persist, typically with automakers controlling their greatest market shares in their home countries. Table 6.2 illustrates these national differences.<sup>5</sup>

---

<sup>5</sup> Source: Verband der Automobilindustrie E.V., *International Auto Statistics*, Frankfurt, 1998.

**Table 6.2: Four-Firm Concentration Ratios and Leading Firms' Market Shares in Selected National Markets, 1984 and 1996**

<b>Country</b>	<b>CR(4) 1984 (%)</b>	<b>CR(4) 1996 (%)</b>	<b>Leading Firm's Share 1984 (%)</b>	<b>Leading Firm's Share 1996 (%)</b>
Germany	66.3	60.6	27.9	25.1
Italy	76.6	67.9	54.3	43.6
France	75.2	60.6	31	29.4
Japan	88.4	70.1	44.6	30.9
United States	78.1	71.8	44.2	32.3

This table reveals that differences among separate national markets remain. In each national market, the leading firm is a home-based automaker. While globalization has significantly reduced concentration, home-based producers still have the greatest market shares, and concentration in each national market is significantly greater than that for the entire global industry.

## 6.2: Alliance Formation in the Automobile Industry: The Amorphous Structure

As discussed above, the past two decades have witnessed a tremendous proliferation in formation of strategic alliances in the automobile industry. Table 6.3 lists and describes the major horizontal alliances of the world's largest automakers.

**Table 6.3: Major Horizontal Alliances Among the World's Largest Automakers**

<b>Alliance Partners</b>	<b>Descriptive Summary</b>
GM, Ford, DaimlerChrysler	USCAR (United States Council for Automotive Research) joint research venture
GM, Toyota	joint production at NUMMI; joint research on electric vehicle technology and fuel cell technology; distribution agreement of GM vehicles in Japan
GM, Renault	marketing of Renault vans by GM; joint development of a light commercial vehicle
GM, Suzuki	GM owns 10% of Suzuki; joint production at CAMI; joint development of a subcompact in Europe
GM, Isuzu	GM owns 49% of Isuzu; joint production of commercial vehicles in Egypt and Australia; vehicle swaps of GM vehicles for sale by Isuzu in U.S.
GM, Fiat	GM and Fiat hold equity stakes in each other; joint research and production ventures
Ford, DaimlerChrysler, Mazda	joint research and development venture for automotive fuel cells with Ballard Power
Ford, Volkswagen	joint production of minivans at Autoeuropa in Portugal (VW to take sole possession in 2000)
Ford, Nissan	joint production of minivans in the U.S.
Ford, Peugeot	joint production of diesel engines
Ford, Mazda	Ford owns 33.4% of Mazda; joint production at AutoAlliance in Michigan and in Thailand; joint vehicle design; joint marketing of Ford vehicles by Mazda in Japan; working to commonize global platforms
Ford, Volvo	Ford owns Volvo's passenger car operations.
Toyota, Volkswagen	joint production of pickups in Germany; joint development of a new direct injection engine
Toyota, Renault	joint production of Renault cars and Toyota trucks in Columbia
Volkswagen, DaimlerChrysler	joint production at VW-Daug.
DaimlerChrysler, Renault, Volvo	joint ownership of a production facility in Thailand
DaimlerChrysler, Honda	joint assembly of Jeeps for DaimlerChrysler by Honda in Thailand
DaimlerChrysler, Peugeot	joint ownership of a production facility in in Egypt
DaimlerChrysler, Mitsubishi	vehicles and parts swaps

DaimlerChrysler, BMW	joint production of engines in Brazil
Fiat, Peugeot	joint production of minivans in France and commercial vehicles in Italy
Fiat, Renault	merger of coach and bus operations
Nissan, Fuji	Nissan owns 4.23% of Fuji; plan to share components and platforms
Peugeot, Renault	joint production of engines and mechanical components; joint development of engines and gearboxes
Peugeot, Suzuki	joint marketing of Peugeot cars in Japan by Suzuki
Renault, BMW	joint ownership in Van Technology Ltd.
Renault, Volvo	parts swaps of engines and gearboxes
Renault, Daewoo	licensing of diesel engine production by Renault to Daewoo
Honda, Mitsubishi	joint production of vehicles in the Philippines
Honda, Isuzu	vehicle swaps of passenger cars for Isuzu and sport utility vehicles for Honda
Honda, Daewoo	Daewoo builds a version of the Acura Legend.
Mitsubishi, Volvo	joint assembly of vehicles in the netherlands
Mitsubishi, Hyundai	Mitsubishi owns 12.63% of Hyundai and has provided Hyundai with technology.
Suzuki, Mazda	vehicle swaps for sale by Mazda in Japan; joint assembly of minicars
Mazda, Isuzu	joint ownership of an engine facility in Thailand
Fuji, Isuzu	joint production at Subaru-Isuzu Automotive Inc. in the U.S.
Fuji, Volvo	joint development of a mid-engine sight-seeing bus

These alliances are shown together in Figure 6.1 above. As this diagram illustrates, alliance formation in the automobile industry is amorphous; there is no discernible pattern as to how these relationships have evolved. Thus, the automobile industry provides an ideal model for describing the characteristics of the amorphous structure of alliance formation.

As opposed to clustered alliance structures, the firms in the automobile industry are not split into separate alliance groupings, and having an alliance with any one firm seems to have little prohibitive effect on establishing alliances with other firms. Consider, for example, the relationships among three of the world's largest automakers: General Motors, Toyota, and Volkswagen. GM and Toyota have forged a long-standing

relationship through NUMMI and other joint production and research ventures. However, while GM and Volkswagen have no such link, Toyota and Volkswagen jointly produce pickup trucks in Germany, and have recently established an alliance to jointly develop a new direct-injection engine. Toyota has expanded its relationship with Volkswagen despite the current animosity between Volkswagen and GM resulting from a recent lawsuit over allegedly stolen documents. Clearly, Toyota does not feel its relationship with GM inhibits it from creating alliances with Volkswagen or with any other automaker.

The freedom to establish new relationships regardless of the alliances firms already possess is typical of amorphous alliance formation, and stems from a relative lack of dependence on firms' alliance partners. In the automobile industry, this relative independence of alliance partners can be seen in the nature of their relationships; automobile alliances tend to be task-specific and limited in scope. Examination of Table 6.3 reveals six common types of automobile alliances:

1. Research and development joint ventures are separate entities created to conduct research into specific areas or develop specific technologies. Ford, Mazda, and DaimlerChrysler, for example, are jointly researching automotive fuel cell technology with Ballard Power to produce emissions-free vehicles.
2. Production joint ventures are separate entities created to produce specific products. The best known automotive joint production venture is NUMMI, where General Motors and Toyota jointly produce passenger cars and pickup trucks in California.



3. **Technology swaps are agreements to share or trade technology, usually in a specific area. Mitsubishi, for example, has provided Hyundai with advanced technology for the development of its automobiles.**
4. **Vehicle swaps are agreements where automakers manufacture entire vehicles for sale under other automakers' nameplates. These alliances are common in the automobile industry, so that distinguishing the origin of automobiles is often confusing. For example, Isuzu and Suzuki manufacture vehicles for General Motors, Honda produces vehicles for Isuzu and Isuzu for Honda, Mazda for Ford, and Suzuki for Mazda.**
5. **Parts swaps are agreements where automakers manufacture parts for other automakers. For example, Mitsubishi produces parts for DaimlerChrysler, and Volvo and Renault exchange engines and gearboxes.**
6. **Distribution agreements occur when automakers market and sell other automakers' vehicles in a specific region. Toyota, for example, markets and sells the Chevy Cavalier for General Motors in Japan.**

As the description of the agreements in table 6.3 indicates, automobile alliances do not involve broad-based cooperation over a wide range of functions, but, rather, are directed towards accomplishing specific tasks (developing new technologies, reducing costs, entering new markets, etc.). Thus, regardless of its alliances, each automaker retains the ability to independently design, produce, and market its own automobiles. Indeed, the relatively low extent of interdependence associated with automobile alliances supports the hypothesis developed in Chapter 2 that amorphous alliance formation is more likely where alliance-created interdependence is low.

Because of this relative lack of dependence, the termination of alliances in an amorphous structure is relatively easy. As alliances make up only a small portion of automakers' activities, the termination of most partnerships, while possibly costly, is not disastrous. Thus, alliances that fail to realize expectations are often terminated quickly. Ford, for example, recently dissolved its Brazilian joint venture with Volkswagen, Autolatina, after it left Ford with an overall market share of just 12% compared to Volkswagen's 34%.<sup>6</sup> Such terminations are often cited as evidence of the failure of alliances as a strategic device; however, it is this ability to quickly terminate alliances in an amorphous structure which often makes them such successful strategies -- a failed merger is not so easily reversible. Thus, amorphous alliances allow firms to take greater risks with the knowledge that, if an alliance fails, it can be dissolved with fewer consequences than other strategies.

Just as the relative lack of dependence makes alliances in an amorphous structure easy to terminate, so, too, does it facilitate alliance entry. This is so for two reasons. Firstly, given that limited dependence facilitates termination, firms are more likely to enter into a risky alliance, as they can more easily cut their losses if the alliance should fail. Secondly, while joining an existing alliance cluster generally requires the consent all of the cluster's partners, joining alliances under an amorphous structure generally requires the approval of only one or two firms, as the alliances tend to be on a more bilateral basis. Thus, Ford was able to join DaimlerChrysler's fuel-cell joint venture with Ballard Power

---

<sup>6</sup> Katz, Ian and Naughton, Ian, "The Flag Drops on the Great Auto Race," *BusinessWeek*, New York, Apr. 8, 1996.

relatively easily, as Ford's entry required the consent of only two firms -- Ballard and DaimlerChrysler.<sup>7</sup>

The relative ease of entry and exit to and from alliances in an amorphous structure results in a continuous evolution in the industry-wide network of relationships. Thus, the diagram presented in Figure 6.1, created from the alliances existing as of March 1999, is considerably different from how a similar diagram would look only a few years earlier, as new alliances are created and others are terminated. For example, General Motors recently established a new joint venture with Toyota to conduct electric vehicle research, and ended a long-standing alliance with South Korean automaker, Daewoo. Ford recently ended its Autolatina joint venture with Volkswagen (the two automakers also plan to terminate their Portuguese joint manufacturing venture shortly) and is ending its relationship with Kia,<sup>8</sup> while it has established a new joint venture with DaimlerChrysler and Ballard Power to conduct fuel cell research and development. Mitsubishi purchased Chrysler's share of their American joint production venture, Diamond-Star Motors, but has recently established a new joint venture with Honda to produce cars in the Philippines. Similar examples of new alliance formation and termination exist for almost all of the world's automakers, and illustrate the constantly changing nature of the industry's amorphous alliance structure.

The properties of the amorphous structure of alliance formation are exhibited by the world automobile industry. Specifically, the industry's amorphous alliance structure is

---

<sup>7</sup> It is much more difficult to imagine American Airlines, for example, trying to join the Star Alliance, as this would require the approval of a number of airlines, including American's rival, United.

<sup>8</sup> Hyundai recently agreed to purchase 51% of Kia.

characterized by a task-specific alliance orientation, a general lack of dependence of firms on their alliance partners, considerable freedom of partner choice, relatively easy entry into new alliances and termination of existing alliances, and a continuously changing industry-wide alliance structure. These structural characteristics of amorphous alliance formation are significant because of the impact they have on market conduct; particularly, the willingness of automakers to compete against their competitor/partners.

### **6.3: Automobile Alliances and Market Entry**

Table 6.2 above illustrates the change in the market shares of the largest automakers along with the four-firm concentration levels for five national markets from 1984 to 1996. In every market, both the share controlled by the largest firm and concentration diminished significantly. The primary reason for the reduction of concentration in these national markets has been the entry and market penetration of new competitors. This entry has been facilitated greatly by strategic alliances.

#### **6.3.1: Geographic Entry**

Joining forces with local partners has helped foreign automakers overcome cultural, regulatory, and trade barriers and, thus, gain entry into new geographic markets. Alliances with American automakers played a significant role in helping Japanese automakers gain manufacturing footholds in the American market. In the early 1980's, Japanese automakers were faced with a significant trade barrier to the American market in the form of "voluntary" import restraints. They needed to establish North American production facilities to overcome this barrier and continue their penetration of the

American market; however, they weren't completely confident that they could apply Japanese lean-manufacturing techniques using American labour. Therefore, in 1984, Toyota partnered with General Motors to establish NUMMI through which Toyota learned to successfully transfer its management techniques to North America.<sup>9</sup> Toyota has since used the knowledge acquired through NUMMI to expand its North American production through transplant facilities throughout North America, overcoming barriers caused by restrictive import restraints.<sup>10</sup> Other Japanese Automakers followed a similar path to gain greater access to the North American market. Mitsubishi established a joint production venture with Chrysler, Diamond-Star Motors, which it now owns entirely. Mazda teamed up with Ford to jointly produce automobiles at their Autoalliance joint venture, and Suzuki established the CAMI (Canadian Automotive Manufacturing Inc.) joint venture in Ontario with General Motors.

For these smaller Japanese automakers, joint ventures were perhaps even more important for gaining significant American market penetration than NUMMI was for Toyota. Not only did they provide knowledge for manufacturing in North America and a volume of vehicles not subject to import restrictions, but they also helped the smaller Japanese automakers achieve the economies of scale required for efficient production. Without their alliance partners with which to share output, small Japanese automakers' sales of individual models in North America would have been too small to have justified establishing independent manufacturing plants. For example, in 1989, in the first year of

---

<sup>9</sup> Inkpen, Andrew, "Learning and Knowledge Acquisition through Strategic Alliances," *Academy of Management Executive*, 1998, Vol. 12, No. 4, pp. 74-75.

<sup>10</sup> Womack, James P., Jones, Daniel T., and Roos, Daniel, *The Machine that Changed the World*, pp 82-86.

its Diamond-Star joint venture with Chrysler, Mitsubishi's sales of passenger cars in North America (not including vehicles produced for sale under Chrysler's badges) totalled just 62,824 vehicles with 60,261 of those manufactured at Diamond-Star.<sup>11</sup> This was well below the the minimum efficient scale for an automobile plant (The average capacity of a modern automobile assembly plant is well over 250,000 vehicles per year.).<sup>12</sup> The joint venture helped Mitsubishi obtain economies of scale and gain quick penetration of the American market so that by 1991, the year Mitsubishi became sole owner of Diamond-Star, the automaker's sales of passenger cars had increased to 158,346 vehicles.<sup>13</sup>

Entry-promoting alliances between American and Japanese automakers have not been restricted solely to assisting Japanese automakers gain a foothold in the United States; alliances have been used to help foreign automakers try to gain access to the Japanese market as well. In these alliances, foreign automaker's vehicles are distributed and marketed by Japanese partners. This allows foreign automakers to sell their vehicles in Japan without the expense of establishing independent marketing and distribution systems. Additionally, partners' experience with Japanese consumers can help foreign automakers overcome cultural barriers to entering the Japanese market. Some examples of these distribution agreements are as follows: Honda markets Jeeps in Japan for Chrysler, Mazda sells vehicles for Ford, Toyota for General Motors, Suzuki for Peugeot, and Isuzu for General Motors. While these alliances have enjoyed limited success, by

---

<sup>11</sup> Verband der Automobilindustrie, *Das Auto International in Zahlen*, 1991 edition.

<sup>12</sup> McAlinden, Sean B., "What's the Right Size for an Assembly Plant?" *Automotive Manufacturing and Production*, October, 1997, pp. 14-16.

<sup>13</sup> Verband der Automobilindustrie, *Das Auto International in Zahlen*, Frankfurt, 1993 edition.

greatly reducing the costs of entry, they have at least given their foreign partners a small foothold in Japan from which to build.<sup>14</sup>

Strategic alliances are a common mode of entry into developing markets.

Typically, such an alliance will link an automaker from a developed country with a firm from a developing country. The foreign partner generally provides start-up capital and technology, while the domestic partner provides knowledge of local customs and a means of circumventing foreign ownership restrictions. Consider the Indian market. The only established automaker is Maruti Udyog, a joint venture between Suzuki and the Indian government. Suzuki established its partnership with the government-owned Maruti in the early 1980's. The Japanese automaker provided Maruti with much-needed technology and manufacturing expertise, while the joint venture provided Suzuki with access to the Indian market at a time when it was closed to foreign competition.<sup>15</sup> Maruti currently controls over 70% of India's market for passenger cars, and produced 349,780 vehicles in 1997.<sup>16</sup> Since 1993, when the Indian market began to open up to foreign competition, a number of foreign automakers have joined with Indian partners to produce automobiles affordable to Indian consumers. DaimlerChrysler, Ford, General Motors, Mitsubishi, Toyota, Hyundai, Daewoo, Fiat, and Peugeot all have established alliances with Indian partners in the past few years.<sup>17</sup> Joint ventures such as these provide international

---

<sup>14</sup> There are numerous reasons for the lack of success of American automakers in Japan (German automakers have had slightly more success), not the least of which has been their failure, until recently, to offer Japanese consumers vehicles with right-hand drives. Additionally, American vehicles are often too long to fit into Japanese parking spaces.

<sup>15</sup> "Maruti's Wager: Cars in India," *The Economist*, 03-02-1996, pp 62-63.

<sup>16</sup> Verband der Automobilindustrie, *Das Auto International in Zahlen*, 1998 edition.

<sup>17</sup> Paul Lienert, "World's top automakers seeking to invade India," *Gannett News Service*, 03-12-1996.

automakers with the localized knowledge required to produce and sell vehicles in foreign markets and, by helping to attract foreign capital and technology, foster the creation of viable automobile industries in developing countries.

### **6.3.2: Product Entry**

While alliances have been used frequently to foster geographic entry, they have also enabled automakers to enter new product segments. Consider, for example the American-Japanese joint ventures in the United States discussed above. While the Japanese hoped to use these alliances as a means of securing geographic entry into the U.S., American automakers needed to learn how to produce quality small cars efficiently. Strategic alliances have helped American automakers to successfully enter the small car market segment. NUMMI provided General Motors with an immediate entry into the small car segment with the Geo Prizm, and GM has been able to transfer the knowledge it received from NUMMI and apply it to its popular Saturn division.<sup>18</sup> The CAMI joint venture with Suzuki provided General Motors with a subcompact vehicle. Additionally, GM imported numerous small vehicles produced by Suzuki and Isuzu under the Geo nameplate. Similarly, Ford's relationship with Mazda helped it enter the small car market segment. The compact cars Mercury Tracer and Ford Escort have both relied heavily on Mazda technology, and the subcompact Festiva was designed by Mazda and produced by Kia in Korea for sale by Ford in the United States.<sup>19</sup> Without the assistance of their

---

<sup>18</sup> find me.

<sup>19</sup> Chan, Peng, S. and Wong, Anna, "Global Strategic Alliances and Organizational Learning," *Leadership and Organizational Development Journal*, Vol.15, No.4, 1994, pp.31-36.

Haigh, Robert, W., "Building a Strategic Alliance: The Hermosillo Experience as a



Japanese partners, entry into the small car segment would have been much more difficult and costly for American producers.

A quick method for gaining entry into a new product segment is through vehicle swaps. These occur when one automaker manufactures an automobile for sale under another automaker's nameplate. Vehicle swaps allow automakers to enter new market segments without incurring the expense of development and production. They are particularly important to smaller firms who need to offer consumers a full product line, but are unable to generate sufficient sales in certain product categories to justify independent production. Honda, for example, supplies Isuzu with minivans which sell as the Isuzu Oasis. In return, Isuzu produces a version of the Isuzu Trooper sport utility vehicle which is sold under the Acura nameplate. Only a few thousand of each automobile are swapped each year: enough for the partners to enter each product segment, but an insufficient quantity to generate the scale economies for independent production.<sup>20</sup> Thus, entry could not have occurred as quickly without the vehicle-swapping alliance, and might not have occurred at all.

In one or two instances, alliances have been at least partly responsible for the entry of an entirely new competitor into the global automobile industry. There are many significant barriers to entering the global automobile industry, not the least of which are the considerable technological requirements. Without at least adequate technology, a new automaker could never hope to compete against firms which rank amongst some of

---

Ford-Mazda Proving Ground," *The Columbia Journal of World Business*, Spring 1992, pp. 60-74.

<sup>20</sup> "Isuzu's Motto: Share and Share Alike," *Ward's Auto World*, May 1, 1995, pp. 28-29.

the world's largest research and development spenders.<sup>21</sup> Firms from developing countries, especially, face an insurmountable technology gap. This was the situation confronting South Korea's Hyundai as it prepared to enter the global market. Hyundai's management realized that they lacked the technological expertise to compete globally. Thus, the Korean automaker turned to Mitsubishi which provided Hyundai with its vehicle designs.<sup>22</sup> With Mitsubishi's technology and low Korean wages, Hyundai has emerged as a global competitor. In 1997, Hyundai sold 1,242,895 vehicles to rank as the world's thirteenth largest automaker in terms of unit sales - ahead of BMW, Daimler-Benz, and Mazda.<sup>23</sup> Hyundai could not have made such progress without the help of an alliance partner.

### **6.3.3: Automobile Alliances and Entry: A Centrifugal Force**

As was described earlier, alliances can act to reduce entry barriers, but they can also become significant barriers themselves. Alliances provide firms with access to additional resources beyond those it controls on its own. If alliance use among incumbents is widespread, then a potential entrant might need to acquire these additional resources to compete effectively. If there are few suitable partners available, this can significantly raise entry barriers.

Given the amorphous structure of their formation, however, automobile alliances generally do not raise entry barriers. Under the automobile industry's amorphous

---

<sup>21</sup> In 1997, General Motors was the world's largest R&D spender at \$8.4 billion (*Research & Development*).

<sup>22</sup> Taylor, Alex III, "Competition, Who's Ahead in the World Auto War," *Fortune*, 11-09-1987, pp. 74-81.

<sup>23</sup> Source: *Automotive News Europe*.

structure, there is general freedom of alliance formation, as the level of dependence on alliances remains relatively low. Thus, automakers are not restricted to trying to gain access to two or three large alliance clusters, but can potentially form an alliance with any other automaker. Such freedom of choice among numerous potential partners is not limited to incumbents, but is available to potential entrants as well. Thus, as evidenced by the numerous examples of entry-supporting alliances above, potential entrants face few restrictions in their ability to establish alliances. Therefore, entry generally requires no additional resources over and above those that incumbent automakers already possess (although these are significant enough). Automotive alliances generally do not raise entry barriers.

In fact, it would appear that automobile alliances lower entry barriers by providing potential entrants with the resources they require for gaining access to new geographic markets and product segments. Advanced technology, production volume for scale economies, access to established distribution systems, insider experience with operating in a foreign market, and even finished vehicles can all be acquired through alliances. Thus, with respect to entry, strategic alliances in the automobile industry represent a significant centrifugal force. The assistance alliances have given firms in entering into new markets has contributed to the substantial lessening of concentration in numerous markets throughout the globe (see Table 6.2).

#### **6.4: Automobile Alliances and Virtual Bigness**

Between 1985 and 1994, the number of cooperative relationships between U.S., Japanese, and European automakers has nearly quadrupled from 36 to 121 cases.<sup>24</sup> Numerous other alliances have been established among these automakers and firms in developing countries. Yet, alliances have been used by automakers for many years; as early as 1971, for example, Mitsubishi was producing the Dodge Colt for Chrysler.<sup>25</sup> Why, then, has the proliferation of alliance activity in the automobile industry been so great only recently? The answer lies in the culmination of a pair of sets of opposing inherent forces: one pushing automakers to become larger, the other pulling on them to remain small. Caught between these two sets of forces, automakers have turned to strategic alliances because they enable firms to achieve virtual bigness: the ability to realize the advantages enjoyed by large organizations, while still remaining relatively small.

##### **6.4.1: The Advantages of Remaining Small**

The principal benefit of remaining relatively small is that it helps automakers become more flexible. The last two decades have been an era of rapid change in the automobile industry. With an increase in trade and foreign direct investment, the industry has become more global -- automakers in once-protected markets now face the scrutiny of foreign competition; Japanese competitors have introduced new advanced production processes; technology has transformed the automobile into a complex integration of

---

<sup>24</sup>Japanese Automobile Manufacture's Association Website, [http://www.japanauto.com/library/brochures/globe/global\\_02.html](http://www.japanauto.com/library/brochures/globe/global_02.html), Sept. 4, 1999.

<sup>25</sup>"Foreign Invasion: Imports, Transplants Change Auto Industry Forever," *Ward's Auto World*, Vol. 32, 05-01-1996, p. 73.

computer hardware and electronic components; governments and consumers have demanded safer, more fuel-efficient automobiles; and consumer tastes have evolved considerably, demanding new model types to suit their changing needs (hence the introduction of new segments such as minivans, sport utility vehicles, and even updated retro-vehicles such as the VW bug). To remain competitive, automakers must be able to adapt quickly to this changing environment. Large firms are generally not as conducive to change as small firms, as they are burdened by overly large bureaucracies, often with entrenched corporate cultures. The American automobile industry provides a useful example. Almost two decades since it initially faced a serious threat from high-quality Japanese imports, General Motors is still trying to cope with this shock to its environment. After investing billions of dollars, GM's newer plants are even less efficient than its old ones, and GM remains considerably less productive than Toyota.<sup>26</sup> Chrysler, on the other hand, has come back from the brink of bankruptcy to the point where it may now produce some of its cars at costs approximately equal to the most efficient Japanese automakers.<sup>27</sup> In 1997, GM produced 16.3 vehicles per employee worldwide, while Chrysler produced 25.7 and Toyota 28 (Toyota's Japanese plants are even more efficient).<sup>28</sup> GM's huge bureaucracy and numerous divisions made it too inflexible to adapt quickly to the threat of foreign competition, while Chrysler's relatively small size allowed it to change much more rapidly to become an efficient competitor. The inability

---

<sup>26</sup> Adams, Walter and Brock, James, "Automobiles," Adams and Brock, eds., *The Structure of American Industry*, Prentice-Hall Inc., 1995, p. 82.

<sup>27</sup> *Ibid.*

<sup>28</sup> Source: US Office of Automotive Affairs, Department of Commerce.

of large organizations to remain flexible in a era of rapid change provides automakers with a strong incentive to remain relatively small.

A second advantage of small firms is that they are able to maintain a specialized focus. For automakers, specialization often takes the form of focusing on specific geographic markets. Consumers in separate geographic markets demand different automobiles because of different tastes, customs, and regulations. Thus, trucks and sport utility vehicles are more popular in North America, where petroleum is relatively inexpensive and roads are wider, while compact vehicles are more popular in Europe, where petroleum is more expensive, roads are narrower, and distances are smaller. Attempts to produce a single global automobile have often failed. Ford, for example spent \$6 billion developing its “world car,” the Contour. While the car sold well in Europe, American consumers considered the Contour to be too small for a vehicle in its price range.<sup>29</sup> Because of the difficulties with trying to produce automobiles that consumers in diverse geographic markets will desire, it is often in an automaker’s best interest to specialize in producing vehicles for local markets.

---

<sup>29</sup> Flint, Jerry, “Remember, the Best Cars Still Win: There’s No Proof Globalization Really Works,” *Ward’s Auto World*, 12-01-1996, p. 19.

#### **6.4.2 How Alliances Provide Small Automakers with Large Firm Characteristics**

Thus, given the benefits accrued through increased flexibility and specialization, it can be an advantage for automakers to remain relatively small. However, there are also inherent forces which are pushing automakers to become larger. Strategic alliances can help automakers adjust to these forces by giving automakers the characteristics of larger firms without having to become truly larger.

An important advantage enjoyed by large automakers is their ability to realize the considerable scale economies required for efficient automobile production. With the cost of building a new assembly plant totalling over \$1.5 billion, automobile production entails enormous fixed costs which must be spread over large volumes. The average output of a modern assembly plant exceeds 280,000 vehicles per year, up from 150,000 to 200,000 in the 1950's and 60's.<sup>30</sup> Japanese plants, among the world's most efficient, have average capacities of over 325,000 vehicles per year.<sup>31</sup> To achieve the desired plant scale, automakers must not only be able to raise the capital to invest in such plants, but they must also generate the sales necessary to justify such large production volumes. Strategic alliances can help solve both of these problems. Joint production ventures allow small automakers to share the costs of building and operating assembly plants. In 1989, Subaru and Isuzu established Subaru-Isuzu Automotive Inc. (SIA), in Indiana. Neither automaker had the sales volumes to justify independent production, but together they could share production costs and generate sufficient sales.<sup>32</sup> Similarly, Peugeot and Fiat's Sevel joint

---

<sup>30</sup> McAlinden, Sean B., "What's the Right Size for an Assembly Plant," *Automotive Manufacturing and Production*, October, 1997, pp. 14-16.

<sup>31</sup> *Ibid.*

<sup>32</sup> "Isuzu's Motto: Share and Share Alike," *Ward's Auto World*, 05-01-1995, pp. 28-29.

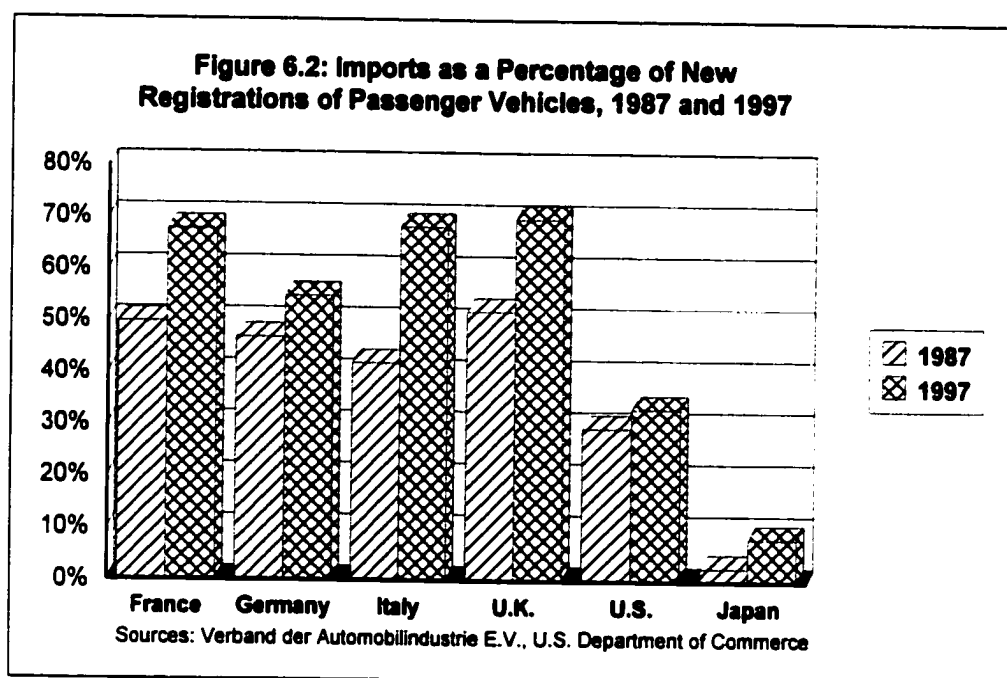
venture produces minivans in France and commercial vehicles in Italy; BMW and DaimlerChrysler jointly manufacture engines in Brazil; Suzuki's CAMI joint venture with General Motors in Ontario provides the small automaker with a North American manufacturing base, as did Mazda's Autoalliance joint venture with Ford; and Mazda and Suzuki jointly assemble minicars. These joint production ventures allow automakers, many of them relatively small, to share production expenses and achieve the scale economies enjoyed by large firms.

Joint production ventures are not the only means by which alliances can help automakers achieve plant-level scale economies. Vehicle swaps can provide an automaker with a large portion of the sales it needs to produce at an efficient volume. Honda, for example, supplies Isuzu with minivans which sell as the Isuzu Oasis. The agreement not only helps Isuzu fill out its product line, but it increases Honda's production volume for its Odyssey, helping it achieve desired scale economies. Mazda has benefited similarly from vehicles it produces for Ford, and Suzuki and Isuzu for vehicles they produce for General Motors. These vehicle-swapping alliances help small firms to achieve a scale in production comparable to large automakers.

Scale economies are a prime driver behind the globalization of the automobile industry. The large production volumes required for plant-level scale economies require large sales volumes, and foreign markets provide automakers with an opportunity to increase their sales. Additionally, globalization can help automakers achieve other sources of scale economies; by using common platforms for vehicles designed for different geographic markets, large, global automakers can spread the cost of research and



design over a greater number of vehicles.<sup>33</sup> These objectives, together with the gradual lessening of trade and investment barriers, have contributed to the rise of globalization. This trend can be seen in Figure 6.2, which shows the rise in imports of passenger vehicles as a percentage of new registrations from 1987 to 1997 for various major automobile markets. In all cases, imports as a percentage of sales have increased significantly.<sup>34</sup>



Globalization is also evident in the increase in foreign direct investment in the automobile industry. Japanese and European automakers have recently established transplant facilities in North America. In 1997, 71.8% of the Japanese auto sales in North America

<sup>33</sup> Flint, Jerry, *Ward's Auto World*, Detroit, Jan. 1998, pp. 19-21.

<sup>34</sup> The increase in the market shares of foreign automakers is even greater, particularly in the United States, due to the creation of transplant facilities.

were produced by the North American transplants of Japanese automakers.<sup>35</sup> The Japanese and Koreans have expanded into Europe, and international automakers have invested heavily in manufacturing operations throughout the developing world. This foreign investment has elevated many automakers into the ranks of the world's largest transnational corporations in terms of foreign assets. In 1994, five automakers -- Ford, General Motors, Volkswagen, Toyota, and Daimler-Benz -- each ranked among the top ten global organizations in terms of foreign assets.<sup>36</sup>

Globalization is ordinarily limited to large organizations, as establishing foreign production and distribution networks typically requires large capital outlays; alliances, however, can provide smaller automakers with a global presence. As discussed above, in section 6.3.1, strategic alliances can provide automakers with the resources they require to enter into new geographic markets. Thus, through their alliances, small automakers can globalize without having to become large. Consider Suzuki. Through its CAMI joint venture, Suzuki has established a North American production base; it is jointly developing a mini-car with General Motors to be produced and sold in Europe; the automaker's Santana joint venture in Spain is now a wholly-owned subsidiary; its Maruti joint venture is the largest producer of vehicles in India; and Suzuki is also a partner in joint production ventures in China and Eastern Europe. Although it remains relatively small, through these alliances, Suzuki has become a global firm, an advantage which, without alliances, could only be enjoyed by larger automakers.

---

<sup>35</sup> Verband der Automobilindustrie, *Das Auto International in Zahlen*, 1998 edition.

<sup>36</sup> World Trade and Investment Report 1996: Investment, Trade, and International Policy Arrangements, United Nations, New York, 1996, pp. 30-32.

Another advantage enjoyed by large automakers is their ability to conduct large scale research and development. Vehicle manufacturers have been pressed by governments to meet increasingly stringent environmental and safety regulations. Perhaps even more significant, the entry of new foreign competitors into once-protected national markets has compelled automakers to become more innovative. Automakers have responded to these pressures by devoting more resources to research and development. Table 6.4 illustrates the increase in research and development expenditure over the last decade for seven major automakers.<sup>37</sup>

**Table 6.4: Automaker Research and Development Expenditure, 1987 and 1997**

<b>Automaker</b>	<b>1987 R&amp;D Expenditure, 1997 \$US (millions)</b>	<b>1997 R&amp;D Expenditure, 1997 \$US (millions)</b>	<b>Average Annual Compound Growth Rate (%)</b>
Chrysler	1128.6	1699.9	4.2
Daimler-Benz	1430.1	3225.3	8.5
Fiat	1036.4	1474.7	3.6
Ford	3552.9	6329.4	5.9
General Motors	6154.8	8199.4	2.9
Honda	1337.3	2031.2	4.3
Volkswagen	1603.2	2450.1	4.3

In each case, expenditure on R&D has increased significantly. Also of interest are the discrepancies in the levels of R&D expenditure; larger firms typically have more

---

<sup>37</sup> Sources: various corporate reports and SEC filings. Not all automakers make research and development expenditure data available.

Absolute values of research and development expenditure have been used rather than relative values. While relative values (i.e. R&D as a % of sales) would provide a better indication of research intensity, the objective here is to illustrate how large automakers have a greater ability to make large R&D expenditures; absolute values are better suited for this purpose.

resources to devote to R&D. Thus, while Honda's 1997 R&D expenditure was \$2.031 billion, General Motors' was \$8.199 billion. This greater ability to finance large scale research and development gives large automakers a distinct advantage over their smaller rivals.

Research and development joint ventures enable automakers to share the high costs of research and development and avoid concurrent development of similar technologies. Alliances allow automakers to keep abreast of the latest technological advances, without having to incur the full costs of research and development. This is particularly important to smaller automakers who have smaller sales volumes over which to allocate their R&D costs.

Thus, the proliferation of alliances in the automobile industry can be attributed to automakers' strategic response to two sets of environmental forces. By remaining small, automakers can adapt more quickly to their rapidly changing environment, and can produce vehicles more effectively for local markets; however, by becoming larger, they can realize economies of scale, become global organizations, and conduct large scale research and development. Strategic alliances allow automakers to reconcile the conflict between these forces by providing them with many of the characteristics of larger organizations without actually having to become larger. As the forces pushing automakers to become both smaller and larger have grown, so too have the number of automobile alliances.

### 6.4.3: Virtual Bigness as a Centrifugal Force

On November 17, 1997, Chrysler and Daimler-Benz officially merged to become DaimlerChrysler, the world's fifth largest automaker. This was followed by further consolidation, as Ford purchased Volvo's passenger car operations, and Renault announced plans to acquire a substantial share of Nissan. Such mergers represent a powerful centripetal force in the automobile industry, as they lead to a direct increase in market concentration. Yet, industry consolidation even greater than this has been anticipated by market analysts for decades.<sup>38</sup>

Among the reasons this anticipated consolidation has been so slow to materialize is the recent proliferation of alliances, which has furnished automakers with virtual bigness. The ability of alliances to provide automakers with the advantages of larger organizations while retaining the benefits of remaining smaller enables alliances to act as strategic substitutes for mergers and internal growth. Automakers do not necessarily need to become big in a real sense, but can become virtually big instead.<sup>39</sup>

Because of the amorphous structure of alliance formation, virtual bigness represents a significant centrifugal force in the automobile industry. Without the availability of alliances as a strategic tool, automakers would be forced into even more mergers as consolidation pressures increase. However, given that there are advantages to be had by remaining relatively small, automakers instead often turn to alliances to realize

---

<sup>38</sup> Taylor, Alex III, "Competition, Who's Ahead in the World Auto War," *Fortune*, 11-09-1987, pp. 74-81.

Taylor, Alex III, "The Automakers: More Mergers. Dumb Idea," *Fortune*, February 15, 1999, p.

<sup>39</sup> It should be noted that this argument applies to all firms, small and large. Even if they are already big, alliances can prevent automakers such as General Motors and Toyota from becoming even bigger.

the benefits of becoming larger. Even if they help to prevent internal growth or full-fledged mergers, alliances might be viewed as representing a partial consolidation (pseudo-mergers) and, hence, like mergers, would be centripetal. However, as discussed above, given the automobile industry's amorphous structure, alliances are typically task-specific, and, thus, individual automakers generally retain their independence. As long as automakers remain independent to compete against one another, alliances and virtual bigness do not represent true consolidation. Therefore, because automobile alliances prevent concentration increases that would otherwise occur through greater internal growth or merger activity, virtual bigness in the automobile industry is a centrifugal force.

### **6.5: Automobile Alliances and Innovation**

As discussed in section 6.4 above, research and development joint ventures promote innovation by helping automakers avoid duplicating their research efforts, making innovation for the industry as a whole more efficient, and releasing funds for investment into other research projects. Alliances help foster automotive innovation in other ways as well.

#### **6.5.1: Virtual Bigness and Automotive Innovation**

Although large firms have more resources with which to finance large scale research and development, this does not necessarily translate into more innovation. As discussed earlier, small firms are often more innovative than large firms. Small firms typically have more flexibility, which helps them to respond quickly to changing market

conditions and technological opportunities, and they often have specialized focuses, which help them discover and exploit niche market opportunities. This applies to the automobile industry as well; small firms are often more innovative than large firms. While large firms generally spend more on research and development, their research efforts are frequently not as efficient. General Motors, for example spends approximately four times as much as Honda on R&D, but the two firms earn roughly the same number of patents each year. In 1998, General Motors spent \$8.2 billion on R&D and received 305 U.S. patents, while Honda spent only \$2.0 billion on R&D but received 389 U.S. patents.<sup>40</sup>

An example of a small, yet innovative automaker is Isuzu. Isuzu has maintained a relatively specialized focus, concentrating on the production of light trucks. Its specialized focus has made Isuzu a leader in light truck technology. In 1998, Isuzu's new direct injection diesel engine won Japan's prestigious Researchers and Journalists Conference (RJC) Technology of the Year Award for the best new automotive technology in Japan, ahead of much larger automakers such as Toyota and Nissan. The engine provides greater efficiency along with fewer emissions.<sup>41</sup> Despite being considerably smaller than its competitors - in 1997, Isuzu accounted for only 3.3% of all vehicles produced in Japan<sup>42</sup> - Isuzu remains at the forefront of truck technology.

Because it is a centrifugal market force, acting to prevent increasing concentration, virtual bigness in the automobile industry may indirectly promote

---

<sup>40</sup> U.S. Patent and Trademark Office, *Patenting By Organization, 1998*, March, 1999.

<sup>41</sup> "Isuzu Diesel Gets Technology of the Year Award," *Industrial Environment*, 05-01-1999.

<sup>42</sup> Verband der Automobilindustrie, *Das Auto International in Zahlen*, 1998 edition.

innovation by keeping firms smaller. Through virtual bigness, an automaker can experience the best of both worlds with respect to innovation; by remaining smaller, automakers can retain their individual innovative efficiency, while R&D alliances allow them to jointly finance expensive research. Thus, virtual bigness indirectly promotes innovation by allowing automakers to remain smaller and more flexible and specialized.

### **6.5.2: Automobile Alliances and the Appropriation of Research Costs**

The modern automobile contains a complex integration of computer hardware, software, and electronic components. Many of these technologies lie outside the automakers' traditional areas of expertise. Therefore, vehicle manufacturers are relying increasingly on outside sources to produce advancements in these types of technologies.<sup>43</sup> Alliances between these firms and automakers can facilitate innovation in two ways. Firstly, through a development alliance, an automaker can provide the expertise to assist an outside innovator in integrating its technology into the automobile. Secondly, alliances with automakers allow such innovators to appropriate the costs of their research.

An excellent example of how alliances with automakers can help such outside innovators develop technology is Ballard Power. Ballard is a leading innovator in automotive fuel cell technology. Ballard's fuels cells combine hydrogen with oxygen in the air to produce water (In the process, electrons are released to create electricity). Since the only emission is water vapour, fuel cells offer enormous environmental benefits. Over

---

<sup>43</sup> "Responsibility creates innovation," *Ward's Auto World*; Detroit; Aug 1997, p. 52; Sperling, Daniel, "Testimony at Hearing on a Partnership for a New Generation of Vehicles," *U.S. House of Representatives, Committee on Science, Subcommittee on Energy and Research*, Washington, DC, July 30, 1996.



the past twenty years, Ballard has produced considerable advances in enhancing the performance and lowering the cost of their fuel cells. However, Ballard is a small organization with fewer than 400 employees, and the technology still requires substantial development before it can be used effectively in affordable automobiles.<sup>44</sup> Therefore, Ballard has turned to alliances with two automakers, Ford and DaimlerChrysler, to help facilitate this development. These automakers have invested roughly \$750 million in Ballard, and are helping to integrate Ballard's fuel cells into prototype vehicles (both automakers plan to be mass-producing fuel cell vehicles by 2004).<sup>45</sup> The alliances are not only accelerating the development of an environmentally beneficial technology, but are allowing Ballard to appropriate the costs of its earlier research. If a firm such as Ballard is to risk investing considerable resources in developing a new technology, it must have a reasonable expectation of recovering the costs of its investment. As a small, specialized firm, it would be difficult for Ballard to complete the final stage of development -- the integration of its technology with that of modern automobiles -- alone. Thus, alliances such as Ballard's with Ford and DaimlerChrysler provide small firms with the means of completing the development of their technology and, therefore, appropriating the costs of their earlier research. The knowledge that they will eventually be able to form alliances with automakers and appropriate their research costs, provides firms such as Ballard with a strong incentive to innovate.

---

<sup>44</sup> Nauss, Donald W., "Ballard Battling to Break through with Daimler and Ford Behind It," *Ward's Auto World*, 03-01-1998.

<sup>45</sup> *Ibid.*

### **6.5.3: Automobile Alliances and the Diffusion of Knowledge:**

The process of innovation involves not only the invention and development of new technologies, but also the spread of this new knowledge throughout an industry. Strategic alliances have played an important role in facilitating the diffusion of knowledge -- particularly tacit knowledge -- throughout the automobile industry.

Consider NUMMI, General Motors' and Toyota's joint production venture in Fremont, California. One of General Motor's goals with NUMMI was to learn Toyota's lean manufacturing techniques. Lean production is an example of tacit knowledge in that it is embedded in Toyota's corporate culture; such knowledge is not easily transferable from organization to organization. Thus, as part of the joint venture agreement, GM is allowed to assign sixteen managers to NUMMI for two-year terms, after which they are rotated back into GM where they can apply what they have learned to GM's other plants. This type of continuous interaction was necessary for GM managers to absorb the tacit elements of lean production and spread this knowledge throughout their organization.<sup>46</sup> It has allowed GM to adopt many of Toyota's lean-production techniques throughout its global operations, particularly in its successful Saturn division.<sup>47</sup> Similar alliances between Ford and Mazda and Chrysler and Mitsubishi have helped diffuse lean production throughout the industry.<sup>48</sup>

---

<sup>46</sup> Inkpen, Andrew, "Learning and Knowledge Acquisition through International Strategic Alliances," *Academy of Management Executive*, Vol. 12, No. 4, 1998, pp. 69-80.

<sup>47</sup> Womack, James P., Jones, Daniel T., and Roos, Daniel, *The Machine that Changed the World*, New York, Harper Perennial, 1990, pp.82-84.

<sup>48</sup> *Ibid.*

#### **6.5.4: Automobile Alliances and the Simultaneous Model of Innovation:**

Under the simultaneous model of innovation discussed in chapter 5, innovation occurs best, not as a linear process, where simple R&D effort eventually leads directly to the development of new technologies, but as a continuous, cyclical process, where firms seek to acquire knowledge to respond to changing market conditions. Such knowledge is obtained by procuring feedback through linkages among internal organizational divisions and from outside sources, including competitors, suppliers, retailers, and firms in other industries. The relationships with these outside sources often take the form of strategic alliances.

Alliances play an important role in helping the automobile industry innovate in accordance with the simultaneous model. In addition to their horizontal alliances, automakers have established research and development joint ventures with their suppliers and with firms from other industries. For example, Ford recently established a joint venture with ZF Friedrichshafen AG, a German supplier, to develop and build continuously variable automatic transmissions. The new transmissions, which will be used in Ford vehicles and sold to other automakers, have the potential to increase performance and fuel economy while reducing emissions.<sup>49</sup> Volvo and Motorola recently created a joint venture to develop electronic components. The alliance will enable Volvo to coordinate its electronic components using Motorola's advanced microprocessors.<sup>50</sup> Ford and DaimlerChrysler's joint venture with Ballard Power (discussed above) is

---

<sup>49</sup> Brett C Smith, "Ford, ZF, a JV, and the CVT," *Automotive Manufacturing & Production*, Dec. 1998, p. 14.

<sup>50</sup> "Motorola and Volvo Partner to Develop Electronics for Cars of the 21st Century," *Business Wire*, March 4, 1998.

another example of an alliance which helps automakers incorporate knowledge from outside the industry. Such alliances provide automakers with the information they need to develop and adapt their technology to changing market conditions. In particular, alliances with suppliers allow automakers to tap into suppliers' more specialized knowledge base, while alliances with firms from outside the industry enable automakers to incorporate complementary technologies into their vehicles. These alliances make innovation in the automobile industry more efficient; they enable automakers to innovate by using existing sources of information, thus reducing the need for increased R&D expenditure. Thus, alliances foster innovation in the automobile industry by helping to organize the innovative process in accordance with the simultaneous model.

Strategic alliances are a powerful innovative force in the automobile industry. Research and development joint ventures help automakers avoid duplicating their research efforts, freeing funds for additional projects. Virtual bigness acts centrifugally to help small automakers achieve the scale required for large research projects, yet still retain their specialized innovative focuses. Joint research and production ventures facilitate the diffusion of knowledge to alliance partners throughout the industry. Alliances with automakers stimulate innovation by small outsiders by providing a means for these firms to appropriate their research costs. Finally, alliances provide the continuous feedback and access to new knowledge required for innovation in accordance with the simultaneous model.

## **6.6: Automobile Alliances and the Willingness to Compete**

As Figure 6.1 illustrates, alliance activity in the automobile industry has expanded to the point where almost all major automakers are linked either directly or indirectly through other alliances. How do these relationships affect competition in the automobile industry? If the profitability an automaker is linked to the success of its competitors through a complex web of alliances, might an automaker be less willing to compete against its competitors?

Because the structure of alliance formation in the automobile industry is amorphous, automakers have retained their willingness to compete. Amorphous alliance formation is characterized by task-specific alliances and a relative lack of dependence among competitor/partners. This lack of dependence allows automakers to compete vigorously against their alliance partners with the knowledge that, even if their partners falter under the weight of such competition, the repercussions, while harmful, will not be devastating to their own success. Additionally, because automobile alliances tend to be task-specific, automakers can separate the functions in which they co-operate from those in which they compete. Thus, two automakers can collaborate on research, production, or design and still independently compete in marketing and pricing their vehicles.

Again, consider NUMMI. The alliance produces two almost identical automobiles - the Chevy Prizm and the Toyota Corolla. However, in 1989, shortly after production began, the Corolla sold at a price 10% higher than the Prizm.<sup>51</sup> Toyota's vehicle still carries a substantial premium over General Motors'.<sup>52</sup> The difference between the prices

---

<sup>51</sup> "What's in a Name?" *The Economist*, London, Jan. 6, 1996.

<sup>52</sup> *Ibid.*

of these two essentially identical vehicles shows that, even though Toyota and General Motors co-operate in production, they remain competitors in the marketplace.<sup>53</sup> The task-specific nature of amorphous alliance formation allows automakers to separate their co-operative functions from their competitive functions and, thus, retain their willingness to compete.

Profit data from the industry supports the view that, despite widespread collaboration, the automobile industry has remained relatively competitive. Table 6.5 juxtaposes the 1997 returns on revenues of the world's automakers with the weighted average return of the Fortune Global 500 corporations.

<b>Table 6.5: Return on Revenues of the World's Largest Automakers and the Weighted Average Return of the Fortune Global 500</b>	
<b>Automaker</b>	<b>Return on Revenues, 1997</b>
Daimler-Benz	6.48
Chrysler	5.64
Ford	4.59
Honda	4.5
General Motors	4.34
Toyota	4.01
<i>Fortune Global 500 Weighted Average</i>	<i>3.9</i>
Fiat	2.71
Renault	2.61
Fuju (Subaru)	2.35
Bayerische Motoren Werke	2.07
Suzuki	2.03
Volkswagen	1.18
Nissan	-0.21
Mazda	-0.33
Peugeot	-1.48

<sup>53</sup> It is possible that the different prices charged by the two automakers indicates an attempt to jointly practice price discrimination based on consumers' willingness to pay a premium for the Perceived quality of the Toyota nameplate. Such a pricing strategy would be risky, given the antitrust approval of NUMMI restricts cooperative activities to production.

Note that only six of the fifteen automakers listed earned returns greater than the weighted average of the Fortune Global 500. In 1997, the weighted average return on revenues (weighted by revenues) of the world's 15 largest automakers was only 3.4%.<sup>54</sup> This compares with a 3.9% weighted average for the 500 largest global corporations.<sup>55</sup>

### **6.7: Conclusion**

This chapter has examined how the findings of the previous chapters pertain to the automobile industry. The automobile industry provides an excellent example of amorphous alliance formation, and exhibits many of the characteristics described in Chapter 2, *The Structure of Cooperation*. Automobile alliances do not tend to be formed in clusters, and an alliance with one partner does not preclude an automaker from establishing alliances with other automakers. As is typical of amorphous alliance formation, automobile alliances tend to be task specific and limited in scope. As a result, alliance-created interdependence is relatively low and, consequently, alliance partners maintain their willingness to compete. Given the task-specific nature of their alliances, automakers can enter to and exit from alliances with relative ease. Thus, the amorphous structure of alliance formation in the automobile industry is constantly changing. All of these characteristics are consistent with the findings of Chapter 2.

As discussed in Chapter 4, *The Impact of Strategic Alliances on Barriers to Entry*, amorphous alliance formation tends to be centrifugal with respect to entry; alliance formation in the automobile industry is no exception. Automobile alliances promote entry

---

<sup>54</sup> Source: corporate reports and SEC filings.

<sup>55</sup> "Fortune Global 500, 1998," *Fortune*, Apr. 27, 1998, p. F-27.

by providing automakers with the resources and capabilities required to gain access to new geographic markets and product segments.

Chapter 3, *Virtual Bigness*, suggested that the recent proliferation of alliance activity could be attributed to opposing sets of environmental forces that require firms to simultaneously possess the characteristics of both large and small firms. Such forces are present in the automobile industry, and the result has been the formation of numerous alliances. Virtual bigness tends to act centrifugally when alliance formation is amorphous. This is the case with automobile alliances. Alliances have provided smaller automakers with many of the advantages enjoyed by their larger rivals. This virtual bigness has enabled these small automakers to survive in an era of consolidation, keeping market concentration lower than it might otherwise have become.

Chapter 5 demonstrated that strategic alliances can play an important role in fostering innovation. This is true even in the relatively mature automobile industry. Alliances with automakers can help small research-oriented firms appropriate the costs of their research. Research and development joint ventures among automakers spread costs and help to avoid the duplication of research efforts. Other alliances among automakers facilitate the transfer of tacit knowledge.

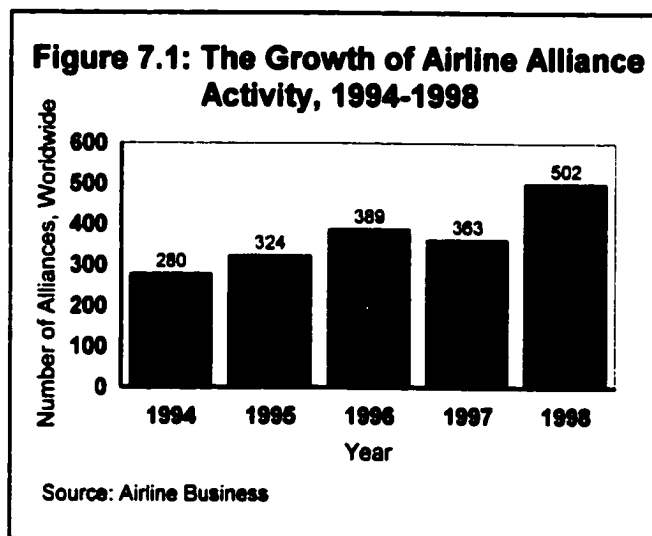
This chapter has focused on how the automobile industry's amorphous alliance formation relates to the concepts developed in the previous chapters. The following chapter addresses the same issues but from the perspective of an industry where clustered alliance formation prevails: the airline industry.



## **Chapter 7: Strategic Alliances in the International Airline Industry**

### **7.1: Introduction**

In 1991, KLM and Northwestern established the first significant international airline alliance. The alliance connected Northwest's main hubs in Minneapolis and Detroit with KLM's main hub in Amsterdam. Its success sparked the creation of numerous other bilateral international airline agreements. As Figure 7.1 illustrates, the proliferation of airline alliance activity has been remarkable.



From 1994 to 1998, the number of airline alliances has grown by 79%, at an average annual growth rate of 16%. The last couple of years have witnessed another significant development. Starting with the formation of the Star Alliance in 1997, the world's largest airlines have begun to group themselves into four distinct global alliance clusters.

While Chapter 6 described the effects of alliance formation under an industry where the amorphous structure is prevalent, this chapter examines the implications of the clustered alliance formation in the international airline industry. The concepts developed

in chapters two through four -- the structure of alliance formation, the impact of alliances on entry, and virtual bigness -- are applied to the international airline industry, and the impact of airline alliances on consumers is examined.

## **7.2: The International Airline Industry:**

Competition in the international airline industry, at least up until the recent formation of alliance networks, global competition has been limited. Rather, international entry barriers have divided the airline industry into a multitude of separate geographic markets. Thus, while there are a large number of significant international airlines (see Table 7.1), the structure of the airline industry should be assessed at the level of smaller geographic markets. Among the variables relevant to such an assessment are the definition of the relevant market, barriers to entry into international markets, and the nature of the airlines' flight networks.

### **7.2.1: The Hub and Spoke Network**

Most major airlines' networks have evolved into a hub and spoke system. Rather than operating a large number of direct flights between destinations, airlines fly passengers in and out of a central hub. Connecting passengers indirectly through a hub allows an airline to operate fewer routes. This is illustrated in Figure 7.2 below, where connecting six routes directly with no hub requires operating fifteen routes, while indirect connection through a hub and spoke system requires operating only five routes.

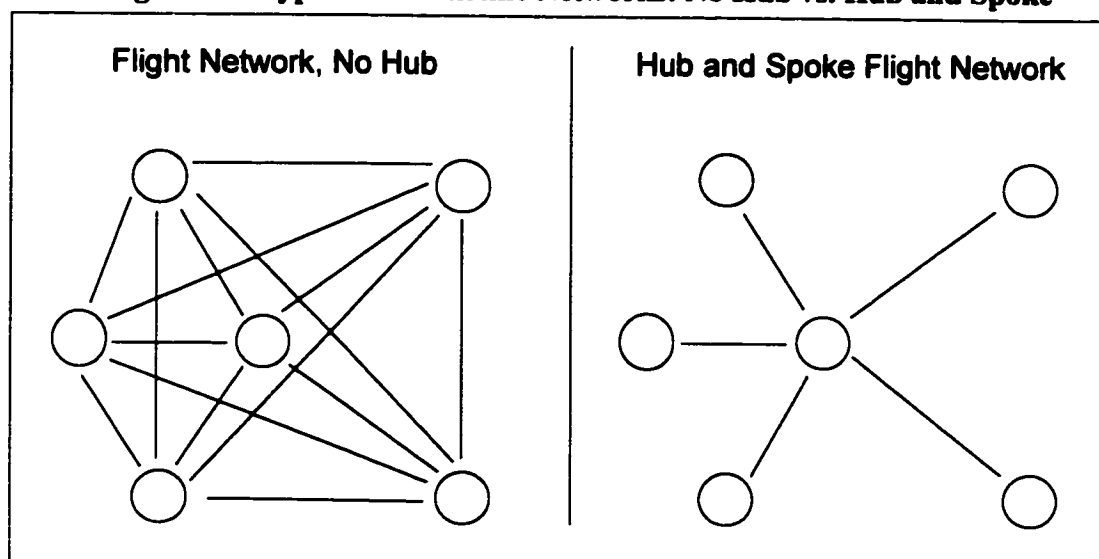
**Table 7.1: The World's Largest Airlines by Revenue Passenger Kilometres, 1998<sup>1</sup>**

<b>Airline</b>	<b>Revenue Passenger Kilometres (000,000)</b>
1. United Airlines	200,496
2. American Airlines	175,309
3. Delta Airlines	166,271
4. British Airways	112,029
5. Northwest Airlines	107,381
6. Continental Airlines	86,741
7. Japan Airlines	78,813
8. Air France	74,542
9. Lufthansa	71,897
10. US Airways	66,564
11. Qantas	58,619
12. Singapore Airlines	57,737
13. KLM	57,304
14. All Nippon	53,825
15. Southwest Airlines	50,553
16. Cathay Pacific	40,679
17. TWA	39,401
18. Air Canada	37,346
19. Alitalia	35,527
20. Thai International	34,448
21. Iberia	32,521
22. Korean Airlines	32,277
23. Swissair	30,283
24. Varig	27,056
25. Malaysia Airlines	27,022

<sup>1</sup> Source: "World Airline Report," *Air Transport World*, July 1999.

*Revenue passenger kilometres* refers to the total revenue from passengers multiplied by the total number of kilometers these passengers travelled.

**Figure 7.2: Hypothetical Airline Networks: No Hub vs. Hub and Spoke**



The advantages of the hub and spoke system are that fewer flights can enable airlines to offer more-frequent departures and reduce operating costs by allowing airlines to fly larger planes. On the other hand, indirect flights through hubs leads to longer travel times for passengers, congestion at hub airports, scheduling problems, and more frequent delays.

### **7.2.2: The Problem of Market Definition**

In assessing the competitive effects of airline alliances, it is important to first define the relevant market. Markets are typically defined by the availability of substitutes. Two airlines would generally be considered to be in the same relevant market when, if one airline raises its fares, a significant number of passengers switch to the other airline: i.e. there is a positive cross-price elastic demand between the two carriers. Defining the relevant market for air passenger service is difficult because the degree of substitutability

will depend on the type of passenger.<sup>2</sup> For passengers who are significantly constrained by flight duration, such as many business travellers, the relevant market most often will consist of direct flights between city pairs. However, for passengers who are relatively indifferent to flight duration, such as many leisure travellers, the relevant market will consist of both direct flights and indirect flights. Even if an airline doesn't offer direct service between two destinations, it may still be considered to be competing in the relevant market if it connects passengers indirectly through its hub. Thus, the relevant market for air passenger service is narrow for passengers who require direct flights and broad for passengers for whom indirect flights will suffice.

How markets are defined, has a significant impact on how the competitive effects of alliances are assessed. The proposed British Airways/American Airline alliance would control 61% of international passenger traffic in and out of Heathrow and a total of 28% of EU traffic.<sup>3</sup> For passengers requiring direct flights to London, the narrow market definition with the resulting high BA/AA market share is appropriate; whereas, for passengers using Heathrow as the hub stop on an indirect flight to another destination, the use of the broad market definition with a lower market share is more appropriate.

### **7.2.3: Barriers of Entry to Foreign Markets**

While there are a large number of international airlines, considerable entry barriers restrict these airlines' ability to compete independently in international markets.

---

<sup>2</sup> Nunes, Natalia, Farago, Stephen, and Travis, Johanna, *The Economic Impact of International Airline Alliances*, Australian Industry Commission, May 1997, pp.33-34.

<sup>3</sup> Gudmundsson, Svienn Vidar, "Airline Alliances: Consumer and Policy Issues," *European Business Journal*, 1999, p.144.

The *Convention on International Civil Aviation* recognizes a nation's sovereignty over its airspace; international commercial air travel is made possible only by a series of air service agreements (ASA's). ASA's are bilateral agreements negotiated by governments that establish the rules for air traffic to and from particular countries. Along with other specifications, ASA's establish freedoms of the air between the countries.

Table 7.2 describes the different levels of air freedoms.

**Table 7.2: Freedoms of the Air**

<b>First Freedom</b>	the right of an airline of one country to fly over the territory of another country without landing.
<b>Second Freedom</b>	the right of an airline of one country to land in another country for an emergency or refuelling only.
<b>Third Freedom</b>	the right of an airline of one country to carry passengers and freight from its country to another country.
<b>Fourth Freedom</b>	the right of an airline of one country to carry passenger and freight from a second country to its own country.
<b>Fifth Freedom</b>	the right of an airline of one country to carry traffic between two other countries provided the flight commences or terminates in its own country.
<b>Sixth Freedom</b>	the right of an airline of one country to carry traffic between two other countries via its own country.
<b>Seventh Freedom</b>	the right of an airline of one country to carry traffic between two other countries, in which the aircraft can be domiciled.
<b>Eighth Freedom</b>	the right of an airline of one country to carry traffic in a second country to a destination in that country; this freedom is known as 'cabotage'

ASA's generally provide for the first through fourth freedoms of the air, which gives airlines of the two countries the right to carry passengers to and from each others' countries, and sixth freedom rights can be established by a combination of ASA's.

However, fifth, seventh, and eighth freedom rights are generally not available. Thus, the

restrictions maintained through ASA's create a significant barrier to establishing a global airline.<sup>4</sup>

Given these restrictions, an airline might attempt to gain access to foreign markets by acquiring foreign airlines. However, airlines are often seen as national flag-carriers or as an essential part of a nation's transportation infrastructure, and countries generally require that their own citizens retain substantial ownership and effective control over their domestic airlines.<sup>5</sup> The combination of these foreign ownership restrictions with the inability to operate flights in foreign countries (eighth freedom) makes establishing a global airline virtually impossible.<sup>6</sup>

A third barrier restricts international competition even when ASA's allow for traffic between two countries. This is the ownership and control of takeoff and landing slots at congested international airports. Slots are normally allocated by airport scheduling committees in accordance to a set of rules developed by IATA. These rules typically allow the airline which previously had use of a slot to automatically get it again.<sup>7</sup> The inability of potential competitors to obtain takeoff and landing slots at congested hub airports is a formidable entry barrier to providing air passenger service to these markets.

---

<sup>4</sup> *Ibid.* p. 139.

<sup>5</sup> Fitzgerald, Paul, "Global Airline Industry: an Overview," <http://ourworld.compuserve.com/homepages/PaulFitzgerald1/ibglobal.htm>.

<sup>6</sup> Nunes, Natalia, Farago, Stephen, and Travis, Johanna, *The Economic Impact of International Airline Alliances*, Australian Industry Commission, May 1997, p. 23.

<sup>7</sup> *Ibid.* p. 26.

### 7.3: Alliance Formation in the International Airline Industry: The Clustered Structure

Until recently, alliances among international airlines were established primarily on a bilateral basis. While the creation of bilateral airline alliances continues, with the announcement of the Star alliance in 1997, the world's major airlines have grouped themselves into four alliance clusters with global aspirations. Joining Star as "global" airline alliances are Oneworld, Wings, and a group centred around Delta and Air France that is still in the early stages of formation. Table 7.3 lists the airlines that make up each of these alliance clusters.

**Table 7.3: Global Airline Alliance Clusters**

Alliance Cluster	Partners	Share of Global Air Passenger Traffic, 1998*
Oneworld	AerLingus, American Airlines, British Airways, Cathay Pacific, Finnair, Iberia, LanChile, Qantas	18%
Star	Air Canada, Air New Zealand, All Nippon, Ansett Australia, Austrian Airlines, Luftansa, Singapore Airlines, Scandinavian Airlines, Thai International, United Airlines, Varig, British Midland <sup>1</sup> , Mexicana <sup>1</sup>	16%
Delta / Air France	Air France, Delta Air Lines, Aeromexico	12%
Wings	Alitalia, Continental, KLM, Northwest	11%
* Source: <i>The Economist</i> , July 17, 1999, p.57.		
<sup>1</sup> To join July 2000.		

Together, these four alliances account for 57% of the world's air passenger traffic, and this share can be expected to increase, as the Delta/AirFrance and Wings clusters look to



add Asian partners to their networks. Presently, only six of the twenty-five largest airlines, and only one of the ten largest, are not a member of one of these alliance clusters. Additionally, Swissair leads another cluster of European airlines: the Qualiflyer group consisting of Swissair, Sabena, Crossair, TAP Air Portugal, Turkish Airlines, AOM, Air Littoral and Air Europe.<sup>8</sup> Thus, alliance formation in the international airline industry is evolving into a clustered structure.

Under clustered alliance formation, there is typically a broad range of coordination among alliance partners. This is true for airlines as well, as airline alliance clusters generally involve coordination of the following activities:

1. joint operation of flights or codesharing -- where one airline assigns its airline designator code to a flight operated by another airline; codesharing can be complementary or parallel; complementary codesharing occurs on end-to-end connector routes (i.e. a Lufthansa code on a flight operated by Air Canada between Toronto and Halifax), while parallel codesharing occurs on routes both airlines fly (i.e. a joint Air Canada / Lufthansa flight between Toronto and Frankfurt);
2. coordination of flight schedules;
3. joint marketing and sales (often including pricing and yield management);
4. amalgamation of frequent flyer mileage awards and corporate discount services;
5. technical cooperation such as maintenance, emergency equipment, and information systems;

---

<sup>8</sup> The Qualiflyer Group has not been included in Table 7.2 because it consists solely of European-based airlines, and does not aspire to become a global alliance. The Qualiflyer Group accounts for approximately 2% of global airline traffic (*Airwise News*, Nov 25, 1999).

6. joint use of ground facilities;
7. coordination of ground handling; and
8. sharing of passenger services such as reciprocal lounge access.<sup>9</sup>

As these activities encompass most of the airlines' primary functions, the range of coordination of the airline alliance clusters is, in fact, not far from that of mergers.

Because of the extensive level of coordination involved, where the clustered structure is prevalent, firms develop a relatively high level of dependence on their alliance clusters. In the airline industry, this dependence is partly due to the benefits that accrue to partners from their alliances. A study by the U.S. General Accounting Office reveals that international alliances result in substantial increases in passenger traffic and revenues for their partners, and that these benefits occur at the expense of non-allied airlines.<sup>10</sup> For example, the GAO estimates that in 1994, the KLM / Northwest alliance increased traffic for the two airlines by 350,000 passengers, and produced approximately \$150 million in additional revenues for Northwest and \$100 million for KLM.<sup>11</sup> The same study indicates that the success of airline alliances is dependent upon the level of integration among alliance partners; the greater the integration, the greater the benefits.<sup>12</sup> However, greater integration reduces airlines' ability to operate independently in international markets. Thus, to realize the full benefits of their alliance clusters, individual airlines must allow

---

<sup>9</sup> Gudmundsson, Svienn Vidar, "Airline Alliances: Consumer and Policy Issues," *European Business Journal*, 1999, pp.141-142; Castles, Chris, "Harnessing the Benefits of the Global Airline Alliances," PricewaterhouseCoopers, October, 1998.

<sup>10</sup> "International Aviation: Airline Alliances Produce benefits, but Effect on Competition is Uncertain," United States General Accounting Office, Washington, April, 1995, pp.27-38.

<sup>11</sup> *Ibid.*

<sup>12</sup> *Ibid.*

themselves to become relatively dependent on their alliance partners. This supports the results of the models developed in Section 2.2, *The Propensity to Cluster*, which predict that clusters tend to evolve where alliance-created interdependence is high.

This greater interdependence makes a firm's exit from an alliance cluster unlikely. So far, this has held for the global airline clusters. Historically, airline alliances have been extremely unstable. A total of 28% of the alliances established between 1994 and 1998 have been terminated.<sup>13</sup> However, this instability seems to apply only to bilateral alliances which are not part of larger global alliance clusters. The only instance of a firm exiting from any of the four global alliance clusters listed above occurred when Austrian Airlines left the informal Delta/Air France group and joined the Star Alliance. The longer these alliance clusters survive, and the more integrated and interdependent their partners' operations become, the less likely will be any possibility of an airline breaking away from the cluster. In the exceptional case of Austrian, no formal multilateral alliance had been established around Delta/Air France. Karel VanMiert, the former European Commissioner for Competition Policy, described the coordination of airline activities and the difficulty of exiting the alliance cluster as follows:

The inherent logic of the alliances is always to go further. One starts, rather innocently, with joint exploitation of lounges, pooling of frequent flyer programmes and continues down the logic of information technology which results in the integration of information networks and databases. This is the price to pay in order to be able to fully exploit the synergies. This also leads to total transparency between the alliance partners. So I do wonder where the competition will remain. Once information on cost data, marketing intelligence and development strategies, going as far as choices of fleets, have been integrated, I do not see how a breakaway is still

---

<sup>13</sup> Gudmundsson, Svienn Vidar, "Airline Alliances: Consumer and Policy Issues," *European Business Journal*, 1999, p.141.

possible because you achieve de facto the same rigidified market structure as in a merger.<sup>14</sup>

While exiting an alliance cluster is difficult under ordinary circumstances, the Star Alliance is planning to make it almost impossible for its members. Following Onex Corporation's failed hostile takeover bid for Star partner Air Canada, the Star Alliance announced that it was considering the adoption of a 'prohibitively expensive' exit fee that would apply to all members of the alliance.<sup>15</sup> Such a fee would not only protect the alliance from hostile takeovers of its partners, but would also serve as a deterrent against individual members leaving the cluster on their own. The Star Alliance partners' willingness to embrace such exit fees further illustrates how interdependent clustered alliance partners have become.

The final, and perhaps defining, characteristic of clustered alliance formation is that competition exists not at the firm level, but at the cluster level. Individual partners in the same alliance cluster do not compete with one another. This is the case with airline alliance clusters. Prior to the emergence of airline alliances, airlines which are now partners competed head to head on many international routes. Now, many of the major alliances have received or requested antitrust immunity which allows them to coordinate prices on these same routes. Even without antitrust immunity, codesharing can lead to route rationalization, and the coordination of schedules ensures that separate flights flown by alliance partners don't compete for the same passengers. As Karel VanMiert asserts above, the alliance clusters are, for all practical purposes, little different from mergers. On

---

<sup>14</sup> VanMiert, Karel, "Competition Policy and Air Transport: The Transatlantic Challenge," Speech at the American Bar Association, Washington, January 22, 1999.

<sup>15</sup> Bertin, Oliver, "Airline Alliance Planning Poison Pill," *The Globe and Mail*, November 19, 1999, p.B7.

many international routes, airline competition now exists among clusters, rather than among firms.

Thus, airline alliance clusters exhibit many of the characteristics typical of clustered alliance formation. These include a broad range of coordination among alliance partners, a relatively high level of dependence of individual firms on their alliance clusters, a lesser likelihood of exit by partners from their alliance clusters, leading to a greater stability of the structure of alliance formation, and competition that exists among clusters rather than among individual firms.

#### **7.4: Virtual Bigness**

##### **7.4.1: Explaining Airline Alliances Through Virtual Bigness**

The primary engine behind the proliferation of international airline alliances is globalization. As the world becomes a "global village," the demand for international traffic increases. For example, total passenger traffic between the United States and foreign destinations increased from 39.5 million passengers in 1980 to 92.6 million in 1993, a 134% increase. I.A.T.A. estimates that this number will increase to 226 million passengers by 2010.<sup>16</sup> Given such growth, airlines want to provide their customers with seamless international service; however, due to entry barriers to international markets -- airline service agreements which restrict international air freedoms, foreign ownership restrictions, and incumbent airlines' control of slots at congested international airports -- it is impossible for an airline to grow and independently create a global flight network.

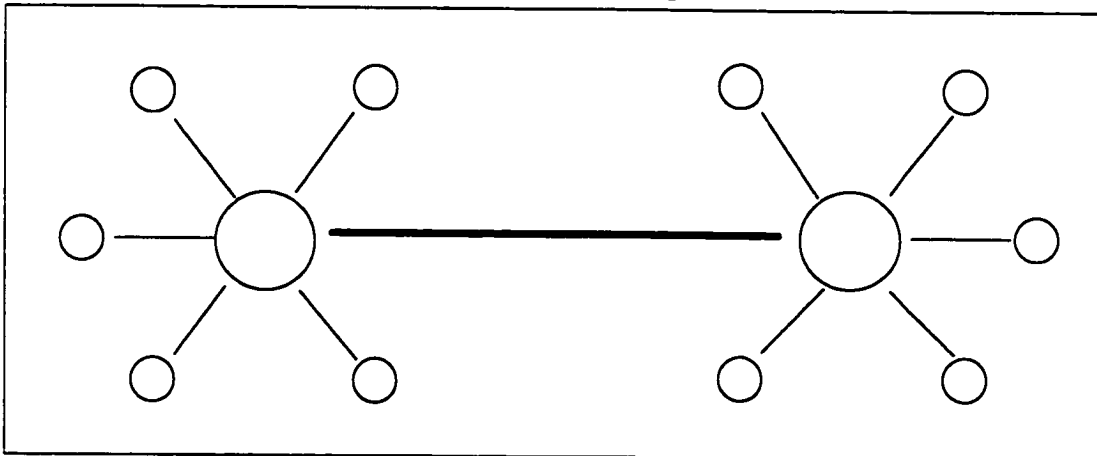
---

<sup>16</sup> International Aviation: Airline Alliances Produce benefits, but Effect on Competition is Uncertain," United States General Accounting Office, Washington, April, 1995, p.10.

Therefore, airlines are forced to circumvent these barriers by creating alliance clusters to establish global networks. Entry barriers to international markets prevent airlines from becoming big independently, so they are using alliances to become virtually big instead.

Codesharing alliances help airlines extend their international reach by connecting the hub networks of alliance partners. Figure 7.3 illustrates the expansion of a network through a codesharing alliance between two airlines; a single flight between two hubs can unite two airlines' flight networks.

**Figure 7.3: Network Expansion Through a Codeshare Alliance**



By connecting their hubs in this fashion, airlines can offer their customers access to all the destinations served by their partners' networks without having to expand significantly their own operations. The Star Alliance partners, for example, have created a global flight network that serves almost 800 destinations in over 110 countries, so that even relatively small airlines such as Air New Zealand and Varig can offer their passengers access to numerous worldwide destinations.<sup>17</sup> The virtual bigness provided through the Star

<sup>17</sup> Source: Star Alliance webpage, <http://www.star-alliance.com/>, June 10, 2000.

Alliance creates a network for these small airlines that even the largest airlines could not achieve independently.

#### **7.4.2: Centrifugal and Centripetal Aspects of Virtual Bigness**

Even though clustered alliance formation reduces the number of independently competing entities, there are circumstances where the virtual bigness created through airline alliances acts centrifugally to reduce market power. Such situations occur when an alliance unites two relatively weak airlines in a market that contains a dominant player. Jointly, the two airlines can obtain the strength to compete effectively against a larger firm where they would be unable to do so, each independently on its own. This effect is supported by a study by Oum, Park, and Zhang which examined 57 transpacific routes from 1982-92 and found that codesharing between two nonleader major carriers made market leaders behave more competitively, resulting in greater output and lower fares.<sup>18</sup>

Nevertheless, in most instances, the formation of clustered airline alliances must be viewed as a centripetal force. The major alliance clusters involve such broad-based coordination that there is little distinguishing them from mergers. Antitrust immunity allows airlines to coordinate marketing and fares, so there is no competition among alliance partners. Thus, competition has shifted from among firms to among clusters, lowering the number of competing entities and increasing their market shares.

In some markets, the consolidation resulting from airline alliances is substantial.

Consider the American Airlines / British Airways alliance currently under review for

---

<sup>18</sup> Oum, T.H., J.-H. Park and A. Zhang, "The Effects of Airline Codesharing Agreements on Firm Conduct and International Air Fares," *Journal of Transport Economics and Policy*, vol. 30, 1996, pp.187-202.

being granted antitrust immunity. The two airlines currently account for 58% of the seats available for flights between the United States and London, and 67% of the total daily round trips.<sup>19</sup> AA and BA are currently direct competitors on six routes between U.S. cities and Heathrow and on a route between Dallas and Gatwick. On five of these routes -- Kennedy, Chicago, Boston, Miami, and Dallas -- the two airlines account for over 70% of the service. Furthermore, they are the only two airlines to offer service between Boston and Heathrow, as well as the only two to offer direct service between Dallas and Heathrow -- the alliance would give them a monopoly on these routes.<sup>20</sup> Thus, the BA/AA alliance represents a considerable centripetal force -- particularly in the direct-flight market for time sensitive passengers. Other alliances have had similar effects on other international routes.

While under certain conditions, virtual bigness under the clustered airline alliance formation can act centrifugally, it is mostly a centripetal phenomenon increasing market shares and lessening competition.

### **7.5: Airline Alliances and Entry**

Although alliances are providing airlines with access to new markets, this does not represent true market entry, as no new competitors are created. For example, as part of the Star alliance, Air Canada can connect its passengers to numerous destinations in Germany; however, these flights, while bearing Air Canada's codes, are operated by

---

<sup>19</sup> Anderson, John H. Jr., *Aviation Competition: International Aviation Alliances and the Influence of Airline Marketing Practices*, Testimony Before the Subcommittee on Antitrust, Business Rights, and Competition, Committee on the Judiciary, U.S. Senate, March 19, 1998, p.13.

<sup>20</sup> *Ibid.*



Lufthansa. As Air Canada and Lufthansa do not compete directly for passengers, there is no true new entry into the German market.<sup>21</sup> However, while they do not directly facilitate true market entry, airline alliances can create new entry barriers and reinforce existing ones.

One such barrier results from the effect that codesharing has on computer reservation systems (CRS). It has been estimated that 80 to 90% of flights are booked from the first screen of the CRS display, often though a lower priced or more convenient flight exists on the second or third screen.<sup>22</sup> Codesharing results in multiple listings on CRS's. A single code-shared connection involving two flights will typically be listed three times: once as an online connection using the code of one alliance partner, a second time using the code of the other partner, and a third time as an interline connection (as two independent flights). As direct online connections get precedence over indirect interline connections, such multiple listings can crowd out other airline's listings, pushing them off the first screen of the CRS.<sup>23</sup> This is particularly harmful to new entrants of smaller airlines which are not members of an international alliance cluster and, thus, rely on interline connections. Thus, multiple listing of codeshare flights represents a significant entry barrier.

---

<sup>21</sup> Entry has been facilitated indirectly by the bilateral open-skies agreements negotiated by the U.S. Department of Transportation in return for granting airline alliances antitrust immunity. The removal of these entry barriers should not be attributed to the alliances, however, but to the decisions of regulatory agencies.

<sup>22</sup> Gudmundsson, Svienn Vidar, "Airline Alliances: Consumer and Policy Issues," *European Business Journal*, 1999, pp.141-143.

<sup>23</sup> *Ibid.*

Clinton, Oster Jr. and Strong, John S., "Consolidation in the Airline Industry: Airline Alliances and Competition," Congressional Testimony, 06-04-1998.

A second barrier associated with airline alliances results from the coordination of frequent flyer programs. Frequent flyer programs offer passengers incentives to fly continuously with the same airline. This incentive is particularly important in the business market, as passengers who do not necessarily pay for the flights themselves receive the benefits. A new airline will have difficulty attracting passengers who have accumulated frequent flyer points with an incumbent airline.<sup>24</sup> Thus, frequent flyer programs raise entry barriers by increasing passenger loyalty to incumbents. Alliance clusters with coordinated frequent flyer programs aggravate the situation by providing passengers with more opportunities to accumulate and use their points, thereby further strengthening the incumbent's position and making entry even more difficult.

A third entry barrier results from the dominant market positions that can ensue from airline alliances. Alliance partners can unite their market shares on specific geographic markets to create formidable market power. In the airline industry, such power is reinforced by the control of takeoff and landing slots and other entry barriers. The Chairman of American Airlines testified before a U.S. Senate committee that the market power of the Star and Delta/SwissAir alliances drove American out of three intercontinental routes: New York-Zurich, Miami-Frankfurt, and New York-Brussels.<sup>25</sup> If a large airline such as American with established routes succumbed to the market power created by alliances, how could a new entrant succeed?

---

<sup>24</sup> Gudmundsson, Svienn Vidar, "Airline Alliances: Consumer and Policy Issues," *European Business Journal*, 1999, pp.143-144; Shepherd, William G. and Brock, James W., "Airlines," Adams and Brock, eds., *The Structure of American Industry*, Prentice-Hall Inc., 1995, p.255-256.

<sup>25</sup> VanMiert, Karel, "Competition Policy and Air Transport: The Transatlantic Challenge," Speech at the American Bar Association, Washington, January 22, 1999.

Even if a potential entrant could obtain access to the slots, it would need to compete in a particular market, it might still be reluctant to do so for fear of retaliation in the form of predation. Airlines have shown a determination to protect their market positions at their hubs. On May 13, 1999, the Antitrust Division of the U.S. Justice Department filed a complaint against American Airlines for abusing its dominant position at its Dallas/Fort Worth hub by lowering fares below a reasonable level with the intent of driving competitors out of the market.<sup>26</sup> Such predation need not actually occur for a significant entry barrier to be created; the simple threat or possibility that it *could* occur can be enough to thwart potential entrants. Airline alliances that produce joint market power increase this possibility, thus raising entry barriers and consolidating their market positions.

While airline alliances can reduce entry by raising barriers, they may also limit future entry by eliminating potential entrants. In section 7.4.1 above, it was discussed how airlines are establishing international alliances as a response to pressures to globalize. Airlines cannot respond independently to these pressures because of artificial barriers to international markets. If these artificial barriers had not existed, airlines might have chosen to globalize by entering foreign markets independently rather than through alliances. Now, if these barriers are removed in the future, airlines will be unlikely to enter foreign markets independently because they already will have acquired access to these markets through their alliances without having to make the significant investment independent entry would require, and their growing dependence on their alliance partners

---

<sup>26</sup> United States of America vs. AMR Corporation, American Airlines Inc., and AMR Eagle Holding Corporation, Civil Action No.: 99-1180-JTM, Filed: May 13, 1999.

will make exit from their alliance clusters extremely difficult. Thus, the formation of airline alliances today has reduced the potential for independent entry in the future.

### **7.6: The Impact of Airline Alliances on Consumers**

Alliances can directly improve the services airlines provide consumers. Alliances allow passengers to fly online (on connecting flights with the same airline or, in this case, alliance) to many more destinations. Passengers generally prefer online connections because the gates involved are more likely to be closer together than the gates of two different airlines. Many passengers believe that if something goes wrong -- for example, if luggage is lost or if flight delays result in missed connections -- they are more likely to be taken care of when there is a clear responsibility for the problem; under online connection, there is no potential for airlines to shift blame to other airlines when something goes wrong.<sup>27</sup> Additionally, alliances enable partners to coordinate their schedules to provide more convenient connections for passengers. Other consumer advantages of "seamless" online air travel provided through alliances include common access to airline lounges around the world, more convenient ticketing and reservations for alliance flights, more opportunities to acquire and use frequent flyer points.<sup>28</sup>

Not all aspects of passenger service are enhanced by airline alliances, however. Passengers tend to like to know with which airline they are travelling. Confusion may arise if they find themselves flying with one airline when they were expecting to be flying

---

<sup>27</sup> Clinton, Oster Jr. and Strong, John S., "Consolidation in the Airline Industry: Airline Alliances and Competition," Congressional Testimony, 06-04-1998.

<sup>28</sup> Coltman, David, "International Airline Alliances," *Consumer Policy Review*, London, May/June, 1999, pp. 111-113.

with its alliance partner. This is particularly significant to passengers who have preferences based on perceived service quality. Another negative impact of airline alliances on passenger service arises from how airlines expand their networks through alliances by connecting their already-congested hubs.<sup>29</sup> These connections feed even more passengers through the hubs, further increasing congestion which increases the potential for flight delays. Thus, there are negative as well as positive effects of alliances on customer service.

In addition to the potential for improved customer service, there is evidence to suggest that, under certain circumstances, airline alliances can result in lower fares. In some instances, alliances between two small airlines can help them jointly obtain the resources to effectively compete against a market leader. A study by Oum, Park, and Zhang revealed that codesharing between two nonleader major carriers made market leaders behave more competitively, resulting in greater output and lower fares.<sup>30</sup>

Another study suggests that alliance partners' ability to cooperate on pricing complementary codesharing flights results in lower fares. Brueckner and Whalen find that for a series of connecting flights, the fares charged by alliance partners were significantly lower (18% - 28%) than those charged by non-allied carriers. The explanation for this finding is that on interline flights connecting non-allied airlines, each airline has an incentive to maximize its profits on its own leg of the passenger's flight itinerary. This creates a negative externality for the other airline by lowering the traffic on its flights and

---

<sup>29</sup> VanMiert, Karel, "Competition Policy and Air Transport: The Transatlantic Challenge," Speech at the American Bar Association, Washington, January 22, 1999.

<sup>30</sup> Oum, T.H., Park J.H. and Zhang, A., "The Effects of Airline Codesharing Agreements on Firm Conduct and International Air Fares," *Journal of Transport Economics and Policy*, vol. 30, 1996, pp.187-202.

preventing it from exploiting scale economies. By jointly maximizing profits over the entire flight itinerary, alliance partners have an incentive to keep traffic levels higher so that they can exploit these scale economies; thus, the overall fares charged on interline flights will be lower.<sup>31</sup> The results of this study should be viewed with caution, however, as the price reductions could be a temporary measure to drive non-aligned airlines off these routes. A long-term assessment of fares needs to be conducted before conclusions can be drawn.

Finally, the coordination of services among alliance partners can reduce airline costs by helping them realize economies of scale. Alliance partners can lower costs by sharing and rationalizing services such as check-in and ground handling, administration, and ticketing, sales and promotions. Alliances provide greater traffic density by allowing airlines to tap into their partners' networks and through the rationalization of flights on served jointly by partners. These greater traffic densities help airlines exploit scale economies by using larger aircraft.<sup>32</sup> Such cost savings should result in lower fares for passengers -- if competition is sufficient.

This is an important qualification, however; if there is not sufficient competition, the cost savings from alliances will not be passed on to consumers. The potential benefits of each airline alliance must be weighed against any increased market power that could result. As discussed above, the clustered alliance formation of the airline industry is most often a centripetal market force that can significantly raise market power in many

---

<sup>31</sup> Brueckner, Jan K., Whalen, W. Tom, "The Price Effects of International Airline Alliances," Institute of Government and Public Affairs University of Illinois at Urbana-Champaign, Dec. 1998.

<sup>32</sup> Nunes, Natalia, Farago, Stephen, and Travis, Johanna, *The Economic Impact of International Airline Alliances*, Australian Industry Commission, May 1997, pp.18-19.

markets. This is particularly significant in the relevant market for time-sensitive passengers who require direct flight service between congested hub airports and, thus, are unable to take alternate routes. Furthermore, dominant market positions resulting from alliances are cemented by high entry barriers which, themselves, are strengthened by airline alliance clusters.

It is too early to assess empirically the effect of international alliance clusters on the airfares on direct flights between major international hubs. However, given the dominant positions being created in some markets, antitrust authorities should proceed with extreme caution in deciding whether to grant airline alliances antitrust immunity.

The Department of Transportation, which has U.S. antitrust jurisdiction over international air travel, has been quick to grant airline alliances antitrust immunity in return for bilateral open-skies agreements between the U.S. and the home country of the foreign alliance partner. Given the other barriers to international markets, which themselves are strengthened by airline alliances, it is unlikely that open-skies agreements alone will increase competition significantly, and passengers will be faced with a greater potential for market power abuse from immune alliances.

The European Competition Commission has taken a more cautious approach towards the approval of international airline alliances. The Commission has required concessions designed to alleviate market power concerns before granting approval - i.e. requiring alliances to give up slots at congested hub airports and to reduce flight frequencies if requested by a competitor. With the potential for international alliances to obtain significant power in direct-flight markets, this approach is more reasonable than

that of the Department of Transportation. The next chapter considers these issues in greater detail as it discusses how antitrust should deal with strategic alliances.

### **7.7: Conclusion**

This chapter has examined how the concepts developed in chapters 2 through 4 relate to the airline industry.<sup>33</sup> Alliance formation among international airlines is clustered, and the industry exhibits many of the characteristics associated with clustered alliances described in Chapter 2, *The Structure of Cooperation*. The world's major airlines have grouped themselves into four separate clusters with global aspirations; the airlines in each cluster generally do not establish alliances with airlines in other clusters. As is typical of clustered alliance formation, airline alliances cover a broad range of business functions, involving a substantial portion of each partner's activities. As a result, interdependence among partner airlines is relatively high. This high level of alliance-created interdependence makes exit from airline clusters difficult and, thus, leads to a relatively stable alliance structure. The final characteristic of clustered alliance formation exhibited by the airline industry is the effect on competition. Airlines typically do not compete with their partners; rather, clusters compete with other clusters.

Chapter 3, *Virtual Bigness*, suggested that the proliferation of alliances was a response environmental forces requiring firms to simultaneously possess the characteristics of both small and large firms. Rather than becoming big in an actual sense, small firms can become virtually big through alliances instead. This phenomenon is driving alliance formation in the international airline industry. Globalization is creating

---

<sup>33</sup>A discussion of innovation is not particularly relevant to the airline industry.



the demand for global flight networks; however, entry barriers to international markets prevent airlines from establishing such large networks independently. Because these barriers prevent airlines from becoming big independently, they have turned to alliances to become virtually big instead. When alliance formation is clustered, virtual bigness can act either centrifugally or centripetally. Both types of forces are exhibited by airline alliances. Airline alliances can act centrifugally when an alliance between two weaker airlines provides more effective competition to a market leader. In most instances, however, the virtual bigness created by airline alliances must be viewed as a centripetal force, as the alliances involve such broad-based cooperation that there is little to distinguish them from mergers.

As discussed in Chapter 4, *The Impact of Strategic Alliances on Barriers to Entry*, because they are often exclusionary, alliance clusters can prevent potential entrants from acquiring the resources they need to gain access to new markets. This is the case in the airline industry. Airline alliances reinforce incumbent's control over listings on central reservation systems and access to scarce slots at crowded airports, and they entrench passenger loyalty by expanding frequent flyer programs. These factors make it more difficult for airline which are not part of a global cluster to access new markets.

Given this prohibitive effect on entry and the centripetal nature of much airline alliance activity, the effect of airline alliances on consumers must be examined with caution. While airline alliances can produce efficiencies which could lower the costs of providing passenger service, such savings will not be passed on to consumers if competition is insufficient. Chapter 8, *Antitrust Treatment of Alliances*, deals with how

**this type of trade-off between competitive and anticompetitive aspects of alliances should be evaluated.**

## **Chapter 8: Antitrust Treatment of Alliances**

On February 25, 2000, Ford, General Motors, and DaimlerChrysler established the world's largest online business-to-business (B2B) exchange to purchase parts from thousands of suppliers worldwide. The joint venture, named Covisint, now includes Renault and Nissan, and other automakers have expressed interest in joining.<sup>1</sup>

Competitors in numerous other industries have united to create similar exchanges; non-existent only a few years ago, there are currently more than 750 B2B exchanges in operation worldwide.<sup>2</sup>

A B2B exchange is an online marketplace which allows buyers and sellers to conduct procurement activities using common computer software systems. These exchanges have the potential to create significant efficiencies; they may lower transaction costs, facilitate inventory management, create volume-related scale economies, and improve the overall pricing mechanism of the market.<sup>3</sup> At the same time, B2B exchanges, particularly those controlled by a horizontal collaboration of competitors such as Covisint, raise anticompetitive concerns. Among these concerns are an increased potential for information to be exchanged among competitors which could facilitate conspiracy and the accumulation of monopolistic power where a joint venture of powerful sellers control the exchange or of monopsonistic power where buyers jointly control the exchange.<sup>4</sup> In response to these concerns and the rapid proliferation of B2B

---

<sup>1</sup> "Seller Beware," *The Economist*, Vol. 354, 03-04-2000.

<sup>2</sup> *Ibid.*

<sup>3</sup> Federal Trade Commission, "Notice of Public Workshop: Competition Policy in the World of B2B Electronic Marketplaces," FTC webpage, June 2000.

<sup>4</sup> "A Market for Monopoly," *The Economist*, Vol. 355, 06-17-2000.

exchanges, both the FTC and the Justice Department are conducting investigations to assess how antitrust should deal with B2B exchanges.<sup>5</sup>

The issue of B2B exchange joint ventures is but the latest variant of the more general problem of how antitrust should treat strategic alliances;<sup>6</sup> it is, like most antitrust issues, a problem of balance. While circumstances exist where alliances can create anticompetitive concerns, in most instances, alliances produce real efficiency gains without significantly enhancing market power. Alliances allow firms to combine complementary assets and capabilities to achieve economies of scale and scope, invest in large scale research and development, realize network externalities, adapt to the convergence of markets, quickly enter new geographic and product markets, and respond to rapidly changing competitive environments. Particularly important is the impact alliances have in promoting innovation (detailed in Chapter 5). Additionally, by promoting virtual bigness, alliances often act centrifugally to restrict market concentration and preserve competition.<sup>7</sup>

The goal of competition policy towards strategic alliances should be to find the correct balance of enforcement so that consumers can fully benefit from the improved competitive performance alliances can create. A loose alliance policy might result in a reduction in firms' willingness to compete, or allow firms to collectively acquire or abuse market power. On the other hand, an overly-strict alliance policy could inhibit firms from

---

<sup>5</sup> *Ibid*; Federal Trade Commission, "Notice of Public Workshop: Competition Policy in the World of B2B Electronic Marketplaces," FTC webpage, June 2000.

<sup>6</sup> In this chapter, as with most of those preceding it, the term, alliances, refers to horizontal alliances (collaborations among competitors). Analysis is restricted to this type, as horizontal alliances have the greatest potential to raise anticompetitive concerns.

<sup>7</sup> Refer to Chapter 3, *Virtual Bigness*.

establishing alliances for legitimate purposes. This would be detrimental to consumers, not only because it would eliminate potential gains in efficiency and innovation, but because it could also have the paradoxical effect of deterring the formation of alliances which could act centrifugally to prevent rising concentration. Thus, antitrust must achieve a balance between over and under-enforcement for consumers to benefit fully from alliances.

### **8.1: The National Cooperative Research and Production Act**

The first legislative attempt to achieve greater balance in the antitrust treatment of alliances was the National Cooperative Research Act (NCRA) which was enacted in 1984. In the early 1980's a consensus among American policymakers emerged that cooperative research and development must play a central role if the United States was to maintain its technological leadership.<sup>8</sup> It was feared that the threat of litigation under the Clayton Act would deter firms from collaborative research that would otherwise have lead to significant innovation.<sup>9</sup> Therefore, the NCRA was passed in an attempt to promote cooperative research. The significant provisions of the NCRA were twofold: firstly, the Act mandated that research joint ventures must be evaluated under the rule of reason, and secondly, where partners to a research venture complied with the prenotification

---

<sup>8</sup> Hemphill, Thomas A., "U.S. Technology Policy, Intraindustry Joint Ventures, and the National Cooperative Research and Production Act of 1993," *Business Economics*, Vol. 32, 10-01-1997, pp 48-55.

<sup>9</sup> Dougherty, Veronica M., "Antitrust Advantages to Joint Ventures Under the National Cooperative Research and Production Act," *Antitrust Bulletin*, Winter 1999, pp. 1007-1078.

Less significant provisions include the recovery of legal fees from antitrust litigation.

provisions of the statute, they would be subject to single rather than treble damages under antitrust litigation.<sup>10</sup>

In the late 1980's, numerous reports suggested that the exclusion of production joint ventures from the NCRA was inhibiting the competitiveness of American industry. The principle argument was that the legislation should be extended to include joint production ventures to provide joint researchers with adequate feedback mechanisms required for innovation and so that the partners could adequately appropriate the costs of their research.<sup>11</sup> This view is summarized by Jorde and Teece:

The NCRA unwisely precludes joint manufacturing and production of innovative products and processes, which is often necessary to provide the cooperating ventures with significant feedback information to aid in further innovation and product development, and to make the joint activity profitable. The NCRA implicitly accepts the serial and not the simultaneous model of innovation.<sup>12</sup>

In response to this argument, the NCRA was amended to include production joint ventures and redesignated the National Cooperative Research and Production Act (NCRPA) in 1993.

The success of the NCRPA has been somewhat disappointing, primarily because of its underutilization. There were only 544 registrations under the NCRA over its ten years of existence, and there have been only 242 R&D joint venture notifications and only 38 R&D/production joint venture notifications over the first three years of the NCRPA's

---

<sup>10</sup> Ibid.

<sup>11</sup> Refer to Sections 5.4 and 5.5 of Chapter 5, *Strategic Alliances and Innovation*.

<sup>12</sup> Jorde, Thomas M. and Teece, David J., "Innovation and Cooperation, Implications for Competition and Antitrust," *Journal of Economic Perspectives*, Volume 4, Number 3, Summer 1990, p. 151.

Refer to Section 5.6 of Chapter 5, *Strategic Alliances and Innovation*, for a discussion of the simultaneous model of innovation.

existence.<sup>13</sup> This amounts to an average of just under 65 filings per year. While this number may appear significant, it is dwarfed by the thousands of alliances that are established yearly.<sup>14</sup> Furthermore, according to Jorde and Teece, the filed joint ventures "are very modest endeavours that are aimed at solving industry problems and are not of great competitive moment."<sup>15</sup> Finally, it is surprising to note that no antitrust case has ever invoked the NCRPA and only a handful have mentioned it.<sup>16</sup>

Numerous explanations for the NCRPA's underutilization have been suggested. Protection from treble damages under the NCRPA does not extend to joint marketing ventures; however, these alliances are often necessary for innovators to adequately appropriate their research costs.<sup>17</sup> Furthermore, without the option of joint marketing, innovators might be reluctant to establish joint research and production ventures for the fear that their partners will steal their innovations and market them independently.<sup>18</sup> The concern for secrecy is also an issue when it comes to registration under the act. Potential joint venture partners might be reluctant to make public the information required for registration under the Act for the fear of losing trade secrets to their competitors.<sup>19</sup> Most important, although the NCRPA states that the rule of reason must be applied to the

---

<sup>13</sup> Federal Trade Commission Staff Report, *Anticipating the 21st Century: Competition Policy in the New High-Tech, Global Marketplace, Chapter 10: Joint Ventures*, 1996.

<sup>14</sup> Refer to Chapter 1, *Introduction*.

<sup>15</sup> Jorde, Thomas M. and Teece, David J., "Innovation and Cooperation, Implications for Competition and Antitrust," *Journal of Economic Perspectives*, Volume 4, Number 3, Summer 1990, p. 152.

<sup>16</sup> Dougherty, Veronica M., "Antitrust Advantages to Joint Ventures Under the National Cooperative Research and Production Act," *Antitrust Bulletin*, Winter 1999, p. 1109.

<sup>17</sup> Kattan, Joseph, Federal Trade Commission Joint Venture Project Hearings Testimony, Washington, July 5, 1997.

<sup>18</sup> *Ibid.*

<sup>19</sup> Kobak, James, Federal Trade Commission Joint Venture Project Hearings Testimony, Washington, July 1, 1997.

assessment of joint research and production ventures, it provides no indication of *how* it will be applied. The lack of a clear procedure leaves firms facing considerable uncertainty over how their joint ventures will be evaluated. Even with treble damages removed, this uncertainty might be enough to prevent firms from establishing legitimate joint ventures. To remove the uncertainty that remains under the NCRPA, it is important that the antitrust authorities establish a clear set of alliance guidelines.

### **8.2: The Competitor Collaboration Guidelines**

Following the Federal Trade Commission's 1996 Hearings on Global and High-Tech Competition, participants were asked which area of antitrust they believed to be most uncertain. The overwhelming response was the treatment of joint ventures.<sup>20</sup> In an effort to reduce this uncertainty, the FTC hosted a series of joint venture hearings and, along with the Justice Department, drafted the recently-released *Antitrust Guidelines for Collaborations Among Competitors*. Robert Pitofsky, FTC Chairman, summarizes the goal of the Guidelines as follows:

The goal in this draft was to achieve balance. We accept that joint ventures are a common and useful device in an economy that is increasingly involved in global competition and that exhibits an expanding high-tech sector. One goal was to diminish the possibility that pro-competitive joint ventures might be abandoned because of uncertainty about the law. On the other hand, history demonstrates that some collaborations occasionally are designed primarily to curtail output and increase price - with few or no countervailing efficiencies.<sup>21</sup>

---

<sup>20</sup> "Joint Venture Guidelines: Views by One of the Drafters," Remarks by Robert Pitofsky, Chairman, Federal Trade Commission ABA/ Section of Antitrust Law Workshop: Joint Ventures and Strategic Alliances, The New Federal Antitrust Competitor Collaboration Guidelines, Washington, D.C., November 11&12, 1999.

<sup>21</sup> *Ibid.*



Thus, the primary goal of the Guidelines is to achieve the proper level of enforcement so that anticompetitive cooperative arrangements are prohibited without discouraging firms from establishing legitimate, pro-competitive alliances.

### **8.2.1: Outline of the Competitor Collaboration Guidelines<sup>22</sup>**

The following summarizes the principal stipulations of the Competitor Collaboration Guidelines:

- The Guidelines create a separation between agreements to be challenged as per se illegal and agreements to be analysed under the rule of reason. Agreements challenged as per se illegal are those "of a type that always or almost always tend to raise price or reduce output." Specific mention is given to agreements among competitors to fix prices or outputs, rig bids, or share or divide markets. All other agreements are to be assessed under the rule of reason to examine their overall competitive effect.
- Three types of relevant markets are specified which may need to be defined in assessing a collaboration. For goods markets, the relevant market is defined in accordance with Sections 1.31 and 1.32 of the Horizontal Merger Guidelines; the "Agencies" (FTC and Justice Department) consider the reactions of buyer to increases in price over prevailing price-levels. When the rights to intellectual property are marketed separately from the products in which they are used, relevant technology markets may be defined. A relevant technology market consists of the intellectual property under consideration and its close substitutes. Sometimes, a collaboration may have competitive effects on

---

<sup>22</sup> *Antitrust Guidelines for Collaborations among Competitors*, Issued by the Federal Trade Commission and the U.S. Department of Justice, April 2000.

innovation that can not be assessed through technology or goods markets. In such cases an innovation market must be defined. An innovation market "consists of the research and development to particular new or improved goods or processes, and to the close substitutes for that research and development."

- Safety zones are established for agreements that are not per se illegal. Agreements falling within the safety zone will not be challenged. For collaborations in general, the safety zone is a 20% combined market share for the participants of the agreement. For research and development, agreements in an innovation market where there are three additional independently controlled research efforts that are close substitutes for the R&D activity of the collaboration will not be challenged.
- The Guidelines specify the procedure that will be used to assess the overall competitive effect of collaborations under the rule of reason (acknowledging that analysis must remain flexible enough to accommodate a wide variety of alliances). Analysis begins with an examination of the nature of the agreement. This includes a review of the business purpose of the agreement and whether anticompetitive harm has already occurred. If there has been anticompetitive harm already, the agreement may be disallowed without further review; otherwise, a more detailed assessment of market power and competitive effect is required.
- This detailed assessment begins with the calculation of market shares and concentration (in accordance with Sections 1.4 and 1.5 of the Horizontal Merger Guidelines) as a starting point for the analysis of market power. Other market conditions

are examined to assess the presence of market power, outlined by Section 1.5.2 of the Horizontal Merger Guidelines.<sup>23</sup>

- The nature and likelihood of entry into the market is considered, including the effect of the collaboration, itself, on entry.
- Given the assessment of market power, other market factors are examined to analyse the likelihood of an agreement resulting in anticompetitive harm. These factors are discussed in Sections 2.1 and 2.2 of the Horizontal Merger Guidelines.
- The nature of the agreement is analysed to assess the ability and incentive of the participants of the collaboration to compete. The Competitor Collaboration Guidelines refer specifically to six relevant factors: (a) the extent to which the relevant agreement is non-exclusive in that participants are likely to continue to compete independently outside the collaboration in the market in which the collaboration operates; (b) the extent to which participants retain independent control of assets necessary to compete; (c) the nature and extent of participants' financial interests in the collaboration or in each other; (d) the control of the collaboration's competitively significant decision making; (e) the likelihood of anticompetitive information sharing; and (f) the duration of the collaboration.
- Finally, the procompetitive benefits of the alliance are identified and whether the alliance is reasonably necessary for their achievement. The benefits of the collaboration are compared with its potential to generate anticompetitive harm to determine its overall competitive effect.

---

<sup>23</sup> These include the changing nature of market conditions and the closeness of substitutes that fall outside the market definition. Refer to *1992 Horizontal Merger Guidelines*, released by the U.S. Department of Justice and Federal Trade Commission.

### **8.2.2: An Assessment of the Competitor Collaboration Guidelines**

The challenge in drafting guidelines for the antitrust treatment of competitor collaborations stems from alliances' diversity. Alliances can serve numerous purposes and take a variety of forms, each having its unique market effects. Guidelines must be flexible enough to accommodate this diversity, yet specific enough to still have meaning. Given this difficulty, the drafters of the Guidelines have produced a document that should be of considerable use in assisting the antitrust authorities in preventing the potential anticompetitive effects of alliances while helping firms assess their antitrust risks when establishing alliances with their competitors. A few of the Guidelines' provisions warranting special mention are discussed below.

The separation of agreements to be treated under the rule of reason from those that are per se illegal is an important provision. Many alliances have both competitive and anticompetitive effects and, thus, need to be examined under flexible criteria, assessing the pros and cons. Such agreements require the rule of reason. On the other hand, certain activities are almost always anticompetitive. Firms should not be given the benefit of the doubt simply for claiming their cartel is a joint venture. The specification of per se illegal offences helps to preserve their status as serious criminal offences.

As described in Chapter 5, alliances are particularly important with respect to innovation; thus, the Guidelines' inclusion of the innovation market concept is very helpful. In many high-technology industries, there are no existing products to form the basis of competition. Rather, firms compete over their innovative efforts to develop new technologies. The traditional definition of the relevant product market is inadequate to

address this type of competition. The use of the innovation market definition is particularly significant for assessing the competitive effects of alliances, as one of the few drawbacks for innovation of research and development joint ventures is their potential to decrease the competitiveness of technology races and the variety of separate research paths pursued by innovators.<sup>24</sup> The innovation market definition thus produces a clearer picture of the overall effect of alliances on innovation.

The introduction of safety zones in which alliances will not be challenged is beneficial as it removes much of the uncertainty of alliance formation for small firms. By removing this barrier to alliance formation, the safety-zone provision not only promotes the enhanced efficiency that can result from such alliances, but also enables small firms to achieve virtual bigness. Virtual bigness is often a centrifugal market force, as small firms, obtaining the advantages of large firms through their alliances, forgo mergers and internal growth.<sup>25</sup> This helps to restrict rising concentration levels and preserves market competitiveness.

Particularly relevant to this study are the factors to be examined in assessing the ability and incentive of the participants of a collaboration to compete. In Section 2.3, *interdependence* is defined as the extent to which the success of a firm depends upon the success of its alliance partners. It was demonstrated that increasing levels of interdependence reduces firms' willingness to compete. While three of the six factors discussed in the Guidelines affect firms' willingness to compete directly, the other three affect partner interdependence which, in turn, affects their willingness to compete. The

---

<sup>24</sup> Refer to Chapter 5, Section 5.2, *Pooled Research Efforts and Duplication*.

<sup>25</sup> Refer to Chapter 3, *Virtual Bigness*.

three factors which affects firms' willingness to compete through interdependence are as follows:

- **Financial interests in the collaboration or in other participants:** To promote the long term stability and commitment to their agreements, many alliances involve a swap of equity shares. Equity cross-holdings are probably the most visible evidence of interdependence, as the profits of each firm become directly related to the profits of their partner. The greater the extent of equity cross-holdings, the greater the interdependence.
- **Control of assets:** Most alliances involve the pooling of assets. As firms contribute more assets to an alliance, they become increasingly dependent on the success of the alliance and their partners to generate an adequate rate of return on these assets. This is particularly relevant where firms cede control of their assets to the alliance or their partners.
- **The duration of the alliance:** Alliances vary greatly in duration. Some are designed to perform a specific task and are quickly disbanded when their goals have been achieved, while others are long-term relationships involving widespread cooperation with no expected termination date. As the duration of an alliance increases, its partners have greater opportunities to integrate their business functions, thus increasing their interdependence.

### **8.2.3: Recommendations**

The widespread use of strategic alliances is still a relatively new phenomenon. As a result, there is currently a scarcity of research examining the long-term effects of alliances

on market structure and behaviour. While a set of guidelines is needed to clarify the procedure to be used in the assessment of alliances and thus reduce the uncertainty of alliance formation, a danger of establishing guidelines at such an early stage is that new research will contradict the assumptions on which the Guidelines are based. Therefore, it is important that the Guidelines remain open to modification, particularly in these early stages of the alliance phenomenon, as the affects of alliances are studied in greater detail. The following recommendations are based on the findings of this study.

As stated above, the Guidelines list six factors which affect partners' incentive (willingness) to compete with one another, three of which affect the willingness to compete indirectly by influencing partner interdependence. Three additional factors affecting interdependence should be included.

- **The extent of coordination of operations:** By definition, alliances involve the sharing of resources. This inevitably results in a certain amount of coordination among partners' activities. As coordination increases, functions which firms once performed independently become increasingly reliant on their alliance partners. Firms, then, become reliant on the continued success of their partners to ensure they will be able to perform their required business functions. Thus, alliances in which there are high levels of firm coordination result in increased partner interdependence.
- **The proportion of the partners' profits derived from the alliance:** If an alliance provides its partners with a high proportion of their profits, then the continued success of the alliance becomes imperative. An unprofitable partner will not always be able to devote the resources required to make the alliance successful, resulting in a significant decline in the other partner's profits. Therefore, when a high proportion of partners'

profits is derived from an alliance, the profitability of each partner depends upon the success of the other partner(s) and, therefore, interdependence is high.

- **The ease of exit and the availability of alternative partners:** Even if a firm derives a considerable proportion of its profits from an alliance, it still may not be overly-dependent on the continued success of its partner(s), provided it has the option of exiting the alliance and establishing a new one with a different partner. The ability to exit an alliance depends greatly upon the extent of coordination of business functions and also upon the structure of the alliance agreement itself. Some agreements include strict penalties for exiting the alliance; the Star Alliance of the international airline industry is an example.<sup>26</sup> If firms can leave their existing partners to establish similar alliances with new partners, then they will be less dependent upon their partners. However, when exit from the alliance is difficult, or when there are no suitable alternative partners, partner interdependence will become entrenched.

These factors should be assessed, along with the others already included in the Guidelines, to determine the likely effect of an alliance on partners willingness to compete.

The review of a collaboration should include an examination of the structure of cooperation prevailing in the relevant market. Under the clustered structure of alliance formation, groups of allied firms, rather than individual firms, compete with one another. Clustering thus reduces the number of separately competing entities, so that concentration measures based on individual firms' market shares are no longer valid. If the amorphous structure is prevalent, then firms typically remain competitors; concentration should

---

<sup>26</sup> Refer to Section 7.3: *Alliance Formation in the International Airline Industry*.



continue to be based on individual firms' market shares. Assessing the structure of cooperation provides a more thorough understanding of the competitive nature of the market and thus offers a better foundation on which to build the analysis of an alliance.

Similar care should be taken for alliances that fall within the safety-zone and are passed without further review. An individual agreement where the partners control less than 20% of the relevant market may be part of a larger cluster that control a far greater share. By not considering the impact of the entire cluster, granting an individual agreement immunity under the safety-zone provision may help protect the market power of alliance clusters resulting in anticompetitive harm.

Finally, uncertainty with respect to the antitrust treatment of alliances could be further reduced by giving firms the option of prenotification. Alliances which are assessed to be procompetitive should then be granted time-limited immunity, perhaps for a period of three years.<sup>27</sup> Such a system would help firms which wish to establish legitimate alliances but are concerned about the antitrust implications make a decision before undertaking a significant investment. It would also allow the antitrust authorities to recommend modifications so that the reviewed alliances could be granted immunity. This would promote the formation of more alliances, keeping their efficiency-enhancing aspects, while removing the potential for anticompetitive harm.

---

<sup>27</sup> Such a system is currently being developed for the antitrust treatment of alliance in Canada. See below.

### 8.3: Canadian Competition Policy Towards Strategic Alliances

The Canadian competition authorities face the same general problem with respect to the treatment of alliances as their U.S. counterparts: that is to achieve the correct balance so that consumers can benefit from the efficiency-enhancing aspects of alliances, while avoiding their potential anticompetitive effects. However, the distinct structure of Canadian markets provides Canadian authorities with additional rationale for exercising caution in dealing with alliances. Among the structural characteristics of the Canadian market is the fact that, while Canadian firms tend to be small relative to their international competitors, they tend to be large relative to their domestic market. Table 8.1 contrasts the revenues of the largest Canadian corporations with those of the largest U.S. corporations.

Canadian Corporations		American Corporations	
Corporation	Revenue (\$US millions)*	Corporation	Revenue (\$US millions)
General Motors of Canada	21,415	General Motors	161,315
BCE Inc.	18,508	Ford Motor	144,416
Ford Motor Co. of Canada	17,844	Wal-Mart Stores	139,208
Nortel Networks Corp.	17,577	Exxon	100,697
Chrysler Canada Ltd.	13,963	General Electric	100,469
TransCanada Pipelines Ltd.	11,614	Intl. Business Machines	81,667
Power Corp. of Canada	10,149	Citigroup	76,431
George Weston Ltd.	9,928	Phillip Morris	57,813
The Seagram Co. Ltd.	9,055	Boeing	56,154
Alcan Aluminum Ltd.	7,790	AT&T	53,588
a. Converted from \$Cdn using the avg. 1998 exchange rate: 1\$US=1.483\$Cdn Source: The Financial Post 500, 1999		Source: The Fortune 500, 1999	

The Canadian firms are considerably smaller in absolute terms than their U.S. counterparts (in every case, less than one-fifth the size). However, relative to the size of their domestic markets, the opposite is true. When we relate the combined revenues of the ten leading non-financial corporations to their respective country's GDP, we notice that Canadian corporations are over twice as large as their American counterparts (23% of GDP compared to 11%). This tendency is confirmed when we look at the concentration levels in Table 8.2.

Classification of Concentration Levels in 53 Large Canadian Industries, 1996 <sup>a</sup>			Classification of Concentration Levels in 63 Large U.S. Industries, 1992 <sup>b</sup>		
	Number of Industries	%		Number of Industries	%
<b>CR<sub>4</sub> (Shipments)</b>			<b>CR<sub>4</sub> (Shipments)</b>		
High (>60%)	17	32	High (>60%)	13	21
Moderate (30%-60%)	24	45	Moderate (30%-60%)	23	36
Low (<30%)	12	23	Low (<30%)	27	43
<b>HHI (Shipments)</b>			<b>HHI (Shipments)</b>		
High (>1800)	11	21	High (>1800)	7	11
Moderate (1000-1800)	13	24	Moderate (1000-1800)	9	14
Low(<1000)	29	55	Low(<1000)	47	75
a. Shipments > \$1 billion (1985)			b. Shipments > \$10 billion		
Source: Statistics Canada			Source: Bureau of the Census		

Under both measurements of concentration, a higher percentage of Canadian industries have high concentration levels and a lower percentage of Canadian industries have low concentration levels. Furthermore, of 22 comparable industries, Canadian industries had

higher concentration than their U.S. counterparts in 20 as measured by the CR<sub>4</sub> and in 18 as measured by the HHI.<sup>28</sup>

The anomaly of small absolute firm size but large relative firm size with high concentration poses a special problem for Canadian firms and competition authorities. If Canadian firms are to achieve the efficiencies required to compete in the global, high-tech marketplace, they must often become big in an absolute sense. However, given the small Canadian market, the acquisition of such absolute bigness can quickly lead to a high degree of concentration.

Strategic alliances offer a solution to this problem. Chapter 3, *Virtual Bigness*, describes how alliances provide small firms with the advantages of large firms. Consequently, alliances can act as substitutes for mergers or internal growth, as firms choose to become virtually big as opposed to becoming actually big. Thus, through strategic alliances, Canadian firms can capture the competitive advantages of absolute bigness without substantially increasing their size relative to the small Canadian market. This centrifugal element of alliances can help preserve the competitiveness of domestic markets. For this reason, alliances are particularly important for the relatively small Canadian economy.

### **8.3.1: The Current Status of Competition Policy Towards Strategic Alliances**

With exception of a limited exemption for research joint ventures under the merger section,<sup>29</sup> and the clearance of Canadian firms to cooperate for the purpose of export,

---

<sup>28</sup>Canada: (1996), Statistics Canada.

U.S.: (1992), Bureau of the Census.

<sup>29</sup>To date, the joint venture provision has not been considered in any Tribunal decisions. -

there are currently no specific provisions in the Competition Act for dealing with strategic alliances. The Competition Bureau's approach towards alliances has been to utilize the existing analytical frameworks of specific sections of the Act as they apply to the alliances under consideration.<sup>30</sup> Hence, some alliances might be assessed under the conspiracy provisions, others assessed under the abuse of dominant position provisions, while other alliances are assessed as mergers. This policy (or lack of one) towards strategic alliances has a number of weaknesses.

There is a lacuna in the current alliance policy because it fails to recognize alliances as a distinct type of organizational structure that requires its own analytical framework. Alliances in an industry form according to different structural patterns - amorphous or clustered; the pattern of alliance formation needs to be assessed as a separate element of market structure. Additionally, alliance-created interdependence can change the very nature of competition. In many industries where alliances predominate, competition no longer pits firms against other firms, but, rather, clusters against other clusters. Traditional frameworks which view the firm as the competitive unit are inadequate for assessing competitive effects of alliances in such industries. Finally, alliances are established for distinct motives and have distinct effects on market structure, conduct and performance. These effects differ from those resulting from mergers or other situations. The analytical frameworks of existing sections of the Competition Act are inadequate to account for the distinctive characteristics of strategic alliances. Therefore,

---

Goldman, Calvin S. and Corley, Richard F.D., "The Review of Joint Ventures Under the Canadian Competition Act," Outline of Speaking Notes to the Federal Trade Commission Joint Venture Hearings, Washington, D.C., June 30, 1997.

<sup>30</sup>"Strategic Alliances Under the Competition Act," Bureau of Competition Policy Bulletin, Apr.15, 1996.

an assessment of the competitive effects of strategic alliances requires its own analytical framework.

A further shortcoming of the existing treatment of strategic alliances under the Competition Act is that the lack of a specific framework for alliances can foster uncertainty among firms considering the establishment of legitimate alliances. This ambiguity towards the treatment of alliances has two effects. Firstly, greater certainty towards the treatment of mergers might prompt firms, who would otherwise have remained independent and formed an alliance, to merge instead, resulting in higher concentration.<sup>31</sup> Secondly, the ambiguity of alliance policy could prevent firms from forming alliances which might otherwise have benefited consumers. The Bureau of Competition recognized this possibility, and in 1996, released the Bulletin, "Competition Policy Under the Competition Act," in an attempt to remove the uncertainty on the part of businesspeople regarding the position of the Bureau on alliances.<sup>32</sup> Nevertheless, due to the lack of a specific framework for alliances, some ambiguity still persists.

The final criticism of the existing alliance policy is that it is too harsh or, at least, there is the perception that it is too harsh. Some alliances may be examined under the conspiracy section of the Act (s.45). Conspiracy is a criminal offence, and carries a penalty of a fine of up to \$10 million and up to 5 years imprisonment. While most alliances do not raise conspiracy issues, the possibility of criminal review still exists, and even the perception that there is a danger of criminal prosecution can be enough to deter

---

<sup>31</sup>Gundlach, Gregory T. and Jakki, J. Mohr, "Corporate Relationships: Legal Limits and Antitrust," *Journal of Public Policy and Marketing*, Vol.11, 09-01-1992, p. 101.

<sup>32</sup>"Strategic Alliances Under the Competition Act," Bureau of Competition Policy Bulletin, Apr.15, 1996.

businesses from establishing legitimate alliances. This problem has recently been recognized by the Bureau of Competition. According to Konrad Von Finckenstein, the Competition Commissioner:

One of the most common concerns [of businesspeople] was the chilling effect that the breadth of the conspiracy section of the Act (s. 45) can have on legitimate, pro-competitive business arrangements such as strategic alliances.

While there is no excuse for price fixing, market sharing and market allocation, there is concern that s. 45 is too broad and that it catches legitimate competitive arrangements.<sup>33</sup>

Because they involve less integration and centralized control, alliances are unlikely to create as many anticompetitive concerns as mergers. Additionally, if the effects on competition are uncertain, it is far easier to disband an anticompetitive alliance than a merger. Despite these favourable characteristics with concerning their competitive effects, under existing policy, alliances may be treated more harshly than mergers. Once two firms merge, they are free to coordinate their prices and output in any way they see fit. Mergers which have the potential to cause anticompetitive concerns are reviewable under civil law. However, because of the possibility of criminal prosecution under the conspiracy provisions, an alliance in which firms coordinate prices or output is treated more harshly than an equivalent merger. The treatment of alliances should be less harsh than mergers; otherwise, firms are likely to substitute mergers for alliances, raising concentration and the potential for anticompetitive practices.

---

<sup>33</sup>Statement by Konrad von Finckenstein, Q.C., Commissioner of Competition, to the "Meet the Competition Bureau" Forum Insight Conference, Toronto, May 3, 1999.

### **8.3.2: Proposed Changes to Alliance Treatment Under the Competition Act**

Recently, the Competition Bureau, recognizing the deficiencies in the present alliance policy, has pushed for legislative changes to alliance policy under the Competition Act. Bill C-472 proposes legislation specifically designed to enable the Bureau to deal more effectively with strategic alliances. Specifically,

- "Bill C-472 would amend section 45 to create a *per se* prohibition against arrangements to fix prices, allocate markets, restrict production or supply, or engage in boycotts targeted at competitors (a safety-zone exemption from this prohibition of 25% collective control of the relevant market is also introduced<sup>34</sup>);
- A companion civil provision would be introduced under which the Commissioner could seek a remedial order from the Tribunal to deal with arrangements which substantially lessen competition but do not amount to price-fixing, market allocation, output restrictions or boycotts; and
- Businesses proposing an arrangement would be able to apply to the Commissioner for clearance in respect of prospective strategic alliances, removing uncertainty about whether they would face prosecution or civil action if they were to proceed with the arrangement. A clearance certificate issued by the Commissioner would normally be valid for three years."<sup>35</sup>

These changes represent a significant improvement over the existing alliance policy. The 25% safety-zone exemption from collusion removes the risk of criminal prosecution for small firms seeking to establish alliances. Such a safety-zone is warranted given that alliances are unlikely to create as many anticompetitive concerns as mergers and, under the Canadian merger guidelines, mergers in which the combined market shares of the parties is less than 35% generally will not be reviewed. The elimination of the risk of

---

<sup>34</sup>*BILL C-472: An Act to Amend the Competition Act (Conspiracy Agreements and Right to Make Private Applications), the Competition Tribunal Act (Costs and Summary Dispositions) and the Criminal Code as a Consequence*, The House of Commons of Canada, 2nd Session, 36th Parliament.

<sup>35</sup>"Amending the Competition Act: A Discussion Paper on Meeting the Challenges of the Global Economy," Canadian Competition Bureau, April 2000, p. 8.



criminal prosecution for small firms will promote virtual bigness; small businesses will use alliances rather than mergers to acquire the capabilities of larger organizations, thus preventing rising concentration.

The ability to apply for a clearance certificate reduces the uncertainty of civil review or criminal prosecution for all firms seeking to form alliances. Furthermore, the clearance application process for strategic alliances is similar to prenotification for mergers in that it seeks to prevent the acquisition of market power, rather than deal with its effects after the fact. Prenotification of this sort allows the Commissioner to recommend changes to the structure of any alliance which raises concern, so that its efficiency-enhancing features can be preserved, while the features which cause concern are removed.

The adoption of a civil procedure for assessing alliances, which allows the Tribunal to deal with agreements which affect competition but which do not involve collusion, is necessary for two primary reasons. Firstly, alliances can provide firms with collective market power which creates the potential for abuse. For example, the firms in an alliance could collectively control access to a critical input, and could use this control to deny entry to new competitors. The civil provision, allows the Tribunal to deal with such issues of abuse of collective dominance.

Secondly, the civil procedure is necessary because it (along with the application for clearance procedure) allows the Tribunal to apply the rule of reason so that it can assess the overall competitive effect of cooperative agreements. The rule of reason allows the Tribunal to take an economics based approach to alliances, weighing costs and benefits on a case by case basis. Furthermore, alliances can adversely affect competition,

not only through abusive practices, but through a decline in competitor-partners' willingness to compete. As discussed in Chapter 2, *The Structure of Cooperation*, high levels of interdependence among alliance partners can reduce firms' desire to compete with one another. This can alter the structure of competition within a market from one where the basic unit of competition is the firm to a market where the basic unit of competition is the alliance cluster. Interdependence and clustering can quickly transform a multi-firm market into a tight oligopoly consisting of a few alliance clusters. This can result in a decline in competition. The civil procedure can enable the Tribunal to identify markets where alliance-created interdependence is high, and take steps to ensure that firms retain their willingness to compete.

The measures for the treatment of alliances under the Competition Act introduced in Bill C-472 are a general improvement because they remove the assessment of alliances from a variety of miscellaneous provisions, allowing the Competition Bureau to devise its own framework for the treatment of alliances. Strategic alliances are a relatively new strategy, which have unique effects on market structure, conduct, and performance. The existing provisions were not designed to deal effectively with these effects. However, the measures introduced under Bill C-472 will enable the Bureau to develop a framework specifically for dealing with the unique characteristics of alliances.

Although the new measures introduced under Bill C-472 will help remove much of the uncertainty associated with the treatment of alliances under the Competition Act, the Bureau can further reduce uncertainty by introducing a set of guidelines describing how it will deal with the evaluation of alliances under the civil provision and for the application of a clearance certificate. The Canadian alliance guidelines should

follow a line of reasoning similar to the U.S. Competitor Collaboration Guidelines, with adjustments made to reflect Canada's individual alliance legislation. Given the structure of Canadian markets, special care should be taken to ensure that small firms are encouraged to establish alliances so as to promote virtual bigness.

#### **8.4: Two Cases to Illustrate a Competitive Assessment of Alliances**

Chapters 6 and 7 analysed the effects of strategic alliances on two different industries, the international automobile and airline industries respectively. These industries were chosen, in part, because they provide a contrast between of the impact of alliances on a market where amorphous alliance formation prevails (automobiles) and their impact where clustered alliance formation prevails (airlines). Given the prevailing theme of how the different classifications of the structure of cooperation affect markets differently, it is natural to conclude this discussion by illustrating a competitive assessment of a recent alliance from each of these industries.

##### **8.4.1: Ballard Power, DaimlerChrysler, and Ford**

This first case assesses a cooperative agreement in an industry where the amorphous structure of alliance formation prevails. Ballard is an innovator in automobile fuel cell technology, and has spent the past two decades developing its technology to the point where it is now feasible to consider placing fuel cell engines in passenger vehicles. Ballard's fuel cells combine hydrogen with oxygen in the air to produce water. In the process, electrons are released to create electricity. Since the only emission is water vapour, fuel cells offer enormous environmental benefits. In 1997, Ford and Daimler-Benz (now merged with Chrysler) invested over \$750 million in Ballard, and the three partners together are sharing technology and investing a further \$1 billion in joint fuel-cell research that could lead to mass production of fuel-cell vehicles by 2004.<sup>36</sup>

---

<sup>36</sup>Nauss, Donald W., "Ballard Battling to Break through with Daimler and Ford Behind It," *Ward's Auto World*, 03-01-1998.

**Procompetitive Benefits:** The principal benefit of this alliance is its effect on innovation. Ballard had developed its fuel cell technology independently, but in order to appropriate the extensive costs of its past research it first needed to integrate its technology with that of modern automobiles and develop efficient processes for mass production of fuel cell engines. DaimlerChrysler and Ford have the financial resources and technical expertise to help Ballard complete this last step. Thus, the opportunity of forming an alliance with the large automakers will enable Ballard to appropriate its costs of research and complete the development of a project with substantial environmental benefits.

**Anticompetitive Concerns:** As is typical of alliances in industries where the structure of cooperation is amorphous, this particular agreement is task-specific: the alliance is focused on the development of automobile fuel cell technology only. Given this task-specific nature of the alliance, the alliance-created interdependence between the two automakers will be marginal; thus, the alliance should not affect the automakers' willingness to compete. This is confirmed by the announcement that DaimlerChrysler and Ford plan to design and produce their fuel-cell vehicles independently, retaining their competitive rivalry across these functions.<sup>37</sup> Thus, the alliance raises few anticompetitive concerns.

In fact, extensive competition exists among automakers to develop rival fuel-cell vehicles. In 1999, Toyota and General Motors established a joint venture to develop vehicles powered by fuel cells.<sup>38</sup> Nissan has joined the California Fuel Cell Partnership

---

<sup>37</sup> *Ibid.*

<sup>38</sup> "Toyota, GM Join in Project: High-tech Deal Could Lead to Expanded Talks," Associated Press, 04-20-1999.

which plans to place about 50 fuel cell passenger cars and fuel cell buses on the road between 2000 and 2003.<sup>39</sup> Honda and BMW are also working on fuel cell vehicles. Thus, there is ample innovative competition to ensure rapid development and implementation of this environmentally beneficial technology.

Overall Assessment: With the considerable social benefits the alliance offers, along with the lack of any substantial anticompetitive risks, the Ballard / DaimlerChrysler / Ford will provide a substantial net competitive benefit.

#### **8.4.2: American Airlines and British Airways**

This case reviews a cooperative agreement in an industry where alliance formation is clustered. In 1996, American Airlines (AA) and British Airways (BA) announced their plans to establish a broad alliance for which they sought antitrust immunity. Among other aspects, the two airline planned to coordinate transatlantic flight schedules and fares (for which they required immunity).

Procompetitive Benefits: The alliance can benefit consumers by allowing them to fly online (on connecting flights) to more destinations. The coordination of schedules can provide more convenient connections for passengers. Passengers may also benefit through shared access to lounges and joint frequent flyer programs. Additionally, the coordination of maintenance and ground services can produce significant cost savings.<sup>40</sup> Most, if not all, of these benefits, however, can be achieved without the coordination of fares and the antitrust immunity that the alliance sought for approval.

---

<sup>39</sup>"Nissan Joins California Partnership," Vol. 2, Fuel Cell Technology News, 04-01-2000.

<sup>40</sup> Refer to Section 7.6.

**Anticompetitive Concerns:** As is typical in industries where the clustered alliance formation prevails, the alliance partners do not plan to compete with one another. This is indicated by their plans to coordinate fares and schedules and their request for antitrust immunity. As such, the proposed agreement essentially amounts to a merger and should be treated as such.

American Airlines and British Airways jointly control a large segment of the direct-flight market to and from London. The airlines currently account for 58% of the seats available for flights between the United States and London, and 67% of the total daily round trips.<sup>41</sup> These shares are essentially locked-in; given the allocation and control of slots to the two airlines, AA and BA are currently direct competitors on six routes between U.S. cities and Heathrow and on a route between Dallas and Gatwick. On five of these routes -- Kennedy, Chicago, Boston, Miami, and Dallas -- the two airlines account for over 70% of the service. Furthermore, they are the only two airlines to offer service between Boston and Heathrow, as well as the only two to offer direct service between Dallas and Heathrow - the alliance would give them a monopoly on these routes.<sup>42</sup> Almost any merger creating such high market shares would be disallowed. Furthermore, BA and AA are members of the large alliance cluster, Oneworld. As such, the two airlines' association with their Oneworld partners must be considered in this analysis. Inclusion of these other airlines further increases the lock that the airlines have on access to and from Heathrow.

---

<sup>41</sup> Anderson, John H. Jr., *Aviation Competition: International Aviation Alliances and the Influence of Airline Marketing Practices*, Testimony Before the Subcommittee on Antitrust, Business Rights, and Competition, Committee on the Judiciary, U.S. Senate, March 19, 1998, p.13.

<sup>42</sup> *Ibid.*

**Overall Assessment: Given the significant control of the direct flight market to and from Heathrow of the two airlines, along with the limited procompetitive benefits, the danger of anticompetitive harm is too significant to grant the British Airways - American Airlines alliance antitrust immunity without significant concessions. This is, in fact what has happened. Both the European Competition Commission and the U.S. Department of Transportation demanded that the airlines relinquish numerous slots at Heathrow in return for immunity. BA and AA have refused this option, but they plan to continue to cooperate on activities that do not require immunity; these will include the sharing of ground operations and continued code-sharing on transatlantic flights.**



## **Chapter 9: Conclusion**

The two cases discussed at the end of Chapter 8 highlight the extremes of the potential impact of strategic alliances on competition. On one hand, there is an agreement which offers considerable benefits to society with few anticompetitive concerns; on the other, there is an agreement where the anticompetitive risks resulting from the accumulation of joint market power greatly exceed the potential procompetitive benefits.

Assessing the overall competitive effects of many alliances is not as clear as these two cases, and demands a careful, detailed analysis. Such analysis, however, must be based on a solid foundation of research on the competitive impact of strategic alliances. Indeed, it has been suggested that there has not yet been enough research on alliances to justify the recent creation of the Competitor Collaboration Guidelines.<sup>1</sup> The widespread proliferation of strategic alliances is still a relatively new phenomenon; consequently, although alliances are a common strategic tool, there is a considerable gap in the research on their competitive effects.

This is the gap that this research has attempted to partially fill. Among the primary objectives of this study was to examine how strategic alliances relate to the structure-conduct-performance paradigm. A framework was developed for classifying the structure of alliance formation as either clustered or amorphous, and a model was introduced to explain how these patterns of alliance formation evolve. This framework will allow alliances to be incorporated into the overall analysis of market structure. Alliances were placed into the framework of centripetal and centrifugal market forces to enhance the assessment of the effect of alliances and virtual bigness on traditional elements of market structure: concentration and entry. Conditions were examined under which alliances among competitors can affect market conduct

---

<sup>1</sup> Federal Trade Commission Staff Report, *Anticipating the 21st Century: Competition Policy in the New High-Tech, Global Marketplace, Chapter 10: Joint Ventures*, 1996.

by reducing partners' willingness to compete. The impact of alliances on innovation incentives and outcomes were discussed. The findings presented in this study should prove helpful in assessing the overall competitive effects of strategic alliances.

Nevertheless, there remains much research to be completed. Among the issues that still need to be addressed are the following:

- The willingness of partner / competitors to compete has been found to depend upon alliance-created interdependence. Some factors which might affect the level of interdependence created by an alliance have been discussed in this chapter. However, it would be useful to find a means for empirically determining the extent of alliance-created interdependence between two competitors.
- Along the same line, it would be worthwhile investigating how the internal governance structure of alliances affect interdependence and partners' willingness to compete. This would assist antitrust authorities in restructuring alliances so that the procompetitive benefits are maintained without the anticompetitive risks.
- An empirical examination of the long-run impact of the characteristics of strategic alliances on market concentration should also be conducted. Such an analysis would need to employ dynamic measures of concentration, and would be aided greatly by the development of a measure of the extent of alliance formation across an industry. Empirical investigation into the effects of alliances, however, requires access to more detailed data on the industry status of alliances than is currently available.
- Chapter 2 discussed how firms have a natural tendency to choose existing partners or indirectly related firms as partners to new alliances. This suggests that as firms establish more alliances, partner interdependence will increase and, where alliance formation was once

**amorphous, a clustered alliance structure will evolve. Therefore, an investigation into the evolution of the structure of cooperation would be worthwhile.**

## Bibliography

- Acs, Zoltan J. and Audretsch, David B., "Innovation in Large and Small Firms: An Empirical Ananysis," *The American Economic Review*, Vol. 78, No. 4, Sept. 1988, pp. 678-690.
- Acs, Zoltan J. and Audretsch, David B., *Innovation and Small Firms*, The MIT Press, Cambridge Massachusetts, 1990.
- Adams, Walter and Brock, James, "Automobiles," Adams and Brock, eds., *The Structure of American Industry*, Prentice-Hall Inc., 1995.
- Adams, Walter and Brock, James, *The Bigness Complex*, Pantheon Books, New York, 1986.
- Air Transport World*, "World Airline Report," July 1999.
- Alperowicz, Natasha, "Dow to Link Up with Montell in Polypropyne Venture," *Chemical Week*, May 29, 1996, p.7.
- Anderson, John H. Jr., *Aviation Competition: International Aviation Alliances and the Influence of Airline Marketing Practices*, Testimony Before the Subcommittee on
- Arthur, W. Brian, "Increasing Returns and the New World of Business," *Harvard Business Review*, July-August, 1996, pp.100-109.
- Bain, Joe S., *Barriers to New Competition*, Harvard University Press, 1956.
- Banerji, Kumal and Sambharya, Rakesh B., "Vertical Keiretsu and International Market Entry: The Case of the Japanese Automobile Ancillary Industry," *Journal of International Business Studies*, March 1996, pp. 89-114.
- Bartholomew, Doug, "Micro Monopoly: Game Over for Microsoft," *Industry Week*, Apr. 20, 1998, pp. 32-40.
- Bertin, Oliver, "Airline Alliance Planning Poison Pill," *The Globe and Mail*, November 19, 1999, p.B7.
- Blair, John M., *Economic Concentration: Structure, Behavior and Public Policy*, Harcourt Brace Jovanovich, Inc., New York, 1972.
- Brady, Diane, "When is Cozy too Cozy," *BusinessWeek*, 10-25-1999, pp 127.
- Brett C Smith, "Ford, ZF, a JV, and the CVT," *Automotive Manufacturing & Production*, Dec. 1998, p. 14.

Briomes, Maricris G., "DM Industry: M&A Leaves Small Firms Reassessing," *Marketing News*, Volume 30, Issue 17, Aug. 17, 1998, pp.1, 18.

Brueckner, Jan K., Whalen, W. Tom, "The Price Effects of International Airline Alliances," Institute of Government and Public Affairs University of Illinois at Urbana-Champaign, Dec. 1998.

Canadian Bureau of Competition, "Strategic Alliances Under the Competition Act," Bureau of Competition Policy Bulletin, Apr.15, 1996.

Canadian Competition Bureau, "Amending the Competition Act: A Discussion Paper on Meeting the Challenges of the Global Economy," April 2000, p. 8.

Castles, Chris, "Harnessing the Benefits of the Global Airline Alliances," PricewaterhouseCoopers, October, 1998.

Chan, Peng, S. and Wong, Anna, "Global Strategic Alliances and Organizational Learning," *Leadership and Organizational Development Journal*, Vol.15, No.4, 1994, p. 31.

Clinton, Oster Jr. and Strong, John S., "Consolidation in the Airline Industry: Airline Alliances and Competition," Congressional Testimony, 06-04-1998.

Coltman, David, "International Airline Alliances," *Consumer Policy Review*, London, May/June, 1999, pp. 111-113,

D'Aspremont, Claude and Jacquemin, Alexis, "Cooperative and Noncooperative R&D in Duopoly with Spillovers," *American Economic Review*, Dec. 1988, pp. 1133-1137.

Dougherty, Veronica M., "Antitrust Advantages to Joint Ventures Under the National Committee on the Judiciary, "Antitrust, Business Rights, and Competition," U.S. Senate, March 19, 1998.

Cooperative Research and Production Act," *Antitrust Bulletin*, Winter 1999, pp. 1007-1078.

Dutta, Shartanu and Weiss, Allen M., "The Relationship Between a Firm's Level of Technological Innovativeness and Its Pattern of Partnership Agreements," *Management Science*, Vol. 43, No. 3, March 1997, p. 345.

Edwards, Mark and Hamilton, Joan, "Ten Deals that Changed Biotechnology," *Signals* (published by Recombinant Capital Inc.), Nov. 11, 1998 ([www.signalsmag.com](http://www.signalsmag.com)).

Federal Trade Commission Report, *Anticipating the 21st Century: Competition Policy in the New High-Tech, Global Marketplace*, 1996.

Federal Trade Commission, "Notice of Public Workshop: Competition Policy in the World of B2B Electronic Marketplaces," FTC webpage, June 2000.

Federal Trade Commission and the U.S. Department of Justice, *Antitrust Guidelines for Collaborations among Competitors*, April 2000.

Flint, Jerry, "Remember, the Best Cars Still Win: There's No Proof Globalization Really Works," *Ward's Auto World*, 12-01-1996, p. 19.

Freidheim, Cyrus F., "The Battle of the Alliances," *Management Review*, September, 1999, pp. 46-51.

Goldman, Calvin S. and Corley, Richard F.D., "The Review of Joint Ventures Under the Canadian Competition Act," Outline of Speaking Notes to the Federal Trade

Commission Joint Venture Hearings, Washington, D.C., June 30, 1997.

Gomes-Casseres, Benjamin, "Alliance Strategies of Small Firms," *Small Business Economics*, 9: 33-44, 1997.

Gomes-Casseres, Benjamin, *The Alliance Revolution: The New Shape of Business Rivalry*, Harvard University Press, Cambridge, Massachusetts, 1996.

Grubb, Thomas M. and Lamb, Robert B., "Exploiting Opportunities when your Rivals Merge," *Across the Board*, Volume 36, Issue 1, Jan, 1999, pp. 18-22.

Gudmundsson, Svienn Vidar, "Airline Alliances: Consumer and Policy Issues," *European Business Journal*, 1999.

Gulati, Ranjay, "Social Structure and Alliance Formation Patterns: A Longitudinal Analysis," *Administrative Science Quarterly*, Vol. 40, Issue 4, Dec. 1995, p. 619.

Gulati, Ranjay, "Alliances and Networks," *Strategic Management Journal*, Vol. 19, 1998, pp.293-317.

Gundlach, Gregory T. and Jakki, J. Mohr, "Corporate Relationships: Legal Limits and Antitrust," *Journal of Public Policy and Marketing*, Vol.11, 09-01-1992, p. 101.

Haigh, Robert, W., "Building a Strategic Alliance: The Hermosillo Experience as a Ford-Mazda Proving Ground," *The Columbia Journal of World Business*, Spring 1992, pp. 60-74.

Harbison, John R., Perkar, Peter Jr., "Cross-Border Alliances in the Age of Collaboration," Booz-Allen & Hamilton Inc. Study, 1995.

Hagedoorn, J., and Narula, R., "Choosing organizational modes of strategic technology partnering: International sectoral differences," *Journal of International Business Studies*, 1996, 265-284.

Hemphill, Thomas A., "U.S. Technology Policy, Intraindustry Joint Ventures, and the National Cooperative Research and Production Act of 1993," *Business Economics*, Vol. 32, 10-01-1997, pp 48-55.

Hoskisson, Robert E. and Hitt, Michael A., *Downscoping: How to Tame the Diversified Firm*, Oxford University Press, New York, 1994.

Inkpen, Andrew, "Learning and Knowledge Acquisition through International Strategic Alliances," *Academy of Management Executive*, Vol. 12, No. 4, 1998, pp. 69-80.

Jorde, Thomas M. and Teece, David J., "Rule of Reason Analysis of Horizontal Arrangements: Agreements Designed to Advance Innovation and Commercialize Technology," Comments made to the *FTC Joint Venture Hearings*.

Jorde, Thomas M. and Teece, David J., "Innovation and Cooperation, Implications for Competition and Antitrust," *Journal of Economic Perspectives*, Volume 4, Number 3, Summer 1990, pp. 147-149.

Kattan, Joseph, Federal Trade Commission Joint Venture Project Hearings Testimony, Washington, July 5, 1997.

Katz, Ian and Naughton, Ian, "The Flag Drops on the Great Auto Race," *BusinessWeek*, New York, Apr. 8, 1996.

Knowlton, Christopher, "Competition: Europe Cooks up a Cereal Brawl," *Fortune*, June 3, 1991, p. 175.

Kobak, James, Federal Trade Commission Joint Venture Project Hearings Testimony, Washington, July 1, 1997.

Lawler, Edward, E., "Rethinking Organization Size," *Organizational Dynamics*, October, 1997.

Lee, Jeanne, "Comfort Stocks," *Fortune*, March 2, 1998, pp. 102-234.

Magun, Sunder, "The Development of Strategic Alliances in Canadian Industries: A Micro Analysis," Industry Canada, Working Paper Number 13, October 1996.

Martin, Richard, "PepsiCo to Divest all Chain Holdings," *Nation's Restaurant News*, Feb. 3, 1997, pp. 1,4.

McAlinden, Sean B., "What's the Right Size for an Assembly Plant?" *Automotive Manufacturing and Production*, October, 1997, pp. 14-16.

Nauss, Donald W., "Ballard Battling to Break through with Daimler and Ford Behind It," *Ward's Auto World*, 03-01-1998.

North, Douglas, C., "The Adam Smith Address: Economic Theory in a Dynamic Economic World," *Business Economics*, Vol. 30, Jan.1, 1995, pp. 7-13.

Nunes, Natalia, Farago, Stephen, and Travis, Johanna, *The Economic Impact of International Airline Alliances*, Australian Industry Commission, May 1997.

Osborn, Richard N.; Hagedoorn, John, "The institutionalization and evolutionary dynamics of interorganizational alliances and networks.(Special Research Forum on Alliances and Networks)," Vol. 40, *Academy of Management Journal*, 04-01-1997, pp 261-279.

Oum, T.H., J.-H. Park and A. Zhang, "The Effects of Airline Codesharing Agreements on Firm Conduct and International Air Fares," *Journal of Transport Economics and Policy*, vol. 30, 1996, pp.187-202.

Paul Lienert, "World's top automakers seeking to invade India," *Gannett News Service*, 03-12-1996.

Pitofsky, Robert, "Joint Venture Guidelines: Views by One of the Drafters," Remarks by Robert Pitofsky, Chairman, Federal Trade Commission ABA/ Section of Antitrust Law Workshop: Joint Ventures and Strategic Alliances, The New Federal Antitrust Competitor Collaboration Guidelines, Washington, D.C., November 11&12, 1999.

Powell, Walter, W., "Learning from Collaboration: Knowledge and Networks in the Biotechnology and Pharmaceutical Industries," *California Management Review*, Spring 1998, p. 233.

Powell, Walter W., Koput, Kenneth W., and Smith-Doerr, Laurel, "Interorganizational Collaboration and the Locus of Innovation: Networks of Learning in Biotechnology," *Administrative Science Quarterly*, March, 1996, p. 123.

Reynolds, Robert J. And Snapp, Bruce R., "The Competitive Effects of Partial Equity Interests and Joint Ventures," *International Journal of Industrial Organization*, 1986, pp. 141-154.



Scherer, F. M., *Industrial Market Structure and Economic Performance*, Houghton Mifflin Company, Boston, 1990. pp. 644-660.

Schumpeter, Joseph A., *Capitalism, Socialism, and Democracy*, Harper and Brothers Publishers, New York, 1942.

Shepherd, William G. and Brock, James W., "Airlines," Adams and Brock, eds., *The Structure of American Industry*, Prentice-Hall Inc., 1995.

Smith, Keith, "New Directions in Research and Technology Policy: Identifying the Key Issues," STEP (Studies in Technology, Innovation, and Economic Policy) Group Report, Oslo, May 1994.

Sperling, Daniel, "Testimony at Hearing on a Partnership for a New Generation of Vehicles," *U.S. House of Representatives, Committee on Science, Subcommittee on Energy and Research*, Washington, DC, July 30, 1996.

Stevens, Tim, "The Gene Machine," *Industry Week*, Vol. 246, 08-18-1997, pp. 168-172.

Suarez-Villa, Luis, "The Structures of Cooperation: Downscaling, Outsourcing and the Networked Alliance," *Small Business Economics*, 10: 5-16, 1998.

Taylor, Alex III, "The Automakers: More Mergers. Dumb Idea," *Fortune*, February 15, 1999.

Taylor, Alex III, "Competition, Who's Ahead in the World Auto War," *Fortune*, 11-09-1987, pp. 74-81.

Taylor, Alex III, "Competition, Who's Ahead in the World Auto War," *Fortune*, 11-09-1987, pp. 74-81.

Tully, Shawn, Gunn, Eileen P., "Megamergers: Premium Priced," *Fortune*, 01-11-1999, p 99.

U.S. Patent and Trademark Office, *Patenting By Organization*, 1998, March, 1999.

United States General Accounting Office, "International Aviation: Airline Alliances Produce benefits, but Effect on Competition is Uncertain," Washington, April, 1995.

VanMiert, Karel, "Competition Policy and Air Transport: The Transatlantic Challenge," Speech at the American Bar Association, Washington, January 22, 1999.

Verband der Automobilindustrie E.V., *International Auto Statistics*, Frankfurt, 1991-1998.

Vossen, Robert W., "Relative Strengths and Weaknesses of Small Firms in Innovation," *International Small Business Journal*, 16, 3, pp. 88-94.

*Ward's Auto World*, "Foreign Invasion: Imports, Transplants Change Auto Industry Forever," Vol. 32, 05-01-1996, p. 73.

*Ward's Auto World*, "Foreign Invasion: Imports, Transplants Change Auto Industry Forever," Vol. 32, 05-01-1996, p. 73.

Williams, Martyn, "Matsushita Licenses 3DO Video Technology," *Newsbytes News Networks*, Oct. 26, 1995.

Womack, James P., Jones, Daniel T., and Roos, Daniel, *The Machine that Changed the World*, New York, Harper Perennial, 1990.

World Trade and Investment Report 1996: Investment, Trade, and International Policy Arrangements, United Nations, New York, 1996, pp. 30-32.