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International Strategic  
Alliances: Their Role in  
Industrial Globalisation

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**Nam-Hoon Kang and Kentaro Sakai**

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## **INTERNATIONAL STRATEGIC ALLIANCES: THEIR ROLE IN INDUSTRIAL GLOBALISATION**

Nam-Hoon Kang and Kentaro Sakai

This paper reviews recent trends in international strategic alliances, which have grown more than five-fold between 1989 and 1999 paralleling the increase in cross-border mergers and acquisitions (M&As). The paper covers frequency, type, purpose and geographical patterns of international alliances during the 1990s as an important aspect of industrial globalisation and analyses sectoral trends in industries such as telecommunications, pharmaceuticals, automobiles and airlines. While international alliances provide firms with strategic flexibility, enabling them to respond to changing market conditions, they can also be effective paths for achieving global scale in enterprise operations along with M&As and greenfield investment. Driving forces behind international strategic alliances include cost economising in production and R&D, strengthening market presence, and accessing intangible assets. The paper presents the recent and comprehensive data available on strategic alliances and provides a preliminary consideration of policy issues. It also complements previous OECD analyses of trends in foreign direct investment and of cross-border mergers and acquisitions (OECD, 2000*a*).

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## **ALLIANCES STRATÉGIQUES INTERNATIONALES : LEUR RÔLE DANS LA MONDIALISATION DE L'INDUSTRIE**

Nam-Hoon Kang et Kentaro Sakai

Ce document fait le point sur les tendances en matière d'alliances stratégiques internationales entre 1989 et 1999, période pendant laquelle ces opérations ont plus que quintuplé, tout comme, d'ailleurs, les fusions-acquisitions transnationales. Sont étudiées la fréquence, le type, l'objet et les profils géographiques des alliances internationales, qui ont constitué un élément majeur de la mondialisation de l'industrie. Les tendances sectorielles sont examinées dans l'automobile, les télécommunications, les produits pharmaceutiques et les compagnies aériennes. Tout en offrant aux sociétés une souplesse stratégique qui leur permet de répondre aux évolutions de l'environnement de marché, les alliances stratégiques internationales constituent aussi des moyens complémentaires pour atteindre une échelle mondiale dans les activités des entreprises, au même titre que les fusions-acquisitions et les investissements ex nihilo. Leurs motivations sont multiples : économiser sur les coûts de production et de recherche-développement, renforcer la présence sur le marché, et se procurer des actifs incorporels. Ce document présente les données les plus récentes et les plus complètes en matière d'alliances stratégiques, ainsi qu'un examen préliminaire de quelques aspects de politique économique. Il vient compléter les précédentes analyses de l'OCDE sur les tendances en matière d'investissement direct étranger et de fusions-acquisitions transnationales (OECD, 2000*a*).

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## SUMMARY

The 1990s have seen significant growth in international strategic alliances, paralleling the increase in cross-border mergers and acquisitions (M&As). The number of international alliances – which encompass a wide range of interfirm links, including joint ventures and co-operative research, production and marketing – has grown more than five-fold between 1989 and 1999. And these tend to be far larger than earlier partnerships in terms of scale and value. The majority of international alliances involve firms from OECD countries, although in the 1990s there has been a surge of alliance activities with non-member Asian countries including China. Alliances are being formed across a broad range of sectors, including chemicals and pharmaceuticals, computers and electronic equipment, and financial and business services. A greater number of partnerships are for joint marketing and R&D rather than production; this partly reflects the increasing role of service firms in international alliances. In order to achieve global scale in operations, enterprises are choosing international alliances, along with M&As and greenfield investment.

More than other forms of internationalisation, international strategic alliances provide firms with strategic flexibility, enabling them to respond to changing market conditions and the emergence of new competitors. They are prompted by a range of motives, including economising on production and research costs, strengthening market presence, and accessing intangible assets such as managerial skills and knowledge of markets. In high-technology sectors like pharmaceuticals, soaring research costs and time-lags to commercialisation are driving partnerships. In telecommunications equipment and other wireless “network” device manufacturing sectors, alliances are directed to developing a new world product or systems standard. In automobiles and many manufacturing industries, achieving economies of scale in production on a global scale may be the prime motive. And in service sectors such as airlines, alliances are aimed at sharing a partner’s sales and distribution outlets. In all cases, international strategic alliances are being driven by the economic demands of global markets, the costs of keeping up with fast-changing technologies, and the opportunities provided by government deregulation and liberalisation initiatives.

The increasing pace, scale and complexity of enterprise alliances at the global level raise issues for policy makers. Efficiency gains derive from synergy effects among firms which are able to continue to operate at arm’s length. Studies point to the positive effects of strategic alliances in terms of firm performance and profits as well as social (economy-wide and consumer) benefits. Learning effects of alliances can raise social welfare by equalising worldwide knowledge. On the other hand, there is the possibility of anti-competitive effects in cases where alliances bring together the leading competitors in a market. Firm-level benefits may also vary among allied firms since larger partners may derive more of the profits than smaller partners. Moreover, a range of barriers, such as information and resource gaps, may prevent smaller firms from participating in international alliances to the same extent as larger enterprises. Thus it needs to be examined whether the benefits of alliances are higher than their costs from the social as well as the private perspective, and what policies are needed to help realise the possible gains and to minimise the social costs.

## INTRODUCTION

There has been dramatic growth in strategic alliances between companies over the last decade. Strategic alliances are co-operative business activities formed by two or more independent firms for various strategic purposes (Yoshino, 1995). Strategic alliances themselves are not a new phenomenon. However, the recent trends in strategic alliances are different from those of the past in several respects, including: *i*) their growing significance as an inter-organisational form for participating firms to enhance competitiveness and to generate innovation-led growth; *ii*) the range, depth and closeness of the interactions among co-operating partners; and *iii*) the effect that such alliances are having upon corporate and overall industrial performance (Dunning, 1995). In addition, the range of partners is now wider; firms that have long shunned joint ventures or close collaboration with other firms in their core business areas are increasingly entering into such co-operative arrangements.

Firms recognise that both competition and co-operation are needed to ensure optimal, innovation-led growth. Strategic alliances are now considered one of most powerful mechanisms for combining competition and co-operation and for industrial restructuring on a global basis. Cross-border alliance formation has followed increasing competitive pressures from more integrated global markets. International alliances occur in many different industries and between firms of different sizes. Firms enter into alliances with numerous purposes such as cost-economising in production and research, strengthening market position and accessing other firms' intangible assets. Alliances may involve vertical or horizontal links between firms and can be effective tools for outsourcing non-core business activities, streamlining and restructuring. For example, in the automobile sector, General Motors' partners include Isuzu, Suzuki, Fuji, Toyota and Fiat; Ford is allied with Mazda. The picture is similar in other sectors, including semiconductors, computers, information technology, telecommunications, air transport and biotechnology.

This is one of the first OECD attempts to review inter-firm alliances, partly because data are collected almost exclusively by the private sector and academics. This paper attempts to shed light on issues concerning strategic alliances as one important aspect of industrial globalisation and to increase understanding of the changing patterns of international alliances, the driving forces behind them and their impact on industry and implications for government policies. It presents the recent and comprehensive data available on strategic alliances across regions and industries, attempts to analyse the causes and consequences of strategic alliances, and provides a preliminary consideration of policy issues. This paper complements previous analyses of trends in foreign direct investment and of cross-border mergers and acquisitions (OECD, 2000*a*).

In the following sections, the paper reviews recent trends in international strategic alliances in terms of frequency, type, purpose and geographical patterns during the period 1990-99; analyses sectoral trends and the main features of international alliances in industries such as telecommunications, pharmaceuticals, automobiles and airlines; identifies the main driving forces of international strategic alliances in economic, technological and governance terms; and discusses the potential impacts of international strategic alliances on industrial restructuring and competition and some implications for government policies.

## RECENT TRENDS IN INTERNATIONAL STRATEGIC ALLIANCES

### Overview

Strategic alliances can take many different forms (**Box 1**), including domestic and cross-border partnerships. The number of new strategic alliances (both domestic and international) increased more than six-fold during the period 1989-99, from just over 1 000 in 1989 (of which around 860 are cross-border deals) to 7 000 in 1999 (cross-border deals: 4 400) (**Figure 1**). Even though annual strategic alliance formations in the 1990s fluctuated between a high of more than 9 000 in 1995 and a low of less than 4 000 in 1990, the number of strategic alliances in the 1990s is significantly higher than those observed in the 1980s. And there are indications that recent alliances, particularly joint ventures, are far larger in scale and value terms than earlier partnerships. In each year of the 1990s, international partnerships linking firms from different national economies are always the majority of these alliances. International strategic alliances accounted for 68% of all alliances (numbering 62 000) between 1990-99. On average, there are about two international strategic alliances for every domestic partnership, illustrating that globalisation is a primary motivation for alliances.

#### Box 1. Definition of a strategic alliance

Strategic alliances can take a variety of forms, ranging from an arm's-length contract to a joint venture. But the core of a strategic alliance is an inter-firm co-operative relationship that enhances the effectiveness of the competitive strategies of the participating firms by the trading of mutually beneficial resources such as technologies, skills, etc. According to Yoshino (1995), strategic alliances have the following three characteristics:

- *The two or more firms that unite to pursue a set of agreed goals remain independent subsequent to the formation of the alliance.*
- *The partner firms share the benefits of the alliance and the control over the performance of assigned tasks.*
- *The partner firms contribute on a continuing basis in one or more key strategic areas, (e.g. technology, products).*

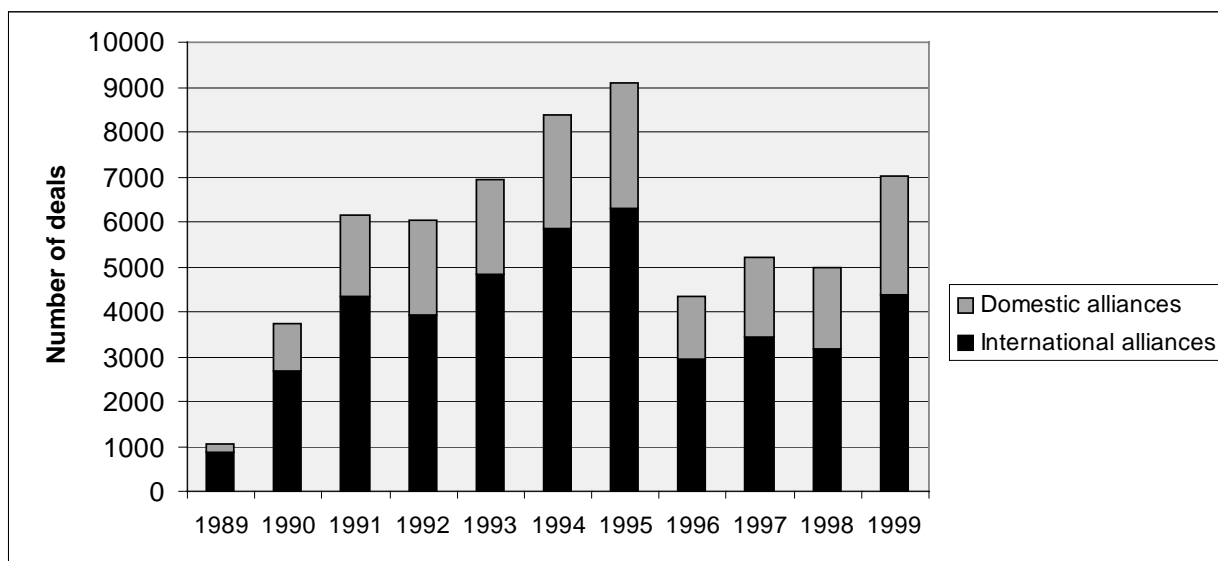
Strategic alliances encompass a wide range of inter-firm linkages, including joint ventures, minority equity investments, equity swaps, joint research and development, joint manufacturing, joint marketing, long-term sourcing agreements, shared distribution/services and standards-setting. However, mergers and acquisitions, overseas subsidiaries of multinational corporations, and franchising agreements are not classified as strategic alliances, since they do not involve independent firms with separate goals or call for continuous contribution of participating firms such as transfer of technology or skills between partners.

Cross-border alliances are often between rival firms. Furthermore, not only rival firms and those from different countries, but firms in different sectors are being joined in strategic alliances. Typical examples of these international alliances include the Du Pont/Sony partnership to develop optical memory storage products; the Motorola/Toshiba union to develop manufacturing processes for microprocessors; the General Motors/Hitachi partnership to develop electronic components for automobiles; and the Fujitsu/Siemens joint venture for manufacture and sale of computer products.



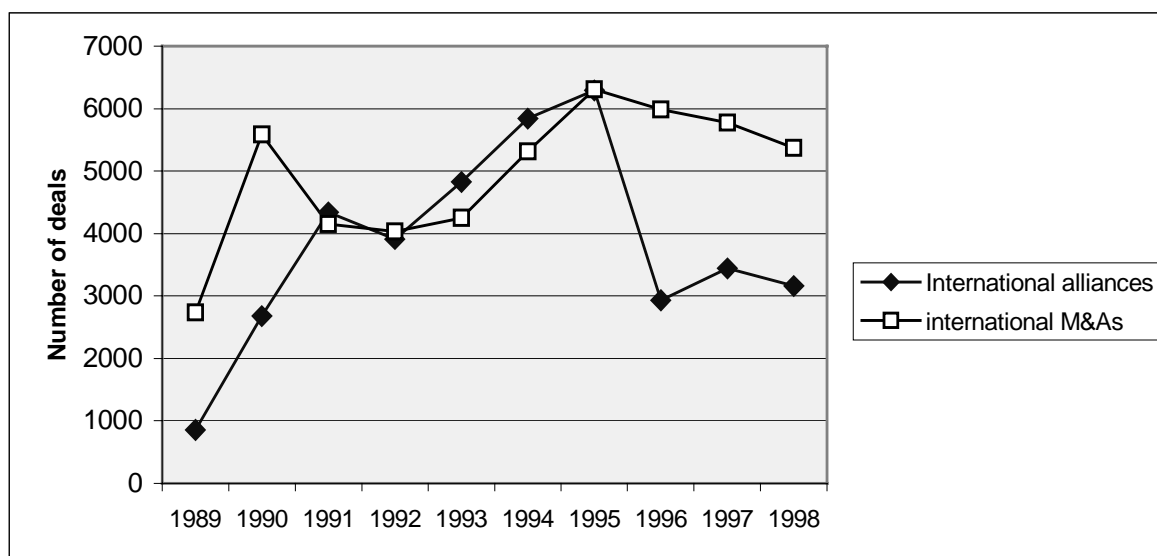
These examples imply that strategic alliances are an instrument for combining co-operation and competition in corporate strategies. Patterns of co-operation and competition can be categorised into three groups: *i*) co-operate, then compete: when companies are not ready for competition in a particular area, they first co-operate with competitors for short-run objectives; then co-operating firms compete among themselves once they build their competence or achieve a common standard; *ii*) co-operate while competing: companies may continue to compete while they co-operate in some business areas (as illustrated by GM's partnership with Toyota). Such an alliance is generally aimed at learning from each other to strengthen weak areas; *iii*) co-operate among themselves and compete with others: companies may formulate co-operative agreements to compete with third parties (Culpan, 1993).

Figure 1. Strategic alliances, 1989-99



Source: Thomson Financial Securities Data.

Figure 2. International alliances and M&As



Source: Thomson Financial Securities Data and KPMG Corporate Finance.

## Link to M&As

Recent trends in international strategic alliances are quite similar to those in cross-border mergers and acquisitions (**Figure 2**). Both seem to reflect the global restructuring strategies of firms, which face increasing globalisation and technological change. On the one hand, firms are actively involved in mergers and acquisitions, in particular in the same or related industries as companies sell non-core businesses and acquire assets to strengthen their core businesses at the global level (UNCTAD, 1998). On the other hand, there is also a general movement by firms towards the “disinternalisation” of activities both along and between value-added chains and towards specialisation in those activities where they have or can acquire a perceived competitive advantage. But because of the interdependence of technological advances, firms may find that they need to assure access to the products or assets over which they have now relinquished control. They may also want to exercise influence over the quality and price of these products and related innovation. As a result, this disinternalisation can be replaced by inter-firm co-operative arrangements or strategic alliances (Dunning, 1995).

Some strategic alliances are driven by the desire of participating firms to reduce the transaction and co-ordinating costs of arm’s length market transactions through co-operative agreements, even though this may also prompt firms to engage in mergers and acquisitions. While *both* alliances and M&As aim to share risks and investment for new business (products) and make the most of partners’ complementary tangible (*e.g.* production facilities and distribution channels) and intangible (*e.g.* market knowledge and managerial skills) assets, alliances differ from M&As in several respects. Strategic alliances may entail no change in the ownership structure of the participating firms. They give firms greater flexibility in responding to changing market conditions and the unexpected emergence of new competing products through a wide choice of partners in looser forms of co-operation. Non-equity alliances enable participating firms to quickly change their strategies by dissolving or leaving an obsolete joint project which no longer provides substantial benefit. Alliances are also flexible in terms of areas of co-operation. Compared to mergers and acquisitions, in which an acquiring firm generally takes on all assets of the acquired company including failing business operations, alliances allow firms to collaborate in only those areas considered beneficial. Strategic alliances can thus create a “win-win” situation among the allied partners, focusing on the mutual benefits for all participants (Parkhe, 1998).

However, strategic alliances have advantages as well as disadvantages in comparison to mergers and acquisitions. In short, strategic alliances may entail more problems (risks) in control and implementation while M&As can provide a merged firm with a more integrated decision-making structure. Strategic alliances can be difficult to realise and involve certain risks since alliance implementation is generally beyond the control of a single party. Partnerships make decision-making and control processes more cumbersome. Shared ownership arrangements can also create problems that result from the roles that partners assume in the venture, since parties may not be clear about their specific roles. A partner may establish co-operative linkages with competing firms, which may hamper the present alliance. As firms enter into more and more alliances, it may be more difficult for firms to keep balance among alliances. Some partners may gain more than the others, and unequal benefits can damage a partnership when expectations differ and stakes are high. Large partners tend to dominate smaller partners and can shape relationships by changing strategies unexpectedly. As a result, a strategic alliance may entail higher transaction costs with lower joint investment than a full merger.

The choice between a hierarchical merger and alliance modality as a means of lessening arm’s length market failure generally depends on a trade-off between the perceived benefits of sharing risks and investment on the one hand, and the costs of a loss of control associated with a reduced or no ownership on the other (Dunning, 1995). While *both* alliances and M&As are expected to provide synergy effects in the long run, by reducing business overlaps among partners and cutting costs, for example, M&As can be a better strategy to realise an instant result as well. Examples include establishing an immediate critical mass

in a particular market, adding new lines of business, and providing ailing firms with financial boost. On the other hand, the outcome (*e.g.* new products) of alliances tends to come later, in several years in some cases, and their scope can be more limited. For example, some R&D alliances may invent new technologies in a couple of years, and many joint development activities tend to be launched as a one-shot collaboration in a specific field. Strategic alliances may be preferred by smaller firms with unique technological advantages, since collaboration with (large) firms having financial resources enables them to enhance core competencies while remaining independent. Other considerations include the relatively high initial transaction costs involved in M&A deals, which can amount to billions of dollars in some cases. While alliances can be initiated with relatively lower transaction costs, firms may choose a full merger when the high initial transaction costs are likely to be paid off by perceived long-term synergy effects. Firms choose between alliances and M&As in an attempt to strike an appropriate balance between short- or long-term strategic objectives and the financial and time costs they bear.

However, we need to note that M&As are not always viable alternatives to strategic alliances. For example, if cross-border M&As are not allowed due to competition constraints (*e.g.* oligopolistic industries) or foreign ownership regulations (*e.g.* airline industry), cross-border strategic alliances are the only viable options allowing firms to respond to increasing globalisation and technological change. There may also be complementary effects between strategic alliances and other types of strategic options, such as mergers and acquisitions or foreign direct investment. According to the MERIT-CATI database on strategic alliances between 1980-94, strategic alliances are not used as an alternative to subsidiaries or mergers but can be complementary to them in accessing markets and other resources (Narula and Hagedoorn, 1999). *Both* alliances and M&As tend to succeed when partners have complementary tangible and intangible assets, and some alliances can allow firms to achieve the benefits of a merger, such as firm's restructuring, if they are carefully designed and implemented (Lorange and Roos, 1992). Similar trends in cross-border strategic alliances and mergers and acquisitions in the 1990s imply such complementary effects. Strategic alliances may also develop into mergers and acquisitions involving partner firms at a later point.

## Type

There is a wide range of types of alliances, reflecting various degrees of inter-firm interdependency and levels of internalisation (*i.e.* vertical integration). Alliances range from relatively noncommittal types of short-term project-based co-operation to more inclusive long-term equity-based co-operation (Narula and Hagedoorn, 1999). They may be placed on a continuous scale between, on the one hand, complete interdependency and total internalisation and, on the other hand, free market transactions. At one extreme lie wholly-owned subsidiaries representing complete interdependence between firms and full internalisation. At the other extreme are free market transactions, where firms engage in arm's-length transactions, while remaining completely independent of each other. Under this conceptual framework, strategic alliances can be categorised into two broad groupings of agreements – equity and non-equity alliances – which represent different levels of internalisation and interdependency. Both equity and non-equity forms of alliances can be long-term relationships that provide individual firms with the means to broaden their scope and share risks without expansion.

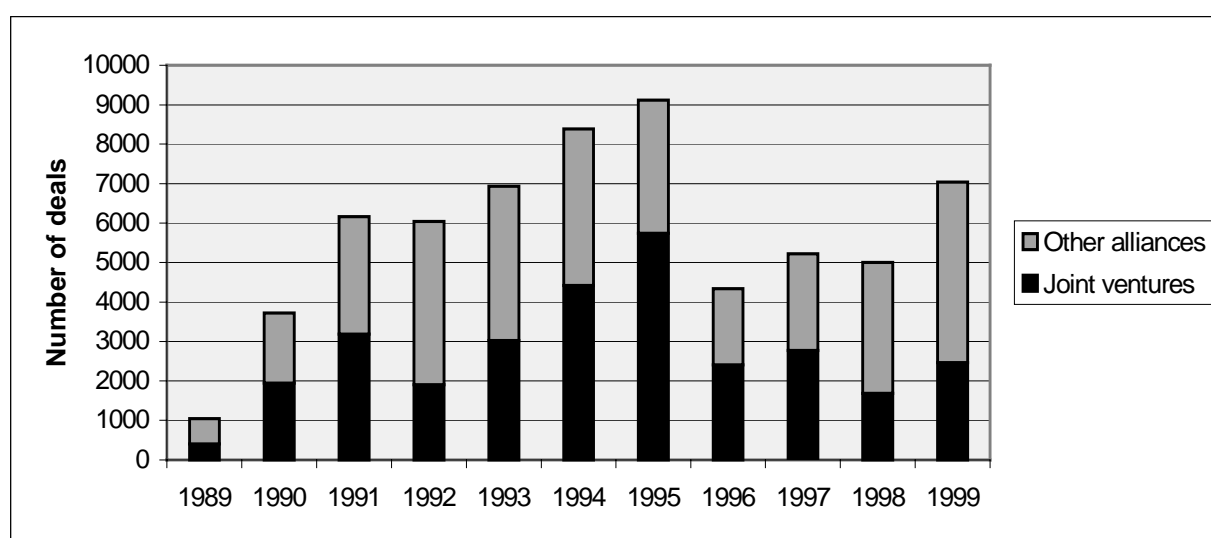
*Equity alliances* include joint ventures, minority equity investments and equity swaps. A joint venture, the most common form of equity alliance, implies the creation of a separate corporation, whose stock is shared by two or more partners, each expecting a proportional share of dividends as compensation. More specifically, a joint venture is defined as a co-operative business activity, formed by two or more separate firms for strategic purposes, which creates a legally independent business entity and allocates ownership, operational responsibilities, and financial risks and rewards to each partner, while preserving each partner's separate identity or autonomy. The independent business entity can either be newly formed

or the combination of pre-existing units and/or divisions of the partners. Even though the partners' stakes in the new business may vary, the partners are all considered owners or parents of the new entity. They normally provide finance and other resources, including personnel, until the venture is able to function on its own. Joint ventures generally aim at making the new company a self-standing entity with its own aims, employees and resources (Faulkner, 1995).

*Non-equity alliances* include a host of inter-firm co-operative agreements such as R&D collaboration, co-production contracts, technology sharing, supply arrangements, marketing agreements, exploration consortia, etc. The non-equity alliance is often a preliminary step to creating a joint venture. It is therefore the most flexible and potentially the least committed form of alliance (at least at the outset). Companies can form a non-equity co-operative contract on a minimal basis to see how the enterprise develops and allow it to deepen and broaden by introducing new projects over a period of time. As the collaboration requires no major initial commitment, it has no limitations. It is probably the most appropriate form of co-operation when the extent of the relationship is impossible to foresee at the outset, when the alliance is not bound by a specific business or set of assets, and when joint external commitment at a certain level is not specifically sought. The non-equity collaborative form may be most appropriate if the activity concerned is a core activity of the partners; if it is non-core, a joint venture may be more appropriate (Faulkner, 1995).

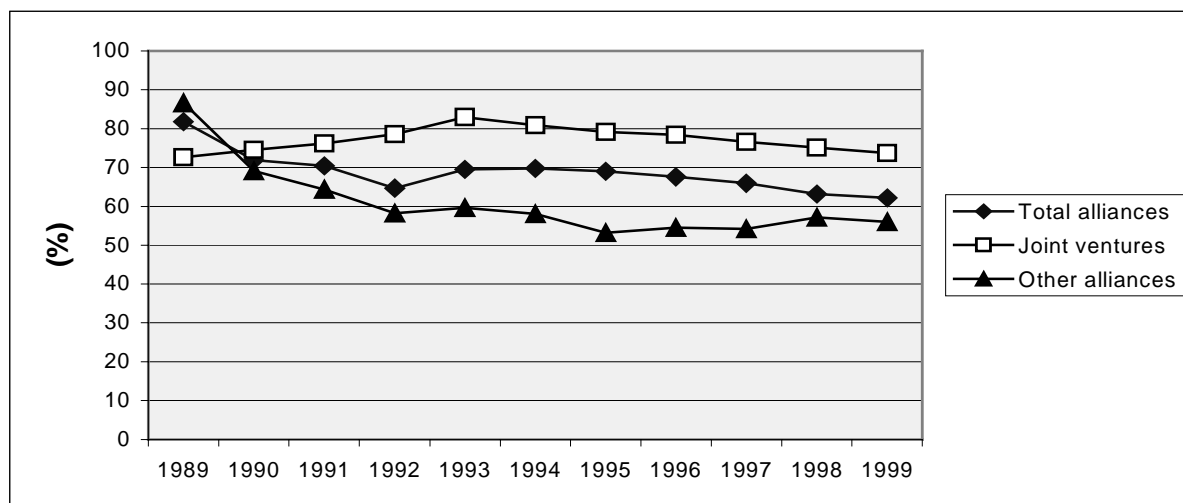
**Figure 3** shows the trend in types of strategic alliances. About 48% of the strategic alliances observed from 1990 to 1999 were joint ventures. The remaining non-joint forms of alliances consisted of co-production and marketing agreements, joint research and development agreements, and various other co-operative agreements, including technology sharing. The share of joint ventures observed as a percentage of total alliances fluctuated during the ten-year period. The slight decreasing trend of the share of joint ventures in total alliances since 1995 implies more use of non-equity forms of strategic alliances in recent years. However, as depicted in **Figure 4**, joint ventures tend to be more international than non-joint ventures. About 78% of joint ventures formed during 1990-99 were international, compared to only 58% of non-joint ventures.

Figure 3. Types of strategic alliances, 1989-99



Source: Thomson Financial Securities Data.

Figure 4. Share of international alliances (%), 1989-99

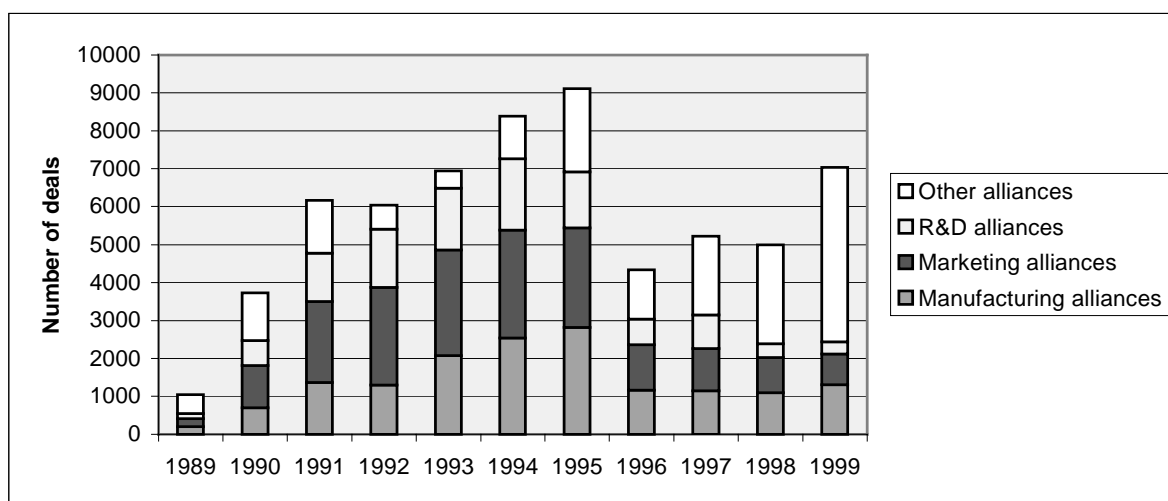


Source: Thomson Financial Securities Data.

**Purpose**

Strategic alliances are formed for various purposes such as market entry and expansion, joint product development (R&D), a production partnership or a combination of these (Figure 5). The largest number of co-operative alliances during 1990-99 were formed to engage in joint sales and marketing activities (29%). R&D strategies were noted as the primary reason for forming an alliance in 17% of cases, while joint manufacturing and production activities were observed in 25% of total alliances. However, there has been a change since the second half of the 1990s. First, the number of joint manufacturing and production activities is higher than that of joint sales and marketing activities, while R&D alliances are still relatively few. Second, the importance of the three traditional major purposes of strategic alliances – manufacturing, marketing and R&D – has decreased significantly; now accounting for less than half of recent alliance activities. This trend partly reflects the rapid increase of strategic alliances in service sectors such as business services rather than in manufacturing.

Figure 5. Purposes of strategic alliances



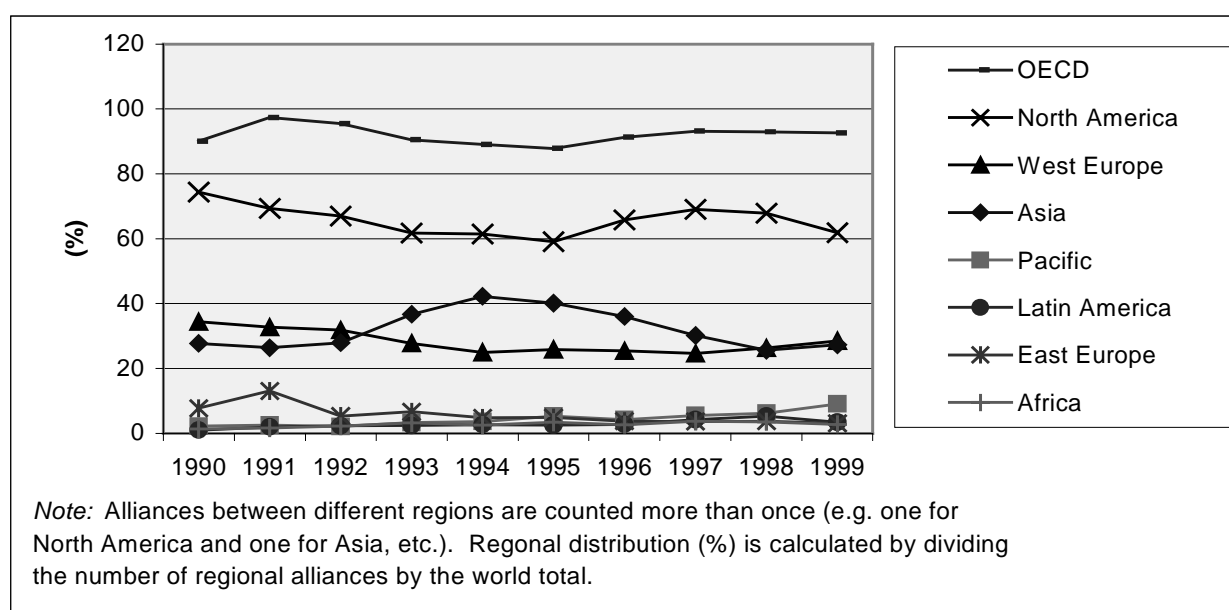
Source: Thomson Financial Securities Data.

## INTERNATIONAL STRATEGIC ALLIANCES BY REGION

### Overview

Most strategic alliances (both domestic and international) involve firms from North America, Asia and Europe, as seen in **Figure 6**. North American firms were involved in about 65% of world strategic alliances during 1990-99, while Asian and European firms were involved in 33% and 28% of world strategic alliances, respectively. Strategic alliances increased rapidly in Asia in the first half of the 1990s from 1 034 in 1990 to 3 654 in 1995, while they decreased to less than 2 000 in 1999 (**Table 1**). This surge of alliance activities in Asia reflects a rapid increase of alliances involving China, Korea and other Asian countries. For example, the number of strategic alliances involving China increased from 55 in 1990 to 1 065 in 1994 and 852 in 1995, even though it decreased to 304 in 1999.

Figure 6. Regional distribution of strategic alliances (%), 1990-99



Source: Thomson Financial Securities Data.

**Table 2** describes regional relationships in strategic alliances in the 1990s. The majority of alliances involving North American firms took place within North America, where North America-Asia alliances and North America-Europe collaborations account for 20% and 16%, respectively, of the total. A major portion of the gap between total alliances in North America (40 000), Asia (20 000) and Europe (17 000) is attributable to significant differences in the number of intra-regional alliances in each area. While intra-Asia and intra-Europe alliances are 7 500 and 5 000, respectively, intra-North American collaborations are more than 22 000. As for primary alliance partners, North American firms are the first choice for both Asian and European enterprises, followed by intra-regional alliances.

There are also differences in the purpose of alliances by region. For example, in the case of manufacturing alliances, the share of alliances involving Asian firms tends to increase significantly for all major regional blocks (**Table 3**). This pattern partly reflects the role of Asia as a world manufacturing centre. As for marketing and R&D alliances, North American firms are active, reflecting large markets and the broad technology and research bases in the region (**Tables 4 and 5**). These alliances are also driven by market entry and technology transfer motives. Interestingly, the share of Asian firms in each type of co-operation is decreasing (from 34% in total manufacturing alliances, 22% in marketing and 17% in R&D) while the share of North American firms indicates an opposite pattern (32% in manufacturing, 53% in marketing and 62% in R&D alliances). For European firms, the share in manufacturing alliances (22%) is slightly larger than that in marketing (18%) and R&D alliances (16%).

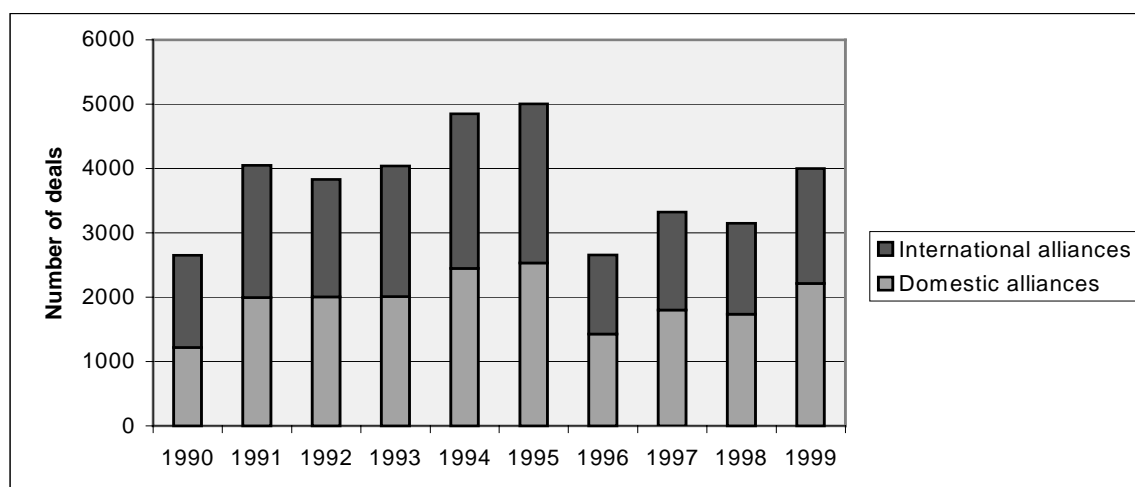
OECD countries accounted for more than 92% of world strategic alliances during 1990-99. Among OECD countries, firms from the United States, Japan, United Kingdom, Canada and Germany are most numerous (**Table 6**). The extent of domestic or international strategic alliances varies significantly from one country to another according to scale, scope and structure. First, there is a broad correlation between the number of domestic alliances and the size of the national economy. Proportionately there are more international alliances in small economies than in the larger countries. For example, the United States and Japan, with their significant home markets and broader research bases, are less internationally oriented in their choice of alliances than countries such as the Netherlands, Sweden and Korea.

Second, countries with outward-oriented economies strongly based on external trade relative to their size tend to seek more alliance partners outside their own countries. For example, the Netherlands, Italy, Switzerland and Korea are more international in their choice of alliances. Finally, the national competitive environment and market structure of different sectors affect alliance patterns. In those countries where industrial concentration is significant, large firms in a dominant market position tend to prefer international alliances, either because of a lack of domestic partners or to enter foreign markets. Smaller firms challenging the market leaders tend to be more interested in setting up national alliances. On the other hand, in those national product markets where there is low concentration or intense competition, there are many domestic alliances.

## United States

The United States accounted for about two-thirds of world strategic alliances in the 1990s. However, US *international* alliances represented only 43% of world international alliances, since US alliances tend to be more domestic-oriented than those of other countries. The majority of US alliances are domestic partnerships including only US-based companies with 48% involving foreign partners (**Figure 7**). The reasons for a large number of US domestic alliances include the significant national market in terms of both size and competition, the broader technological and research bases, and the existence of a large number of leading enterprises in various sectors with rich tangible and intangible assets. As for regional preference, US alliances with Asian and European firms accounted for almost 75% of their total international partnerships (**Table 7**). The top American firm choice for partners are companies from Japan, the United Kingdom, Canada, Germany and China, which together account for about 60% of US cross-border alliances (**Table 8**).

Figure 7. Strategic alliances in the United States, 1990-99



Source: Thomson Financial Securities Data.

Partnerships between US firms and Asian firms fluctuated markedly during the 1990s. They increased rapidly in the first half of the 1990s, from 623 in 1990 to 1 200 in 1994 but subsequently decreased. In particular, US-China alliances surged in the middle of the 1990s, reaching 218 in 1994. US alliances with Japanese firms tended to decrease in the 1990s, particularly in the second half, from 503 in 1990 to 254 in 1999. US alliances with European firms remained stable during 1990-99 compared with Asian alliances. Also notable in the 1990s is a surge in US firm alliances with Canadian and Australian firms. US-Canada alliances increased from 88 in 1990 to 222 in 1999, while US-Australia alliances increased from 17 to 125 during the same period.

As for the types of partnerships undertaken, about 43% of the cross-border alliances of American firms during 1990-99 were joint ventures (**Figure 8**). This implies that the majority of alliances involving US firms are non-equity alliances such as co-operative research and development agreements, joint production and marketing agreements, technology sharing, etc. However, the share of joint ventures in US international alliances fluctuated from year to year, with a slight decrease in recent years.

Marketing alliances accounted for 37% of US international alliances in the 1990s, while manufacturing and R&D alliances represented 25% and 20%, respectively (**Figure 9**). US alliances tend to have a higher R&D orientation than other countries, compared with a world average of 17% of the total. These alliances also have a different international orientation according to the purpose of the alliance (**Table 9**). For manufacturing alliances, US firms prefer foreign partners to domestic firms; however, they tend to prefer domestic partners for marketing alliances and, in particular, for R&D alliances.

Alliances involving American manufacturing firms accounted for about 48% of the total US alliances during 1990-99, while services and primary sectors represented 43% and 5%, respectively (**Figure 10**). In the manufacturing sector, strategic alliances were concentrated within relatively few industries such as pharmaceuticals, electronics and electric equipment, chemicals, pre-packaged software, communications equipment and computer equipment, which together accounted for more than 70% of manufacturing alliances (**Table 10**). These industries characteristically display substantial operating risks, high entry costs and rapidly changing technology. However, more and more alliances are taking place in service industries. The share of manufacturing firms in US cross-border alliances continued to decrease, from 63% in 1990 to 27% in 1999, while that of service firms increased from 18% to 67% during the same period. The increase in service industry alliances in the United States can be traced primarily to surges in alliance activity within the business services, trade and financial service industries.



Figure 8. Types of US international alliances, 1990-99

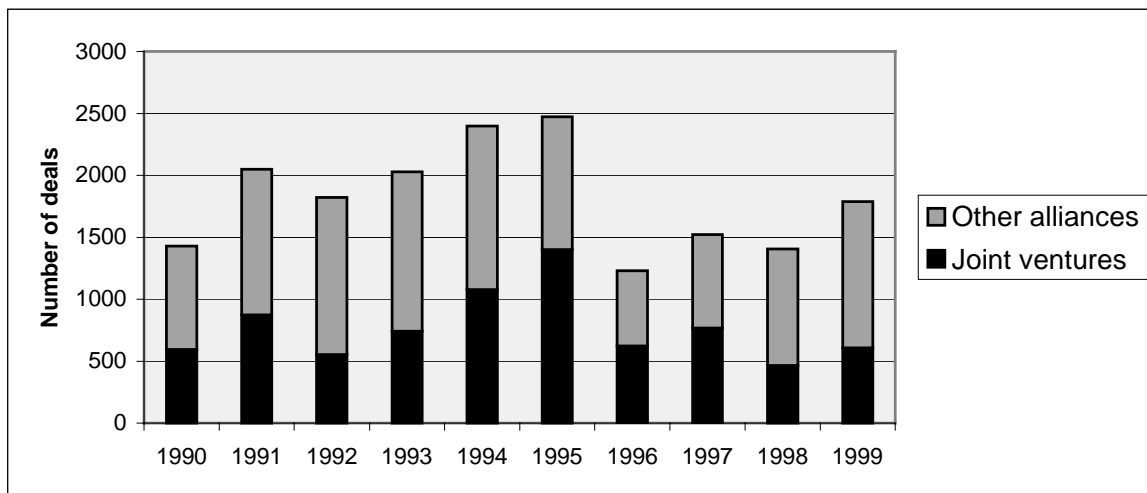


Figure 9. Purposes of US international alliances, 1990-99

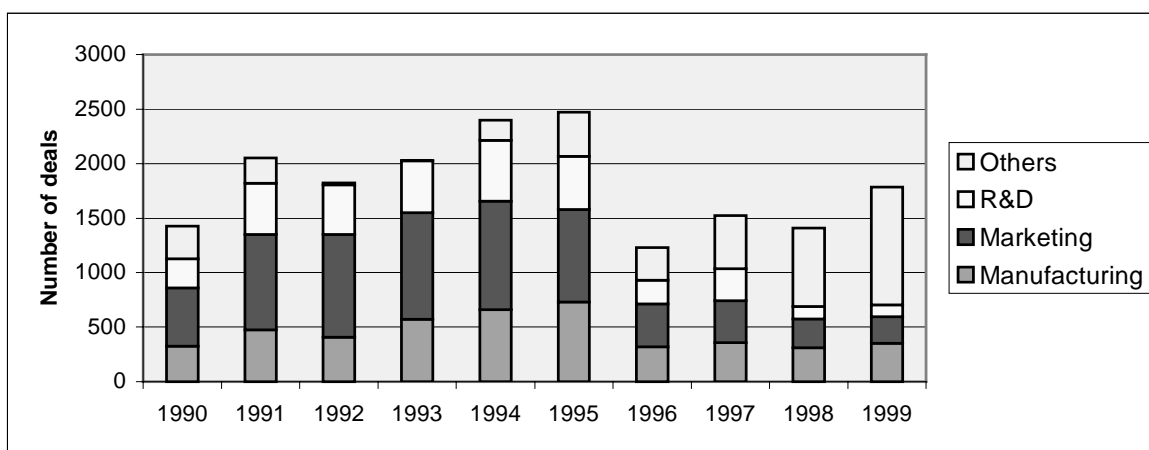
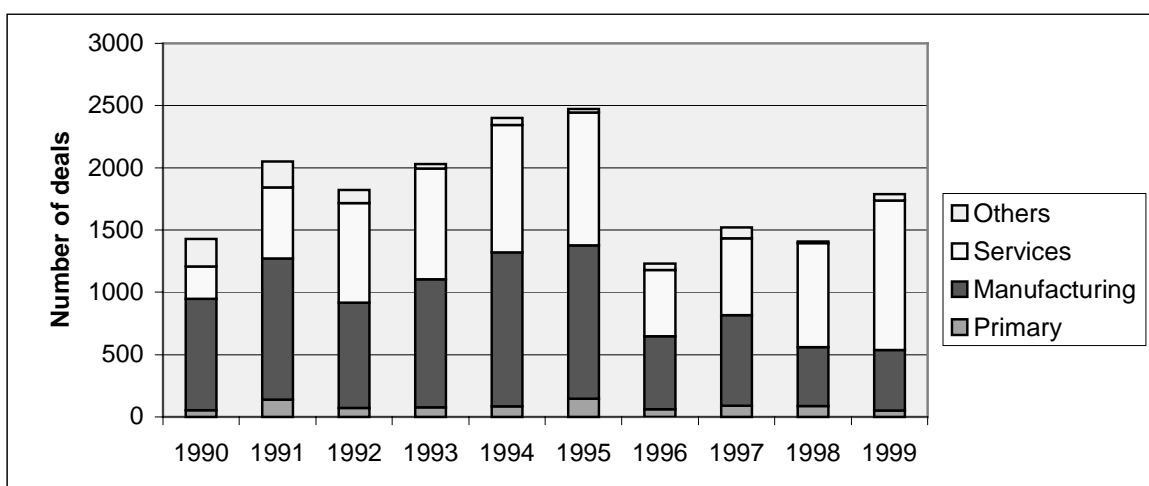


Figure 10. Sectoral distribution of US international alliances, 1990-99

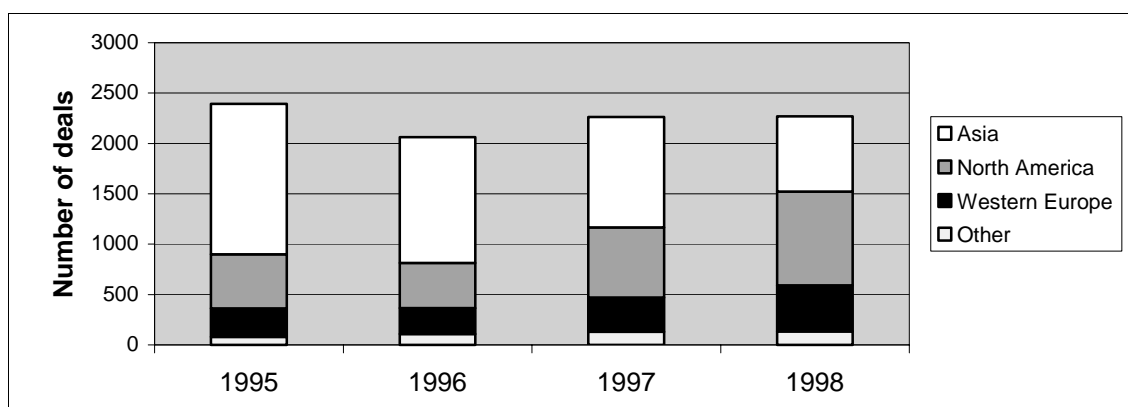


Source: Thomson Financial Securities Data.

## Japan

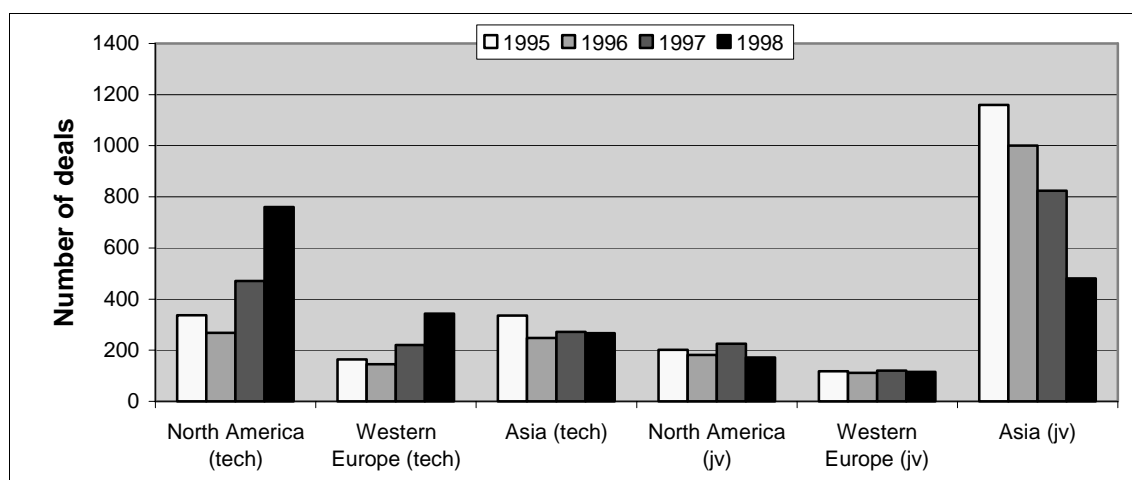
According to statistics from the Japan External Trade Organisation (JETRO), Japanese firms entered into 2 270 international alliances in 1998, about the same level as the preceding three years (**Figure 11**). About 95% of these alliances are co-operation agreements with firms in Asia, North America and Western Europe. Although in 1995, more than half of these alliances were with Asian partners, North American firms accounted for the largest share (41%) in 1998. For Japanese enterprises, US firms were the most popular partner in 1998 (around 900 alliances) followed by China (300), Germany, the United Kingdom and Thailand. As for types of alliances, technology exchange arrangements were common with Western firms while joint ventures were prominent in alliances with Asian firms (**Figure 12**). However, joint ventures between Japanese and Asian companies decreased from 1 160 in 1995 to 481 in 1998, while technology exchange arrangements with North American and European firms more than doubled from 337 in 1995 to 760 in 1998 for the former and from 164 to 343 for the latter.

Figure 11. International alliance deals of Japanese firms, by region



1. "Alliance deals": the total of technology exchange arrangements and joint ventures (JV).
  2. For example, "Asia" = the number of alliances between Japanese and Asian firms.
- Source: JETRO (1999).

Figure 12. Technology exchange arrangements and joint ventures, by region



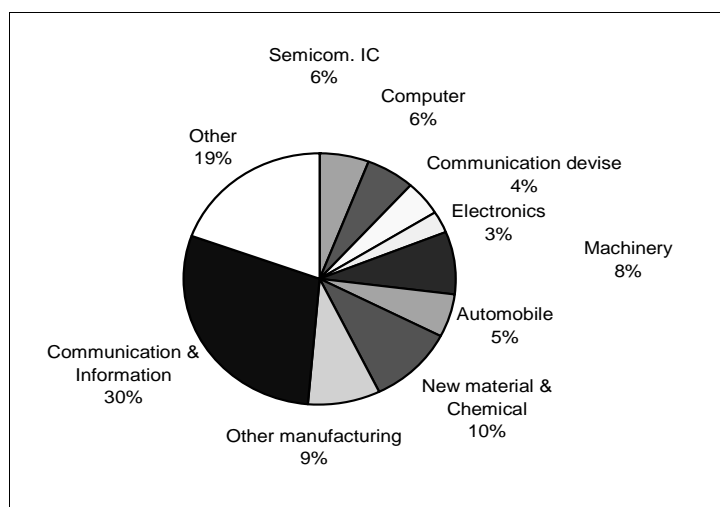
Source: JETRO (1999).

Most of the decrease in Japan-Asian joint ventures, particularly the sharp drop in 1998, is attributable to a significant shrink and slow-down in the Southeast Asian economy due to the financial crisis in the region. For example, Japan-China joint ventures, which were more than 500 in 1995 and accounted for almost half of Japan-Asia joint ventures in general, decreased to around 200 in 1998. The decreasing trend in Japan-China ventures partly reflects Japanese firms' decreasing revenues in the home (Japanese) market leading to less investment in China. In fact, Japanese investment in China dropped from JPY 432 billion in 1995 to JPY 136 billion in 1998, most of which went to joint ventures with Chinese firms. Joint ventures with other affected economies such as Thailand, which were around 150 a year before the financial crisis, decreased to 50 in 1998. However, Japanese investment in Asian economies has been increasing since April 1999 and its configuration (*i.e.* joint ventures and other forms) needs further review.

The large number of joint ventures between Japanese and Asian enterprises partly reflects restrictions on foreign direct investment in Asian countries. Governments in countries such as China, Indonesia, Vietnam and India have tended to protect domestic industries for national economic development purposes and have invited foreign companies to develop joint ventures with local firms. In these countries, more than 60% of Japanese strategic alliances are joint ventures with local Asian companies. On the other hand, in countries which have liberalised foreign capital movements and established a legal framework to attract foreign investment – such as Singapore, Thailand, Malaysia and the Philippines – the majority of Japanese firms have entered through direct investment and established fully-owned subsidiaries. Until the first half of 1997, just before the Asian financial crisis, more than 70% of Japanese establishments in Singapore were direct investments with no local partners, while joint ventures with Singapore firms represented only 20%.

Technology exchange agreements with North American and Western European companies generally represent complementary co-operation arrangements with Western companies having leading-edge technologies. While most alliances with Asian firms involve co-operation in manufacturing and assembly, alliances between Japanese and Western firms are mostly co-operation for research and development. Japanese firms actively exchange advanced and complementary technologies with partners from the United States, Canada and Europe. Alliances are primarily in high-technology sectors such as semiconductors, computer software and other information and communication technology (ICT) fields. Almost half of Japanese alliances with North American firms were in these sectors (**Figure 13**). On the other hand, since many alliances between Japanese and Asian firms are for production, they tend to be in more traditional sectors such as general electronics, machinery and automobiles.

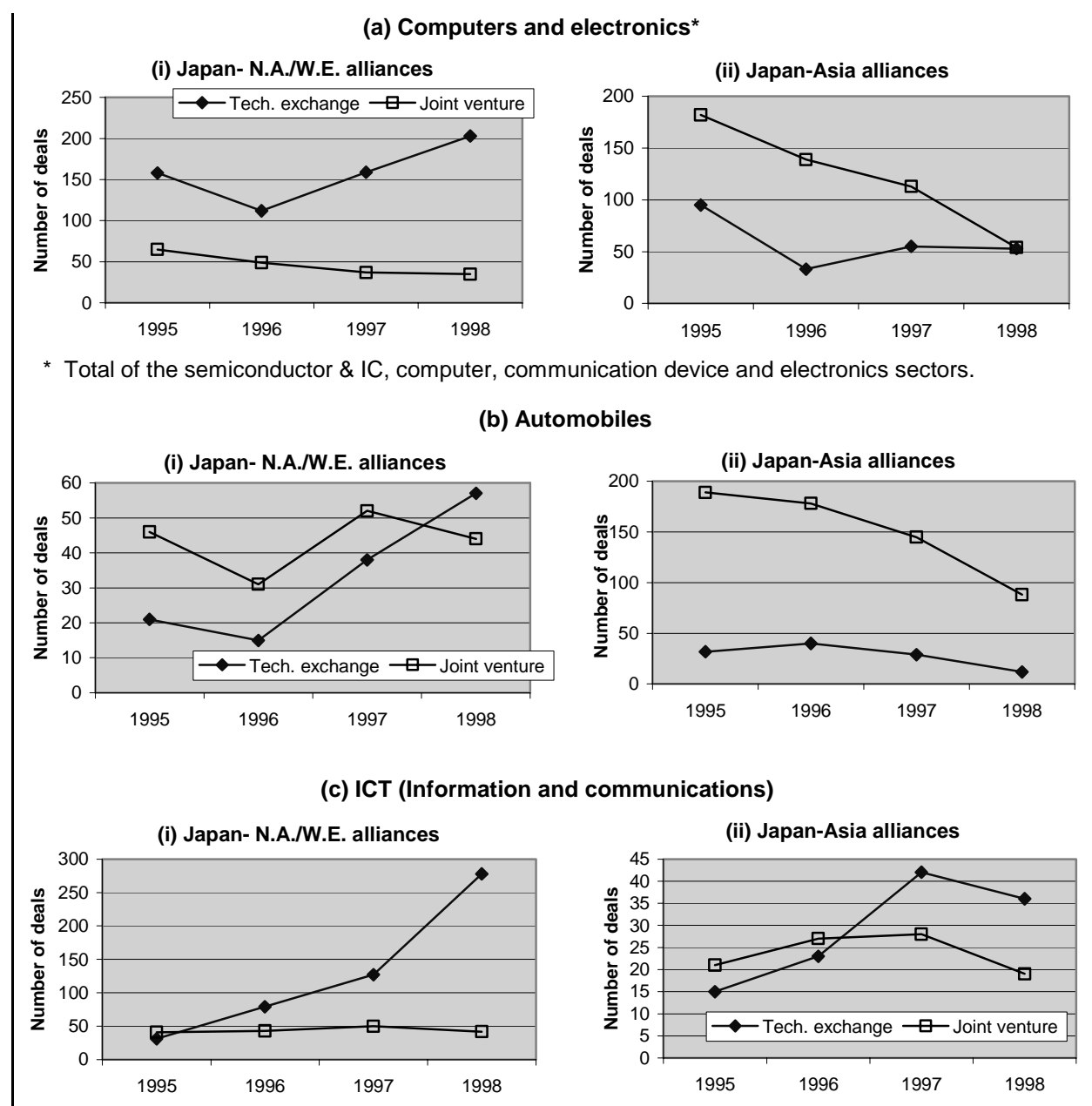
Figure 13. Alliance deals with North American firms by sector, 1998



Note: The number of alliances with Canadian firms are quite small (a few alliances in each sector).  
Source: JETRO (1999).

**Figure 14** shows the number of Japanese alliances, *i.e.* technology exchange and joint ventures, in three sectors: computers and electronics, automobiles, and information and communications (ICT). As for alliances with Western partners, technology exchange arrangements increased rapidly, surpassing the number of joint ventures in all three sectors in 1998, and those in ICT (278 alliances) were nine times greater than in 1995 (31 deals). Joint ventures with Western firms in these sectors remained at the same level or decreased slightly. Japan-Asian joint ventures dropped significantly in the computer and automobile sectors while the decrease is more modest in the ICT sector. Even though the number of alliances between Japanese and Asian firms is decreasing in general, technology exchanges including R&D alliances in ICT are growing.

Figure 14. Japanese alliances, by sector and region



Note: N.A. = North America; W.E. = Western Europe.  
Source: JETRO (1999).

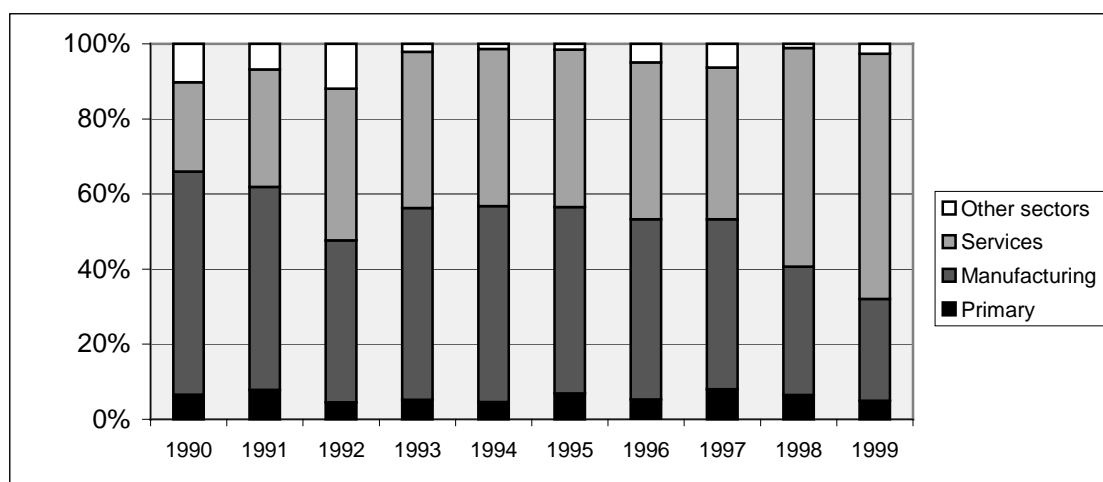
## INTERNATIONAL STRATEGIC ALLIANCES BY SECTOR

### Overview

Strategic alliances are taking place across a range of sectors, manufacturing as well as services. Pharmaceuticals, chemicals, electronic equipment, computers, telecommunications, and financial and business services are examples of industries characterised by a large number of strategic alliances (**Table 11**). Although a large number of alliances are still formed in manufacturing industries, more and more strategic alliances are taking place in the services (**Figure 15**). As the world economy becomes more service-based, strategic alliances are playing a more important role in cross-border restructuring in service sectors.

The sectoral analysis below discusses four different industries in more depth: telecommunications, pharmaceuticals, automobiles and airlines. The telecommunications sector illustrates alliances in the information technology and electronics industry in general, where a major driving force towards international alliances is the desire to develop new global product and system standards. The pharmaceuticals industry, which is highly sensitive to soaring research and development costs and the time-lag to commercialisation, uses cross-border alliances to outsource a part of its R&D activities and for speedy delivery of new drugs to the market. In the automotive sector, car manufacturers seek partnerships to secure sufficient financial resources to develop leading-edge technologies for the next generation of eco-friendly automobiles as well as to achieve global economies of scale in production. Alliances in the airline industry are aimed at realising cost savings through investment in a common system for reservations, ticketing and client services; these co-operative sales and marketing arrangements tend to attract greater numbers of air passengers.

Figure 15. Sectoral distribution in strategic alliances, 1990-99

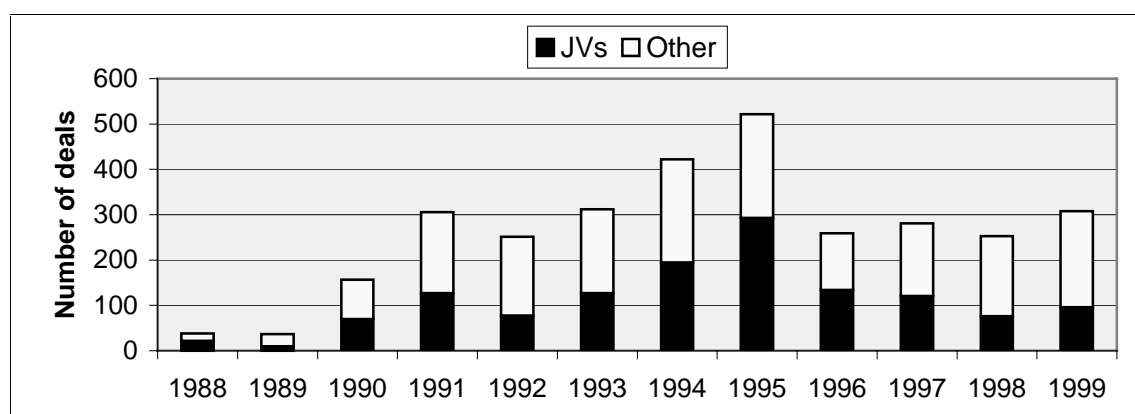


Source: Thomson Financial Securities Data.

## Telecommunications

International strategic alliances are growing rapidly in the telecommunications sector, both in manufacturing (equipment) and services, with expansion of the world information and communication technologies (ICT) market at an average rate of 7% a year since 1992. The number of alliances in the telecommunications sector worldwide, including both domestic and cross-border partnerships, reached a high of over 500 in 1995; over 300 deals were concluded in 1999 (**Figure 16**). More than half of the alliances in 1999 were cross-border and 62 of these created international joint ventures. For the most part, regional telecommunications and Internet service providers are seeking geographically wider and improved communication services through alliances with firms covering different regions and services. In 1999, US firms were involved in about 60% of the cross-border alliances (100 alliances), followed by firms from the United Kingdom (34) and Japan (26). Domestic alliances in the telecommunications sector were also dominated by US firms, who participated in 95 alliances out of a total of 137.

Figure 16. Telecommunications: number of alliances, 1988-99



Source: Thomson Financial Securities Data.

Active alliance formation reflects the significant expansion of the world ICT market, including information technology (IT) hardware, services and software, and telecommunications, which was worth USD 1.8 trillion in 1997. More than half of market growth in 1992-97 was attributable to sales of telecommunication equipment and services, which account for 43% of the world ICT market ahead of information technology services and software (38%) (OECD, 2000b). Mobile communications, including cellular phones, are at the forefront of this growth. The number of users of cellular mobile communication services in OECD countries, which was around 10 million in 1990, reached more than 290 million by June 1999. In other words, in 1990 there was just one mobile subscriber per 100 inhabitants in OECD countries, and by June 1999 there were 26 mobile subscribers per 100 inhabitants. In 1997, mobile communications provided USD 125 billion in revenues in OECD countries, representing 20% of the telecommunications market (OECD, 1999).

Creating a new world product or system standard is key to the long-term prosperity of ICT equipment and software developers and manufacturers, and firms in the electronics (manufacturing) industry in general. Once a single standard is determined, its original inventor (firm) can realise economies of scale in its production and sell the technology involved as a licence. Previous cases include Video Home System (VHS) and Compact Disc (CD), which are the worldwide standards for visual and audio products. Communications software and hardware developers are actively forming R&D and marketing alliances with competitors to accelerate a breakthrough in product development and to promote co-developed products worldwide. Since marketing and advertising are key to making certain products the world standard, many alliances in the telecommunications and electronics sectors are formed between large companies which have dominant marketing power in regional markets.

One goal of alliances in ICT is to establish the standard for the next generation smart phone, where mobile phone subscribers can e-mail, browse the Internet or make a phone call (Economist, 1999a). This requires the integration of conventional phone communications service with Internet-based information services. For example, *Symbian* is a joint venture formed in June 1998 by Psion (UK), Ericsson (Sweden), Nokia (Finland) and Motorola (US); Matsushita (Japan) joined in May 1999. Symbian aims to develop and upgrade the EPOC system, an operating system for wireless information exchange devices including a smart phone. The joint venture promotes the EPOC-based operating system to turn it into the *de facto* global standard for smart phones as well as other portable wireless communications products. The Symbian consortium also collaborates with other firms in partnerships for general development, semiconductor development and software development and sales (**Table 13**).

Part of the motive for setting up the Symbian alliance was to challenge another candidate for the global standard, the Windows CE operating system, promoted by Microsoft (US). Microsoft is trying to expand its Windows-based operating system user base by concluding co-operation agreements with major telecommunications operators such as British Telecom (UK) and the NTT Mobile Telecommunications Network (NTT DoCoMo) (Japan). In the latter case, Microsoft and NTT DoCoMo agreed in October 1999 to establish a joint venture, *Mobimagic Co. Ltd.*, in which each partner holds a 50% share. Mobimagic will start its mobile services in mid-2000, with access to e-mail and other Internet-based information transmission, and will promote wireless communication devices using Microsoft's operating system. In March 1999, NTT DoCoMo also signed a strategic agreement with Symbian for joint development of the EPOC system. This is an example of a firm strategy to maintain multiple R&D alliances with partners developing competing formats or operating systems (**Box 2**).

#### Box 2. The Ericsson/Microsoft Alliance

Increasingly, firms in the telecommunication sector form multiple alliances with other firms so as not to be left behind when a global product or system standard is selected by the market. These often contradict previous partnering arrangements and are undertaken by firms in fierce competition. The Ericsson (Sweden) and Microsoft (US) partnership announced in December 1999 represents such a dual alliance strategy. Ericsson, one of the five founders of the Symbian consortium, is promoting the EPOC operating system which is competing against Microsoft's Windows CE as the system for wireless information exchange devices. Under the Ericsson/Microsoft deal, a new joint venture will build, market and deploy solutions utilising Microsoft's Window-based platforms as well as Ericsson's mobile Internet technologies. It appears that Ericsson intends to introduce the Microsoft system and software into its products while supporting the EPOC system as well.

Although Ericsson has said that its ties with Microsoft will not influence its commitment to the Symbian project and the EPOC system, the new alliance may undermine trust among Symbian partners. It remains to be seen if the Symbian alliance can be maintained once one of the allied partners (Ericsson) joins with the alliance's target company (Microsoft). The Ericsson/Microsoft alliance illustrates a common dilemma among IT developers and manufacturers, who have no choice but to comply with multiple competing formats (*i.e.* operating systems) until a single standard for world use is determined. However, the more alliances a firm enters into, the more difficult it may be for that firm to maintain an appropriate balance between its older and newer ventures.

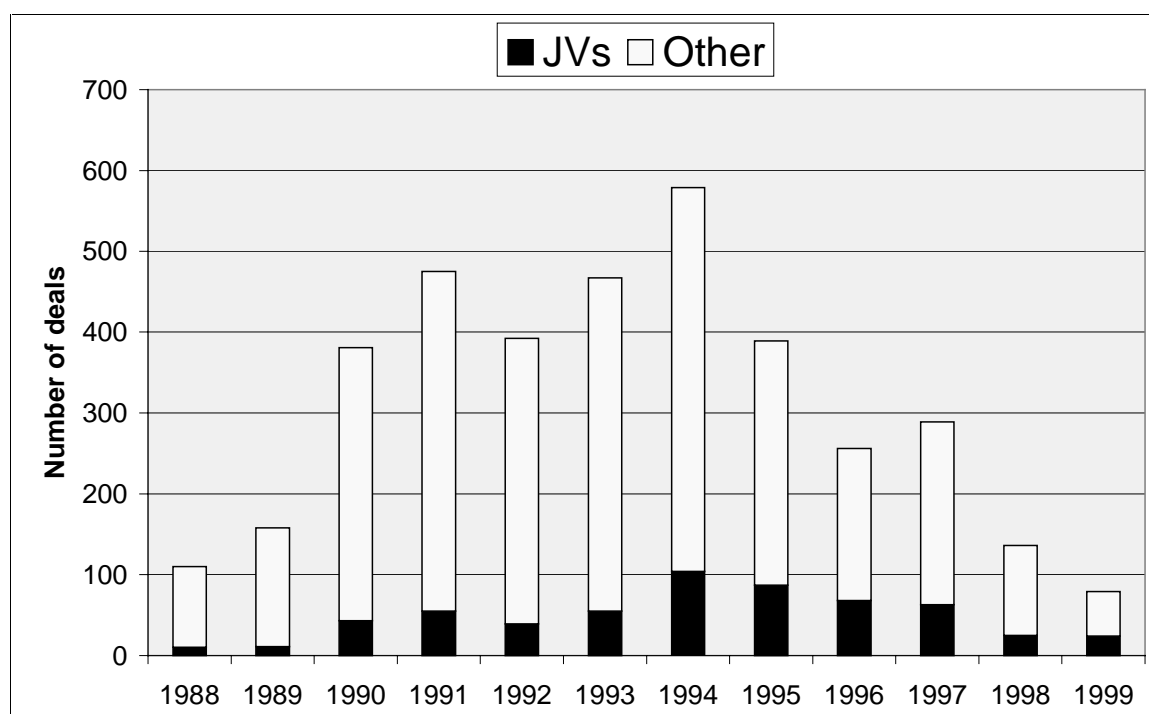
## Pharmaceuticals

Cross-border alliances for product licensing and co-marketing have long been a feature of the pharmaceuticals industry. The total number of domestic and international alliances in 1999 was 79, which was less than one-eighth of the peak of 579 deals in 1994 (**Figure 17**). However, the value of new alliances (each in excess of USD 20 million) in the pharmaceuticals industry reached over USD 3 billion in 1997, a 500% increase since 1991 (PricewaterhouseCoopers, 1999b). Around 60% of the 1999 alliances were cross-border, which included 14 international joint ventures. A major motive for all partnerships is to share research and development expenditures; about 25% of the research and development expenditures of large pharmaceutical firms is now spent through external partnerships (PricewaterhouseCoopers, 1998).

The most rapidly growing type of alliance are those relating to biotechnology; partnerships in early-stage research and development between large pharmaceutical companies and smaller biochemical firms have become quite common (**Table 14**). Such partnership agreements are a major source of financing for the latter. In 1998, biotechnology firms raised USD 6 billion from strategic partnering, primarily through alliances with large pharmaceutical companies, accounting for 60% of the total funds raised by these biotechnology firms during that year (Burrill & Company, 1998).

With regard to the cross-border alliances in 1999, 24 alliances were for manufacturing and 13 for joint research and development, which includes four alliances for *both* manufacturing and R&D. Product licensing and marketing were also motives for alliances. All 1999 international joint ventures except one (13 joint ventures) were for manufacturing co-operation, half of which were for pharmaceuticals production in China. As for the nationality of allied firms, US firms participated in 27 cross-border alliances in 1999, followed by Canada (11), Japan (9), China (8) and Germany (6).

Figure 17. **Pharmaceuticals: number of alliances, 1988-99**



Source: Thomson Financial Securities Data.



Alliances in the pharmaceutical sector are being driven by the rising cost of bringing new products to market as well as the growing expectations of consumers for more specific and direct cures for narrowly defined illnesses. The average cost of getting a new drug to market is over USD 300 million; for every drug approved, an estimated 10 000 molecular compounds will be tested and discarded (Economist, 1998). In general, development and approval of a new drug takes more than a decade. All pharmaceutical companies wish to reduce their R&D costs, which generally involve scientific research in emerging or unknown fields and which may or may not ultimately lead to a commercial product. Another factor, the need to develop more “suites” of products tailored for specific groups of patients, requires a more complicated development process and leading-edge technology. Even the large leading pharmaceutical companies cannot be expert in every field and need to search for external partners. They build multiple alliances with firms having complementary development skills, extensive gene databases and facilities for conducting clinical trials. The nature of government regulation and oversight – particularly the time, costs and procedures involved in new drug approval – is also a factor influencing the size and geographical dimensions of alliances and restructuring in the pharmaceuticals industry (**Box 3**).

#### **Box 3. The Glaxo-Wellcome/Biota Alliance**

Glaxo Wellcome PLC, one of the top three pharmaceutical companies in the United Kingdom, in partnership with Biota, an Australian biochemical company, jointly developed the drug *Relenza*, an influenza therapy. Under this alliance, Glaxo Wellcome has world-wide marketing rights for Relenza, and Biota receives 10% of net sales in Australia and 7% of net sales in the rest of the world. The drug’s world-wide filing for marketing approval began in the second half of 1998, and Relenza has been approved in 30 countries including the United States, all 15 member states of the European Union, and Japan.

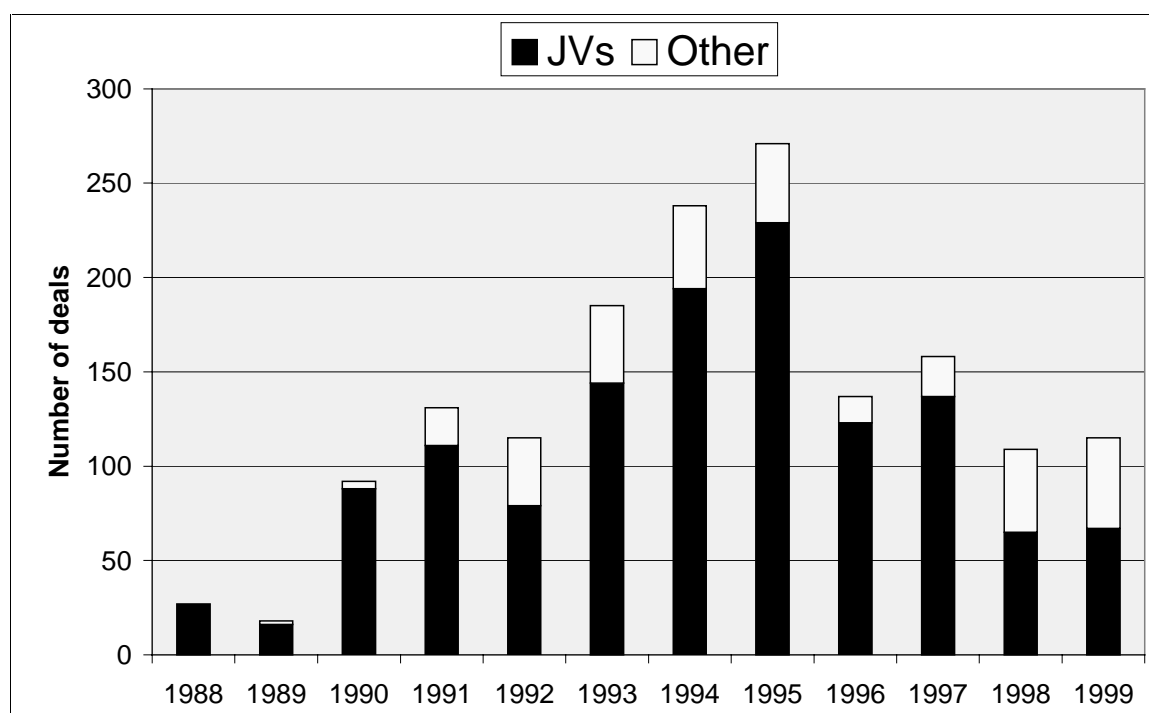
In April 1999, the UK Government established the National Institute for Clinical Excellence (NICE) as a part of the National Health Service (NHS) to provide health professionals with guidance including appraisals of new and existing drugs (and other health technologies) in terms of clinical and cost effectiveness. In October 1999, NICE discouraged doctors from prescribing Relenza in the 1999/2000 flu season, saying that Glaxo Wellcome had not fully proven its effectiveness for elderly and other high-risk patients. The NICE recommendation does not legally bind physicians, but the profitability of the Glaxo Wellcome/Biota alliance was affected.

In early 2000, Glaxo Wellcome announced plans to merge with SmithKline Beecham PLC, creating the world’s largest pharmaceutical company. This merger was partly in response to the increasing research and administrative costs being imposed by governments, such as that of the United Kingdom, as they attempt to measure the cost-effectiveness as well as the safety of various medicines and approaches. The United Kingdom has been a world centre for pharmaceutical R&D activities and a showcase for marketing new drugs, attracting international firms such as Pfizer (US) and Novartis (Switzerland). Additional data requirements, including for drugs already on the market such as Relenza, could be changing the competitive situation in the United Kingdom, prompting the Glaxo SmithKline merger.

### **Automobiles**

Strategic alliances have long been the norm in the automobile industry. Carmakers use alliances to produce car components such as engines and transmissions and achieve economies of scale. In recent years, there have been about 100 new alliances in the automobile industry per year. The majority of these are manufacturing joint ventures (**Figure 18**). Around 80% of the 1999 alliances (91 out of 115) were cross-border, indicating the high degree of globalisation of this sector. International alliances in 1999 included 53 joint ventures, all of which (except one for marketing co-operation) were for assembly of vehicles or parts. US firms participated in 27 international alliances in 1999, followed by Germany (26), Japan (22), China (13), France (10) and Italy (8). As for China, nine alliances were manufacturing contracts between a major carmaker and a local Chinese firm, including Toyota/Tianjian Automotive Industrial and Renault/Dandong Automotive Works. In 1999, Russian firms formed eight international alliances with Western partners including General Motors (US), Ford (US), Renault (France) and Volvo (Sweden).

Figure 18. Automobiles: number of alliances, 1988-99



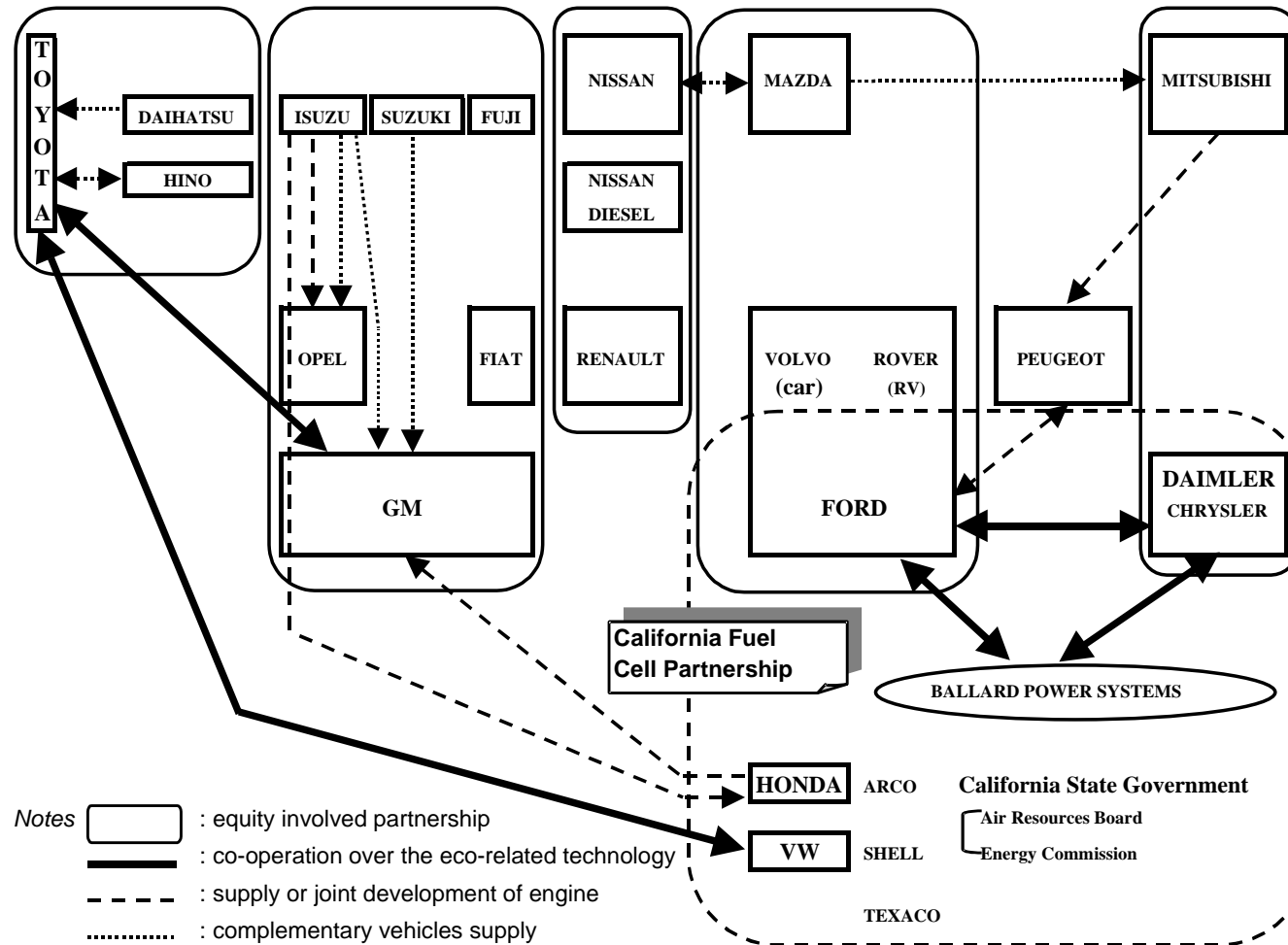
Source: Thomson Financial Securities Data.

As a result of these international alliances, the major automobile manufacturers have been divided into several cross-border groupings (Figure 19). Several of the bilateral alliances are longstanding, but have recently been expanded to include other partners. For example, Ford has held minority equity (25%) in Mazda since 1979 and increased this shareholding to 33.4% in 1996. General Motors and Isuzu formed an alliance in 1971 and the General Motors/Suzuki alliance began in 1981. In recent years, these alliances have strengthened ties within a broader circle by increasing their cross holdings with other companies in an effort to secure sufficient financial resources for research and development and economies of scale in production.

Several factors are driving international alliances in the automobile industry. One is excess production capacity. The auto industry world-wide has excess capacity of some 20 million vehicles (PricewaterhouseCoopers, 1999a). Each carmaker is under pressure to operate assembly lines at full capacity or close some lines. Economies of scale can be achieved through joint or mixed production – where the models of different companies are produced at one site. This is also advantageous when an allied partner has a production site in the region where the other partner has no facility. For example, Renault plans to utilise Nissan's factory in Mexico to produce its own model. Mazda, which has excess capacity in Japan, will start assembly of a Ford model in its factory in the year 2000.

Alliances have also been prompted by the need to combine resources and spread risks for the development of a next generation environmentally friendly car. Participants in the *California Fuel Cell Partnership* include auto manufacturers (Daimler-Chrysler, Ford, Honda and Volkswagen), fuel suppliers (ARCO, Shell and Texaco), a fuel cell company (Ballard Power System) and the California State government (California Air Resources Board and Energy Commission). This alliance was formed in April 1999 following the Ballard, Daimler-Chrysler (then Daimler-Benz) and Ford R&D alliance in 1998 for development of a Fuel Cell Electric Vehicle (FCEV), which operates on hydrogen fuel and oxygen and produces only water vapour emissions. The California Partnership will test FCEV on the road in California and build necessary infrastructure including hydrogen fuel stations. This could be indicative of a new type of cross-border alliance co-sponsored by private enterprises and government.

Figure 19. Major alliances in the automobile sector



Notes

- : equity involved partnership
- : co-operation over the eco-related technology
- : supply or joint development of engine
- : complementary vehicles supply

Source: each company's press releases and California State's home page ([www.drivingthefuture.org](http://www.drivingthefuture.org)).

Market liberalisation and the introduction of a single currency in the European Union is leading to new strategic alliances. The EU market is the second largest in the world (14.6 million vehicles sold in 1999) after the United States. Price differences across EU member states are being revealed, with a significant impact on the price strategies of major automakers. Savings are expected to be realised through alliances for commonalisation of car platforms, power trains (engines and transmissions) and other vehicle components. Through the Renault/Nissan alliance announced in October 1999, common platform use will generate considerable economies of scale – up to 500 000 production units per platform – compared to 280 000 units at Renault and 100 000 units at Nissan. The two companies also agreed to a mutual supply of complementary engines and transmissions, with estimated cost savings of USD 3.3 billion in 2000-02 due to the alliance.

Market entry at lower cost is another motive for cross-border alliances in the automobile sector. Japanese firms have already targeted high-growth markets in Southeast Asia. General Motors and Ford are forming alliances with Japanese firms to build on their capacity and presence in the region. General Motors is jointly developing mini-vehicles for Asian markets with Suzuki and will assemble these vehicles in Suzuki's factory in Japan or other Asian countries. Ford has begun joint assembly of pickup trucks with Mazda in Thailand for sale in the country and export to other Asian-Pacific countries. But the alliance strategies of these two American companies are quite different (**Box 4**).

#### **Box 4. General Motors' alliance strategy**

Many automakers are forming and strengthening alliances with Japanese carmakers in order to penetrate fast-growing Asian markets. General Motors (US) has purchased major car components such as power trains (engines and transmissions) from various Japanese car manufacturers and has acquired minority equity in these firms. Recently, GM acquired 20% equity in Fuji Heavy Industries, a four-wheel-drive vehicle maker producing the Subaru brand, and formed an agreement with Honda for mutual engine supply. GM also holds 49% of the shares of Isuzu, a diesel engine and commercial vehicle maker, and 10% of Suzuki, the top mini-vehicle manufacturer in Japan. The GM strategy is to co-operate with several Japanese carmakers specialising in different fields and market segments.

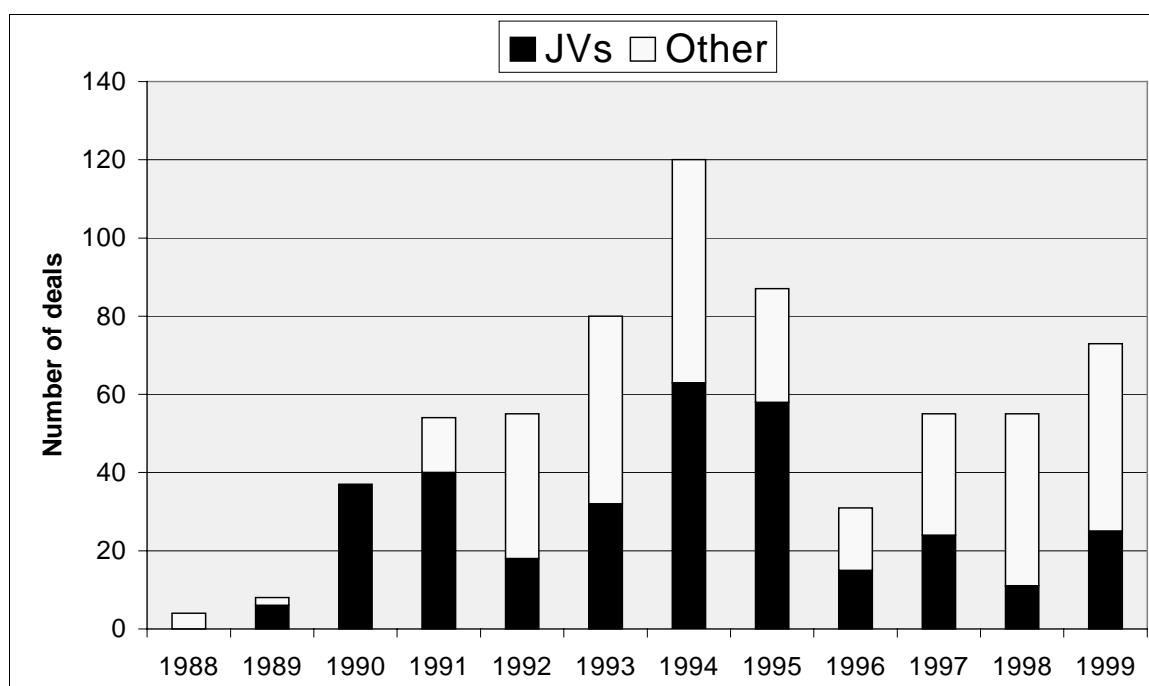
This is different from the strategy of other firms such as Ford (US), which has maintained an alliance with a single Japanese carmaker, Mazda. Ford focuses on cost reduction through commonalisation of car platforms, power trains and other vehicle components while maintaining distinct company car models. In other words, Ford vehicles look different on the surface from Mazda vehicles, although they share common components. General Motors, in contrast, puts its brand on the original models developed by its alliances, as do its partners, who have supplied such models to OPEL (with OPEL's mark), a GM-owned European car marker.

General Motors is fast becoming a service company, leaving automobile manufacturing to its many international partners. The company has established widespread service networks via the Internet where customers can make a car purchase, receive financing and obtain all follow-up services. GM will probably continue to produce vehicles for the US market, where it has the largest market share, but its revenue may come largely from being a service provider rather than a vehicle manufacturer, and it may purchase all models for European and Asian markets from its allied partners.

## Airlines

The international airline industry is highly regulated, and air routes and their frequency are generally determined through bilateral government agreements. Because airlines must limit the number and range of destinations they can service, international alliances among air carriers covering different regions and routes have long been in existence. The number of new alliances in the sector was less than 100 per year in the past five years, reflecting the already high level of integration across airlines (**Figure 20**). In 1999, there were 58 cross-border alliances out of a total of 73. Of these, 19 were joint ventures, mostly to provide aircraft maintenance, ground handling and other shared services. The remaining international alliances were for shared flight services, both for passengers and cargo, including code-sharing and frequent flyer programmes. The United States participated in 16 of these alliances, followed by Germany (8), the United Kingdom (7) and Japan (6). Firms from Germany (5), Belgium (4), France (3), Italy (3) and Switzerland (3) established international joint ventures. Through these alliances, four major airline groups have been created: Oneworld Alliance, Star Alliance, the Delta/Air France alliance and the KLM/NW alliance, which together account for 60% of world air traffic (**Figure 21**).

Figure 20. Airlines: number of alliances, 1988-99

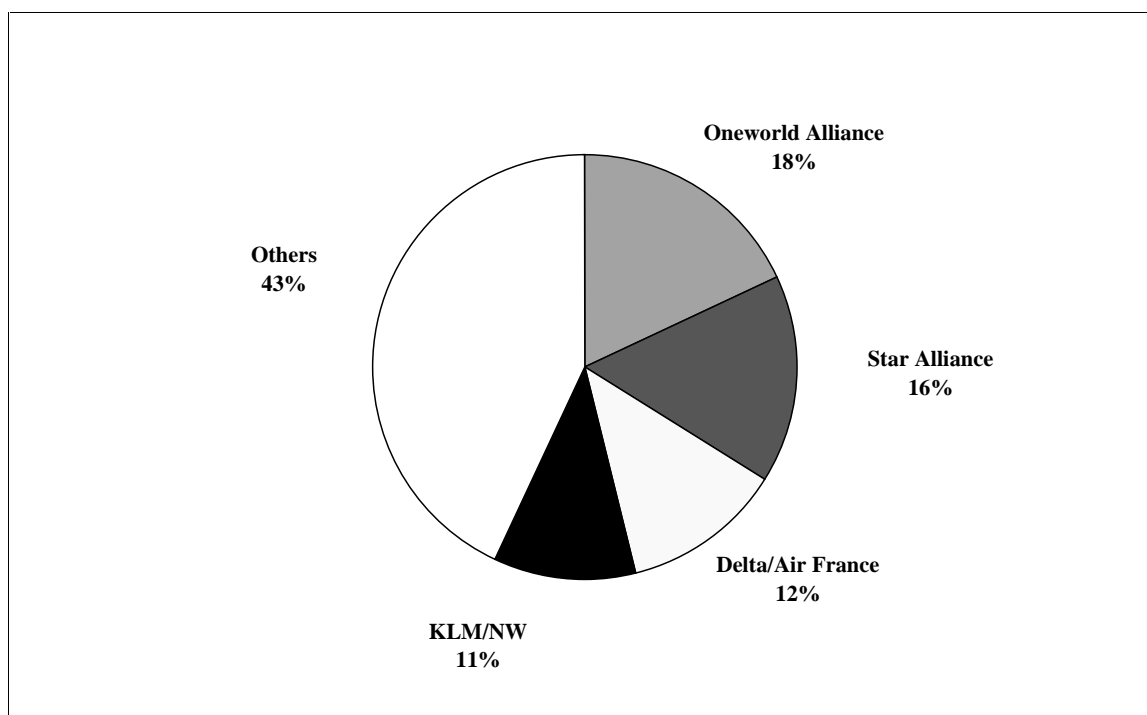


Source: Thomson Financial Securities Data.

The primary focus of alliances in the airline industry is strengthening and expanding market presence through providing customers (air travellers) with “seamless” transport to as many destinations as possible. Around 70% of airline alliances include a code-sharing arrangement through which allied airlines sell seats on each other’s flights under each airline’s name or code. For example, through code-sharing, the Star Alliance (which includes United, Lufthansa, All Nippon Airways, SAS, Air Canada, Varig, Thai Airlines, Ansett and Air New Zealand) covers more than 760 destinations around the world. Through the alliance, each airline can offer a wide range of routes without actually flying to these destinations. Customers are attracted by the diverse destinations available as well as the combined frequent flyer programmes. In addition, the airlines reduce costs through the alliance by sharing airport facilities such as lounges for business travellers and through consolidation of aircraft maintenance and catering services. As a result, competition among the major airline groups for additional members is intense (**Box 5**).

Figure 21. Global airline alliances

Share of world traffic, 1998



1. Oneworld Alliance: AA, BA, Canadian Airlines, Cathay, Finnair, Iberia, Qantas.

2. Star Alliance: United, Lufthansa, All Nippon Airways, SAS, Air Canada, Varig, Thai, Ansett, Air NZ.

3. Delta/Air France: Delta, Air France, Austrian, Swissair, Sabena.

4. KLM/NW: KLM, NW, Alitalia, Continental.

Source: Economist (1999c).

While consolidation of the airline industry increases as more air carriers join the four major groups, each airline also maintains multiple co-operative agreements in specific areas of operation. For example, Japan Airlines (JAL), the largest air carrier in Japan, has code-sharing agreements for passenger flights with 11 airlines while maintaining code-sharing arrangements for cargo flights with six airlines (Table 15). Such bilateral arrangements are concluded regardless of the major alliance/group to which the airline belongs, leading to a complicated web of alliances among airlines, all aimed at increasing the cost-effectiveness of their passenger and cargo operations. However, these alliances and bilateral agreements are believed to have the potential to raise barriers to entry and to significantly restrain competition in the airline sector at the international level.

There has been a tendency for government restrictions on foreign ownership of national flag carriers to drive airlines towards cross-border alliances rather than towards mergers and acquisitions as is the case in other sectors. For example, British Airways purchased 25% of Qantas (Australia) in 1993, but was not permitted under the Qantas Sale Act of Australia to increase this share when Qantas was publicly floated in 1995. And the nature of alliances in the airline sector has differed somewhat. Although cost savings could be realised through joint purchase of aircraft, for example, even the four major alliances have not yet engaged in such a venture. Joint investments in information technology systems and customer databases would also be cost-effective, but none of the major alliances have substantially benefited in this area (Financial Times, 1999).

**Box 5. The Star Alliance**

Two recent cases where the Star Alliance added airlines illustrate the fierce competition between the major airline groups, particularly the *Star Alliance* (which includes United, Lufthansa, All Nippon Airways, SAS, Air Canada, Varig, Thai Airlines, Ansett and Air New Zealand) and the *Oneworld Alliance* (which includes American Airlines, British Airways, Canadian Airlines, Cathay Pacific, Finnair, Iberia and Qantas), to expand their range of destinations and choices of domestic and international routes.

Canadian Airlines, which emerged in 1987 as a successor to five airlines then operating in Canada, was one of the founding members of the Oneworld Alliance with American Airlines and British Airways. The company was being restructured and had streamlined its operations with substantial financial support from AMR Corporation, the parent company of American Airlines. When Air Canada, the largest airline in Canada and a member of Star Alliance, tried to acquire Canadian Airlines in November 1999, American Airlines and British Airways bid against it. United Airlines and Lufthansa, core members of the Star Alliance, backed Air Canada, including with substantial financial support, and succeeded in pulling the two major Canadian airlines into their club. The Minister of Transport and the Commissioner of the Canadian Competition Bureau approved the Air Canada-Canadian Airlines merger in December 1999. Air Canada became the world's tenth largest airline, controlling 80% of Canadian domestic flights and 40% of international flights to and from Canada. This prize was extremely valuable to the Star Alliance in terms of the routes and destinations offered.

Similarly, the Star Alliance won a prize when Lufthansa (a Star partner) acquired 20% of British Midland, the second largest holder of take-off and landing slots at Heathrow Airport in the United Kingdom after British Airways. The acquisition included a condition that British Midland join the Star Alliance. As a result, United Airlines and Lufthansa are able to pose a strong challenge to British Airways on transatlantic routes (utilising the US-based hubs of United and Midland's slots at Heathrow) and on European routes (using the Frankfurt hub of Lufthansa) as well as Midland's regional routes in the United Kingdom.

## DRIVING FORCES

Firms entering into international strategic alliances may be prompted by several motives, including economising on production and research costs, strengthening their market presence, and accessing the intangible assets of other firms such as managerial skills and knowledge of markets and customers. Alliances provide firms with strategic flexibility, enabling them to respond to changing market conditions and the emergence of new competitors. Innovation and the development of leading-edge technologies drive most alliances in higher-technology sectors. In other sectors, alliances may be aimed at more conventional co-operation such as sharing a partner's sales and distribution networks. In all sectors, as deregulation and liberalisation of markets proceed, competition is increasing at the international level and stimulating new and different alliances between enterprises. These driving forces behind cross-border alliances are discussed below in terms of economic, technological and governance factors.

### Economic factors

Intensified global competition in many manufacturing and service sectors and the consequent need to restructure at the global level are the main factors driving growth in international strategic alliances. In general, these alliances provide synergy effects and strengthen the international competitiveness of participating firms by consolidating overlapping capacities and business activities on a global scale. Multinational enterprises enter into cross-border alliances with other firms in their sector to cut costs, streamline operations and concentrate on a few core activities while outsourcing non-core functions. As a result, increased levels of both cross-border mergers and acquisitions and strategic alliances in the 1990s have been accompanied by intensified sectoral and product specialisation.

A considerable portion of international strategic alliances are focused on consolidating and/or accessing *tangible assets*, such as production facilities and distribution networks. In this, many alliances are a defensive reaction to increased global competition. Falling prices and excess capacity in sectors such as automobiles and steel lead to collaboration for cost-economising and risk-diversifying reasons. Agreements which are mainly aimed at minimising net costs are generally (but not always) customer-supplier agreements or vertical relationships within a value-added chain and embody a shorter-term perspective. While these alliances may increase profits, they do not usually raise the value of the firm beyond the short term.

Cross-border alliances are also aimed at opening up markets and are undertaken by firms wishing to offer new services to domestic markets and to gain entry to new markets and diversify operations. According to the MERIT-CATI database on strategic alliances, there is a strong positive relationship between the extent to which firms have overseas production (measured by the percentage of foreign employees) and their participation in international alliances (**Figure 22**).

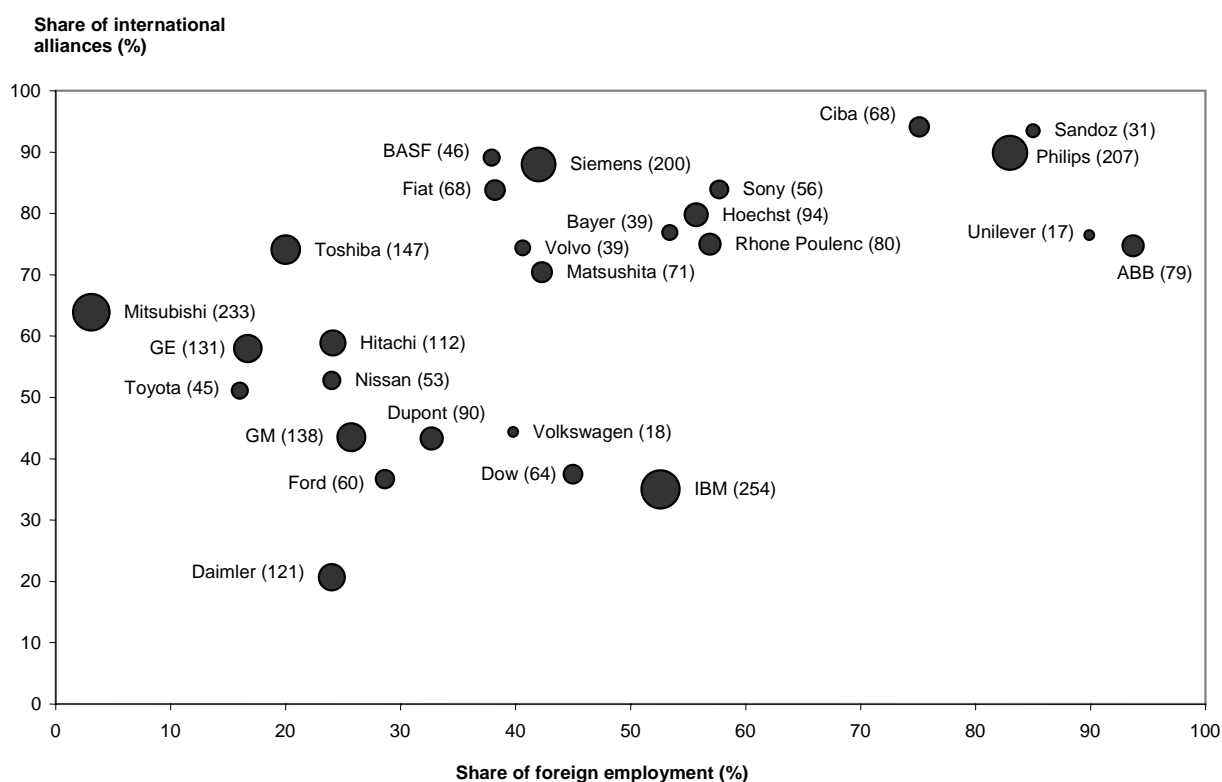
Alliances are also formed to combine and/or access *intangible assets*, such as management skills, technical know-how or brand names. Such agreements are aimed at long-term profit optimising by attempting to enhance the value of the firm's assets, rather than at shorter-term cost-cutting. A study of joint ventures in the United States between 1986-93 verified this effect through analysing the stock market value of the companies participating in the alliance. For certain types of ventures, the performance of the



participating firms was found to decline sharply in the three years leading to the venture, although firms were much more highly valued by the stock market in the years following. This was particularly so in the case of firms with complementary assets, where the companies brought capabilities to the table that were valuable, different and mutually complementary, especially in computers and related sectors (Mohanram and Nanda, 1998).

Corporations are defining more of their value in terms of intangibles, *e.g.* the creativity of their designers (software), the knowledge of their markets (consumer goods) and even the extent of their alliances (airlines). For example, in-depth knowledge of particular markets and customers is a valuable asset which can be traded upon. Alliances between firms for “affinity marketing” build on a partnership with a company with a well-established product or brand name to boost sales of a different product. Other alliances are between manufacturing firms and Internet service providers which have a rich and valuable customer database. Electronic commerce and the spread of online shopping enable firms to approach customers, regardless of their resident country, more directly via Internet. As these new trends have greatly reduced the transaction costs of bringing products to market, companies are paring down to what they do best and outsourcing the rest through a proliferation of alliances among companies that contract with each other for specialised products and services.

Figure 22. International alliances and foreign production



Note: (•) = each firm's total number of alliances (both domestic and international).

## Technology factors

Technology is driving the formation of strategic alliances at the international level in several different but intertwined ways, reflecting the growing ease of communication, cost of research, and need for international standards. The emergence of new communication tools such as the Internet, electronic mail and electronic data interchange (EDI) make cross-border collaborations far easier and more practical than ever before, even compared to five years ago. These information technologies have changed the manner of doing business in many sectors and have enabled firms to share know-how, information, distribution networks and other assets in different locations simultaneously. The knowledge assets of one firm such as new product designs and ideas, can be enhanced and adopted by firms in a distant country without delay. Rapid advances in information and communication technology have provided a more conducive business environment for partnerships and spurred growth in international strategic alliances and in phenomena such as cross-border patenting (**Box 6**).

At the same time, alliances are being driven by multiplying research costs accompanied by shortening product life-cycles which prompt the need to share resources and risks (Duysters, 1998). Technology-related alliances among firms are generally aimed at gaining economies of scale and scope in research and development. This is in contrast to alliances for production, marketing and distribution whose major objective is to gain access to new markets through sharing facilities and networks. In addition to research ventures among large multinationals, there are many smaller companies and laboratories which need capital to maintain their technological advantage in specific fields. This has prompted alliances between larger, richer companies and smaller firms with unique skills or technologies, as seen in the biotechnology sector.

Strategic alliances for R&D, both domestic and international, are concentrated in knowledge-intensive sectors such as information and communication technology (ICT) and pharmaceuticals. The ICT sector entered into the greatest number of cross-border technology-related alliances in 1980-96, at 37% of the total. The pharmaceutical sector had the second largest share, accounting for 28% of the total. Pharmaceutical companies use alliances to outsource a major share of research and development in order to accelerate needed product breakthroughs. Among more traditional manufacturing sectors, the automobile industry has shown a greater tendency towards R&D alliances since the early 1990s. Carmakers increasingly need not only mechanical expertise for efficient vehicle production, but also new materials technologies (for lighter car bodies and components), telecommunications systems (for more advanced car navigation), and electronic parts such as semiconductors (for controlling fuel injection). Developing a new vehicle is exceedingly expensive and exploiting the intangible assets of other companies, including leading-edge technologies and specific types of know-how (*e.g.* expertise on durability tests for various car components), is essential for achieving savings in time and costs.

R&D alliances are also effective in developing global product and system standards with potential competitors and steering the path of technological change. In high-technology sectors, such as electronics and information technology, studies show that the rate of alliances tends to have a cyclical dimension. The early formative periods of new technological systems, during which no dominant design or standards exist, are characterised by high technological uncertainty and a large number of strategic alliances among firms. In later periods when a dominant design emerges and economies of scale and standardisation become more evident, co-operative ventures diminish (Pyka, 2000). Creating a new global product standard and being one of the original patent-holders enhances the long-term prosperity of firms in high-technology sectors. Co-operation is particularly sought with leading multinationals due to their global brand name recognition and marketing power. Once a breakthrough product or system (and possible candidate for a new global standard) is developed, an allied company can exploit its partners' assets including sales and marketing networks. An example is the Sony (Japan)/Philips (Netherlands) alliance which created a global standard for compact discs. Alliances with industrial champions also help firms monitor the direction of technology development and innovation in their field.

#### Box 6. Cross-border patenting

Over the period 1980-95, the degree of international technology-related collaboration has more than doubled, including joint research and cross-border patent ownership. The share of patents in OECD countries involving at least two inventors from different countries has increased from 2.1% in 1980 to 4.7% in 1995, meaning that about five patents out of 100 invented in the OECD are the fruit of international collaboration. Although the degree of internationalisation of technology (measured by the degree of cross-border patent ownership) varies among OECD countries, smaller countries (such as Belgium, Austria and Ireland) and more recent OECD Members (such as Mexico and Poland), which have relatively smaller domestic knowledge and research bases, are highly internationalised. Among the larger countries, the United Kingdom is most internationalised. Four sectors (chemicals, petroleum refining, pharmaceuticals, and food and beverages) are the most global in terms of cross-border patenting. Sectors such as shipbuilding and aerospace, perhaps because they are more dependent on government subsidies, are the least internationalised.

#### Governance factors

The other major driving force of international strategic alliances, and of cross-border mergers and acquisitions, is market liberalisation and deregulation across the OECD. In the 1990s, liberalisation of international capital movements and foreign direct investment have promoted cross-border transactions on a larger scale and involving a wider range of countries. As globalisation heightens the interdependency and inter-linkage of economies, foreign ownership of national enterprises and cross-border business collaboration is becoming the norm. Deregulation in sectors such as telecommunications has led to a flood of new entrants, adding competitive pressures on existing players and leading them to create a new web of alliances in order to compete. Integration of regional markets such as in Europe and North America have encouraged firms to expand operations on a broader geographical base, leading to new sales and marketing alliances. Joining a winning network or alliance at the global level is becoming crucial to firm survival in more sectors. Government regulations can also affect alliance formation. For example, in international aviation where foreign ownership is highly restricted, cross-border mergers or acquisitions are rare but alliances are the favoured mode of market entry.

Globalisation and liberalisation are also prompting changes in corporate governance systems which are facilitating cross-border alliances. In Japan, for example, the evolving nature of corporate relationships with shareholders, stakeholders and banks is leading to record numbers of alliances, both domestic and international (**Box 7**). In countries (*e.g.* Japan, Korea, France, Germany) which previously had more tight-knit systems of corporate governance based on close relations with other firms, suppliers and banks and characterised by higher levels of cross shareholdings, there is a trend towards more widely-dispersed ownership and greater transparency. In addition to raising the level of competition in product markets, governance changes are enhancing the responsiveness and flexibility of firms. Enterprises may find it easier to access a wider range of financing, adopt new approaches to organisation and management and realise savings through information technology – firm characteristics which have been evident in the United States. Their ability to restructure – downsizing to smaller units or upsizing to gain complementary assets – is also affected by corporate governance regimes; enterprises from a greater range of countries are now finding it easier to engage in strategic alliances and M&As.

**Box 7. The changing business environment in Japan**

The number of strategic alliances and mergers and acquisitions (M&As) (both domestic and international) involving Japanese firms is rapidly increasing, and 1999 marked the highest level in Japanese history. The number of M&As more than doubled in the last five years to reach over 1 000. Merger activities are fewer than cross-border strategic alliances which number around 2 200 per year, partly because alliances such as joint ventures and minority-equity holdings have fewer implications for corporate control by a foreign firm (*i.e.* an acquiring partner) than M&As. Nonetheless, as the domestic market shrinks, many Japanese enterprises are seeking business partners for complementary intangible assets and financial resources. Several factors are contributing to this trend:

*First*, the accelerating consolidation of the financial sector is weakening the *keiretsu* system which supported large corporate groups based on a web of cross-share holdings. Recent cross-*keiretsu* marriages include the Mitsui Trust/Chuo Trust merger in May 1999, the consolidation of Dai-Ichi Kangyo Bank, Fuji Bank and the Industrial Bank of Japan in August 1999, and the Sumitomo Bank/Sakura Bank merger in October 1999. These banks are no longer providing low-cost capital to troubled firms in the same *keiretsu*, who may now need to join with competitors or foreign firms. Cross-*keiretsu* consolidation in the financial sector also accelerates rearranging longstanding vertical as well as horizontal supply chains and firms' networks based on intra-*keiretsu* contracts, and newer cross-*keiretsu* supplier networks and alliances are emerging. The Renault/Nissan alliance is an example of a financially constrained Japanese automobile manufacturer which sought financing from a foreign partner rather than from a domestic bank.

*Second*, the introduction of tighter accounting rules to align with international standards is making corporate balance sheets more transparent to shareholders. These require firms to include information on related companies including loss-making affiliates and to value security holdings at market prices rather than at book value. Japanese firms are being forced to restructure or spin off businesses which are not making sufficient profits and to remove those financial assets which could undermine balance sheets. Forming alliances with domestic and foreign companies is another way for a firm to strengthen its financial position and add shareholder value.

*Third*, a series of amendments to the Foreign Exchange Law have liberalised cross-border capital transactions so that direct investment from abroad into Japan doubled in the last two years. In 1998, inward investment in Japan was twice that of the previous year and it was even higher in 1999. Although inward investment in Japan is still low compared to other OECD countries, Western firms such as GE Capital, Bosch, Carrefour, and Cable & Wireless are investing in Japan and elevating the level of competition in the domestic market. This, too, is prompting Japanese firms to enter into a greater number of alliances and mergers (Economist, 1999b).

## POLICY ISSUES

Recent trends in international strategic alliances parallel those in cross-border mergers and acquisitions and present similar policy issues (OECD, 2000a). Cross-border alliances can provide private (firm-level) as well as social (economy-wide and consumer) benefits by raising efficiency and innovativeness. A fundamental question for policy makers is whether economic benefits and efficiency derive from a higher level of co-operation among firms or from a greater degree of competition or a combination of the two. Co-operation in one alliance does not always mean less competition since it can be paralleled by intense competition in other technology areas or with other rival alliances. In the current era, characterised by fast-paced technical change and higher levels of globalisation, traditional theories and measurement approaches concerning market concentration and efficiency are being called into question. The nexus of technological innovation, internationalisation of industry, greater networking, global standards and intellectual property are fostering new debates about the benefits and costs of various forms of international coupling (Hart, 1999).

### Competition effects

Co-operation among firms in international strategic alliances does not necessarily mean less competition. This is true even though international alliances as well as cross-border mergers and acquisitions are breaking all records in terms of pace and size in the 1990s and transforming entire industries. In order to reach scale economies in technology, production and marketing, enterprises are choosing among a number of paths to globalisation, *e.g.* foreign direct investment, mergers and take-overs and strategic alliances. These modes of internationalisation tend to be combined in complex and complementary ways as firms seek to maximise efficiency and profits. As a result, co-operation in one alliance may be paralleled by intense competition in other product or technology areas, at a subsequent point in time and/or with rival alliances.

Anti-competitive effects of strategic alliances are less of a danger where barriers to entry and expansion are low. Often, where alliances are formed to develop new technologies (*e.g.* automobiles, electronics), one network of collaboration will lead to the formation of a competing alliance composed of different firms. In addition, there is a trend for international strategic alliances to include firms of different sizes. This could translate into disproportionate technology access benefits for smaller firms and result in a greater number of effective competitors in the market. Partnerships for product standardisation may lower barriers to entry by enabling new entrants to use common standards at affordable prices. And shorter product and technology life-cycles should mean reduced risk of anti-competitive effects through long-lived alliances. To the extent that firms participate in international alliances to remain globally competitive and innovative, co-operative agreements can preserve the number of competitors and levels of competition in terms of new product developments and possibly price levels.

However, there is always the possibility that international strategic alliances will produce anti-competitive effects. A danger arises, for example, when a strategic alliance supplies a critical input including application of a broadly accepted standard. By inflating the price of such an input, alliance members could effectively engage in anti-competitive price raising or they could charge lower prices to alliance members than to outside firms. There are more straightforward risks to competition when strategic

alliances, particularly those involving marketing and sales co-ordination, bring together close actual or potential competitors. A previous OECD review of strategic alliances found that they were driven by more positive than negative motives, that they did not generally lessen competition and that existing antitrust laws were applicable. However, recent concerns have been expressed regarding the competitive effects of alliances and mergers in digital services and other information technology sectors. Competition authorities can be expected to take action against anti-competitive strategic alliances at the national level and are seeking more effective co-operation among competition authorities at the international level.

### Efficiency effects

Most studies point to the positive efficiency effects of strategic alliances rather than to negative competitive impacts. In general, these alliances can provide private (firm-level) benefits as well as social (economy-wide) benefits by raising efficiency, innovativeness and ultimately consumer welfare. Strategic alliances are typically intended to bring together complementary inputs and stimulate innovative activities to introduce new technologies and products (Parkhe, 1998). Benefits for firms entering into alliances include cost-economising in production and R&D activities and access to intangibles such as more effective managerial skills and knowledge of markets and customers, all of which can contribute to their short- or long-term performance and profitability. The ability of alliances and joint ventures to raise the profits and market value of participating firms has been verified in studies at the national level (Mohanram and Nanda, 1998). Companies acquiring technology through alliances and those involved in R&D co-operation tend to have significantly higher profit rates (Hagedoorn and Schakenraad, 1994). Other studies have shown the positive efficiency effects of geographic and cross-industry diversifications in the presence of significant intangible assets (Morck and Yeung, 1999). These results emphasise the importance of learning through alliances to improve corporate performance.

Firm-level efficiency gains can prompt broader social and consumer benefits from international strategic alliances, which can yield dividends for each country where allied firms are operating. Alliances can help revitalise ailing firms and local economies and create jobs through technology transfers, economies of scale and related productivity growth. Learning effects contribute to raising social welfare at the global level, since international strategic alliances help equalise worldwide knowledge just as international trade tends to equalise factor prices (Sim and Yunus, 1998). There is tangible evidence of benefits for consumers through better, and a wider range of, products and services at less cost. For example, in the pharmaceutical industry, strategic alliances which accelerate development of critical medicines and treatments raise social welfare by providing customers (patients) with more and better choices (drugs) at relatively lower prices.

Strategic alliances may also have negative efficiency impacts on participating firms, and indirectly on other firms as well as on consumers, particularly when they fail. Strategic alliances involve certain risks since their implementation is beyond the control of a single party and the objectives and roles of allied firms may not be clearly set at the start. Unsuccessful ventures can engender a waste of finance, skills and management as well as foregone technological opportunities, since companies could have selected other partners or undertaken alternative strategies. Small contractors or other partners may be swept aside in the process although they could also share the gains when alliances succeed. Losses for consumers could occur, for example, if an alliance creates a candidate for a global product standard but fails to promote it in regional or global markets. The *Betamax* video system, a video cassette recorder for home use invented by Sony, was launched in 1974 and promoted through an alliance with Toshiba (Japan) and Zenith (US). In the following ten years, a different video home system (*VHS*) promoted by JVC, Matsushita and the Radio Corporation of America (RCA) took a majority share of the world market and became the global standard. Consumers who purchased the *Betamax* system suffered financially from the failure of the Sony strategic alliance.

An important question is to what extent international strategic alliances consolidate or erode control over advanced technologies and lead to geographical and other disparities. The vast majority of alliances, particularly technology-related alliances, link firms in the Triad (United States, Europe and Japan) and tend not to include firms from other regions. As a result, many leading-edge technologies are developed and protected by a handful of OECD enterprises, where strategic alliances may not necessarily act to equalise worldwide knowledge. Some smaller firms may join promising collaborations, but once an innovation is brought into production and marketed, larger partners may derive more of the profits. There are also a range of barriers, such as information and resource gaps, which prevent smaller firms from participating in international alliances to the same extent as larger enterprises. In fact, data show that the intensity of strategic partnering tends to rise with the size of companies, indicating that larger firms more actively seek and find external opportunities in strategic linkages. While strategic alliances thus can aggravate technological gaps among countries and firms, the fact remains that, compared to mergers and acquisitions, they open the door to more flexible and “independent” international co-operation among firms and national economies.

In order to realise the full benefits from the cross-border networking of multinational enterprises, government policies should provide a more open business environment and equitable treatment to foreign entrants. Although there have been differences among OECD countries concerning strategic alliances involving foreign firms, trends towards market liberalisation and deregulation are inducing policy convergence. Increasing foreign direct investment flows in the 1990s, including cross-border mergers and acquisitions, are evidence of the accelerating integration of the world economy. The number of firms investing abroad is expanding, with more small and medium-sized companies from a diverse range of countries investing abroad. Deregulation, privatisation, more open equity markets and further liberalisation of trade and investment flows are increasingly recognised as key for profiting from the comparative advantages of multinational firms. The challenge to governments is to provide appropriate frameworks to attract new entrants and investments and realise the possible efficiency gains from cross-border co-operation arrangements.

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## *Annex 1*

### **DATA SOURCES**

This paper used two different data sources on international strategic alliances, one from Thomson Financial Securities Data and the other from the Japan External Trade Organisation (JETRO). Both sources cover newly-formed alliances, and subsequently these alliances may have been rearranged in terms of scope of collaboration or participating firms or dissolved. Unlike mergers and acquisitions, which can be measured in terms of the monetary value of acquiring and targeted firms, strategic alliances are typically measured numerically since the strategic importance or value of collaborative activities are difficult to capture in value terms.

#### ***Thomson Financial Securities Data***

The Thomson Financial Securities database (*SDC Platinum*) contains more than 60 000 worldwide alliances including joint ventures, research and development agreements, sales and marketing agreements, etc., from 1988 to the present. It includes over 200 data elements such as participant profile, terms and conditions, purpose of alliance, current status, capitalisation where possible, deal synopsis, description of business and products, etc. It is probably the most detailed database of international alliances in terms of geographical breakdown and sectoral distribution. Data sources include over 200 English and foreign language newspapers, SEC and international filings, trade publications, newswires, and quarterly surveys of investment banks and advisors.

However, like most other databanks, this database is based on information that firms have announced publicly. Thus, it does not include information on undisclosed alliance deals. In particular, the database may over-represent larger firms and under-represent small firms, since alliances among small firms tend not to be reported by the press. Another drawback to the database is linguistic, in so far as the sources are mainly in English.

#### ***Japan External Trade Organisation Data***

The JETRO focus is on cross-border alliances between Japanese and foreign (non-Japanese) firms, which include technology exchanges, joint ventures and outward direct investment. Technology exchanges and joint ventures include collaboration for sales and marketing, research, product development, production (manufacturing) and information exchange. Direct investment is outward investment by Japanese firms which establishes affiliates or facilities in foreign countries without local partners. Collaborations with local firms are included as either technology exchanges or joint ventures, thus the direct investment category is not referred to in this paper.

Data sources are four Japanese newspapers: Nikkei, Nikkei-Sangyo, Nihon-Kogyo and Nikkan-Kogyo. They cover all geographical areas and manufacturing sectors as well as services such as finance. However, the data contain only publicly announced alliances. And since they are based on Japanese sources, the number of Japanese alliances reported tends to be larger than that of other databases based on English or other language publications (such as SDC Platinum).

## Annex 2

## TABLES

\*Figures in the following tables include *both* domestic and international alliances unless otherwise indicated.

Table 1. **Regional distribution of strategic alliances, 1990-99**

	(Number of deals)										
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	1990-99
Asia	1 034	1 629	1 688	2 546	3 538	3 654	1 562	1 576	1 279	1 917	20 423
Pacific	83	154	129	228	309	481	181	292	311	637	2 805
Western Europe	1 280	2 018	1 922	1 926	2 089	2 357	1 101	1 286	1 315	2 008	17 302
North America	2 777	4 271	4 046	4 289	5 149	5 388	2 852	3 604	3 391	4 355	40 122
Eastern Europe	289	807	319	459	402	443	164	189	187	216	3 475
Latin America	39	123	141	170	223	230	118	221	267	245	1 777
Africa	51	103	135	226	218	313	115	197	178	197	1 733
OECD	3 360	5 997	5 766	6 281	7 465	8 002	3 962	4 859	4 647	6 511	56 850
World total	3 729	6 161	6 041	6 942	8 382	9 113	4 339	5 218	5 000	7 034	61 959

Source: Thomson Financial Securities Data.

Table 2. **Regional correlation: total alliances, 1990-99**

	(Number of deals)						
	Asia	Pacific	W. Europe	N. America	E. Europe	L. America	Africa
Asia	7 569	673	3 534	8 216	379	126	326
Pacific	673	919	416	786	44	34	68
Western Europe	3 534	416	5 018	6 437	1 639	337	431
North America	8 216	786	6 437	22 374	1 088	1 108	631
Eastern Europe	379	44	1 639	1 088	396	11	69
Latin America	126	34	337	1 108	11	233	12
Africa	326	68	431	631	69	12	277
Total	20 423	2 805	17 302	40 121	3 477	1 777	1 733

Source: Thomson Financial Securities Data.

Table 3. **Regional correlation: manufacturing alliances, 1990-99**

	(Number of deals)						
	Asia	Pacific	W. Europe	N. America	E. Europe	L. America	Africa
Asia	3 241	200	1 718	2 522	173	54	134
Pacific	200	77	76	92	14	7	10
Western Europe	1 718	76	1 161	1 274	761	124	148
North America	2 522	92	1 274	2 852	374	271	161
Eastern Europe	173	14	761	374	150	3	26
Latin America	54	7	124	271	3	65	1
Africa	134	10	148	161	28	1	63
Total	7 942	460	5 141	7 431	1 465	503	527

Source: Thomson Financial Securities Data.

Table 4. **Regional correlation: marketing alliances, 1990-99**

	(Number of deals)						
	Asia	Pacific	W. Europe	N. America	E. Europe	L. America	Africa
Asia	1 472	106	897	3 235	66	21	46
Pacific	106	98	66	156	9	3	10
Western Europe	897	66	989	2 190	300	64	80
North America	3 235	156	2 190	7 710	237	233	185
Eastern Europe	66	9	300	237	55	3	3
Latin America	21	3	64	233	3	30	3
Africa	46	10	80	185	3	3	47
Total	5 786	433	4 511	13 871	651	348	364

Source: Thomson Financial Securities Data.

Table 5. **Regional correlation: R&D alliances, 1990-99**

	(Number of deals)						
	Asia	Pacific	W. Europe	N. America	E. Europe	L. America	Africa
Asia	584	24	335	1 542	26	4	13
Pacific	24	50	31	80	1	1	4
Western Europe	335	31	473	1 489	58	10	17
North America	1 542	80	1 489	5 822	101	41	87
Eastern Europe	26	1	58	101	10	1	2
Latin America	4	1	10	41	1	2	0
Africa	13	4	17	87	2	0	15
Total	2 473	179	2 349	9 096	187	55	133

Source: Thomson Financial Securities Data.

Table 6. **Strategic alliances in OECD countries,<sup>1</sup> 1990-99**

	(Number of deals)				
	Total (A)	International (B)	Domestic(C)	B/A (%)	C/A (%)
United States	37 548	18 151	19 397	48.3	51.7
Japan	9 417	7 886	1 531	83.7	16.3
United Kingdom	5 565	4 618	947	83.0	17.0
Canada	4 269	2 827	1 442	66.2	33.8
China	4 242	3 937	305	92.8	7.2
Germany	3 877	3 289	588	84.8	15.2
France	2 828	2 534	294	89.6	10.4
Australia	2 550	1 758	792	68.9	31.1
Netherlands	1 477	1 320	157	89.4	10.6
Korea	1 446	1 341	105	92.7	7.3
Italy	1 430	1 235	195	86.4	13.6
Switzerland	872	798	74	91.5	8.5
Sweden	801	726	75	90.6	9.4
Spain	660	564	96	85.5	14.5
Mexico	577	523	54	90.6	9.4
Belgium	537	478	59	89.0	11.0
Finland	450	382	68	84.9	15.1
Norway	399	347	52	87.0	13.0
Austria	377	332	45	88.1	11.9
Hungary	375	345	30	92.0	8.0
Poland	362	338	24	93.4	6.6
New Zealand	299	239	60	79.9	20.1
Ireland	291	266	25	91.4	8.6
Denmark	268	245	23	91.4	8.6
Turkey	212	197	15	92.9	7.1
Portugal	144	117	27	81.3	18.8
Czech Republic	140	122	18	87.1	12.9
Greece	99	87	12	87.9	12.1
Luxembourg	83	79	4	95.2	4.8
Iceland	8	8	0	100.0	0.0

1. China is included due to its large share in world alliances.

Source: Thomson Financial Securities Data.

Table 7. **Regional distribution of US international alliance partners**

	(Number of deals)										
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	1990-99
Asia	623	872	823	921	1 219	1 135	526	555	455	631	7 760
Pacific	21	52	36	46	70	110	38	78	70	142	663
Western Europe	589	708	597	631	641	737	398	495	488	639	5 923
North America	89	176	178	208	238	242	148	196	207	234	1 916
Eastern Europe	116	205	94	121	125	108	52	65	46	48	980
Latin America	19	66	88	98	124	136	68	121	137	96	953
Africa	20	40	47	73	63	91	40	68	60	54	556
US total	1 428	2 051	1 822	2 029	2 399	2 473	1 231	1 523	1 408	1 787	18 151

Source: Thomson Financial Securities Data.

Table 8. **Top ten countries of US international alliance partners**

	(Number of deals)										
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	1990-99
Japan	503	703	638	584	665	447	224	231	211	254	4 460
United Kingdom	198	210	193	188	215	257	163	178	197	236	2 035
Canada	88	171	173	197	227	234	143	183	197	222	1 835
Germany	101	127	108	121	121	135	67	95	76	96	1 047
China	19	38	51	131	218	192	103	87	83	84	1 006
France	91	115	82	105	96	101	50	72	51	74	837
Australia	17	43	28	42	65	95	36	69	61	125	581
Netherlands	57	55	46	62	49	47	23	34	37	48	458
Korea	48	38	32	30	58	52	41	46	36	74	455
Italy	41	63	43	53	49	50	18	24	19	39	399
OECD	1 247	1 718	1 519	1 531	1 716	1 603	856	1 049	102	1 343	12 684

Source: Thomson Financial Securities Data.

Table 9. **Share of international alliances in US total alliances**

	(Share of deals, %)										
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	1990-99
Manufacturing	68	69.34	61.26	65.48	65.51	65.09	63.27	64.79	58.21	59.53	64.298
Marketing	54.19	50.35	48.98	51.6	50.15	47.35	46.28	45.33	39.1	44.69	49.369
R&D	43.93	43.17	37.71	37.9	36.64	40.26	38.56	39.15	40.57	51.21	40.515
Other	52.08	42.91	48.72	9.091	55.13	46.34	40.65	41.62	43.43	40.87	41.538
Total	53.85	50.64	47.57	50.22	49.48	49.42	46.3	45.85	44.77	44.7	48.341

Source: Thomson Financial Securities Data.

Table 10. Industrial distribution of US international alliances

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	1990-99
Primary	3.7	6.7	4.0	3.8	3.5	5.9	4.8	5.9	6.3	2.8	4.7
Manufacturing	62.7	55.3	46.3	50.6	51.6	49.7	47.9	47.7	33.5	27.3	47.6
Pharmaceuticals	12.5	10.3	8.0	7.5	8.2	5.4	7.8	7.4	2.8	1.1	7.1
Electronic	8.8	6.5	6.5	6.8	5.8	5.4	5.7	5.3	3.3	3.1	5.7
Chemicals	2.7	3.4	3.2	6.3	5.2	3.5	3.6	3.2	2.3	2.6	3.7
Software	8.6	6.7	4.8	4.7	6.2	8.4	8.9	9.8	7.4	6.3	7.0
Communications	3.9	3.9	2.9	5.0	4.1	3.7	3.0	3.6	2.0	1.3	3.4
Computer	7.6	6.1	3.2	3.3	3.4	2.3	2.8	2.7	1.4	1.0	3.4
Services	18.1	27.8	43.9	43.8	42.7	43.1	43.1	40.4	59.3	67.1	42.9
Trade	5.0	12.6	25.9	23.0	19.1	12.5	14.4	8.5	5.8	6.8	14.0
Financial	4.4	3.2	2.2	3.6	4.3	6.7	5.7	6.6	18.9	15.2	6.7
Other services	8.7	12.0	15.8	17.2	19.3	24.0	23.1	25.3	34.6	45.1	22.2
Other sectors	15.5	10.1	5.9	1.8	2.3	1.2	4.1	6.0	0.9	2.9	4.7
Total	100	100	100	100	100	100	100	100	100	100	100

Source: Thomson Financial Securities Data.

Table 11. Top 15 industries for strategic alliances

	(Number of deals)											
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	1990-99	
Trade	190	707	1 216	1 231	1 163	894	556	437	337	488	7 219	
Business services	154	307	450	452	496	550	365	548	926	2013	6 261	
Financial services	243	308	240	383	559	775	248	379	830	942	4 907	
Prepackaged software	371	535	338	377	588	783	416	537	323	397	4 665	
Pharmaceuticals	381	475	392	467	579	389	256	289	138	81	3 447	
Electronic & electric equipment	257	333	313	396	494	436	208	223	142	171	2 973	
Chemicals	119	213	221	427	456	317	177	166	125	172	2 393	
Communications equipment	149	234	190	296	314	263	142	166	85	86	1 925	
Transportation equipment	105	163	150	223	295	345	153	171	143	146	1 894	
Telecommunications services	50	126	94	125	218	342	151	155	210	273	1 744	
Transportation services	57	122	117	207	299	307	100	144	153	223	1 729	
Computer & office equipment	225	299	173	191	199	179	84	103	76	73	1 602	
Measuring & medical equipment	139	215	173	188	192	178	93	70	77	83	1 408	
Machinery	74	160	151	185	220	234	80	79	81	92	1 356	
Food	52	107	98	174	237	250	66	66	78	84	1 212	
Total	3 729	6 161	6 041	6 942	8 382	9 113	4 339	5 218	5 000	7 034	61 959	
Share of 15 (%)	68.8	69.9	71.4	76.7	75.3	68.5	71.3	67.7	74.5	75.7	72.2	

Source: Thomson Financial Securities Data.

Table 12. International alliances and foreign production

Firm	Alliances	International (%)	Share of foreign employment(%)	R&D intensity (%)
Ford	60	36.7	28.6	4.3
GM	138	43.5	25.7	4.5
IBM	254	35.0	52.6	7.9
Volkswagen	18	44.4	39.8	3.4
GE	131	58.0	16.7	2.4
Daimler	121	20.7	24.0	9.4
Mitsubishi	233	63.9	3.1	4.6
Nissan	53	52.8	24.0	4.5
ABB	79	74.7	93.7	8.1
Matsushita	71	70.4	42.3	5.6
Sony	56	83.9	57.7	6.1
Fiat	68	83.8	38.2	4.4
Bayer	39	76.9	53.4	6.6
Hitachi	112	58.9	24.1	6.7
Unilever	17	76.5	89.9	1.9
Philips	207	89.9	83.0	6.8
Siemens	200	88.0	42.0	10.0
Dupont	90	43.3	32.7	3.4
Hoescht	94	79.8	55.7	6.2
Rhone Poulenc	80	75.0	56.9	6.8
Ciba	68	94.1	75.1	10.6
Volvo	39	74.4	40.6	8.5
Toshiba	147	74.1	20.0	6.7
Sandoz	31	93.5	85.0	9.6
BASF	46	89.1	37.9	4.4
Dow	64	37.5	45.0	6.8
Toyota	45	51.1	16.0	5.0

Source: Narula and Hagedoorn (1999).

Table 13. Participating firms in the Symbian project

Owners of Symbian	Development partners	Semiconductor partners	Software vendors
Ericsson	Agfa Monotype	Cogent Computer Systems	Atelier
Matsushita	ANT Ltd.	NEC	CCC
Motorola	ARM Ltd.	ARM Ltd.	CIC
Nokia	DataViz, Inc.	QUALCOMM CDMA Technologies	Citrix Systems Inc.
Psion PLC	Electronic Font Foundry	SunDisk Corporation	Graham Technology
	K3	Texas Instruments Inc.	Lotus Development
	Lernout & Hauspie	Motorola SPS	Palmtop Software
	Motorola SPS		Papyrus Associates
	RSA Security		Purple Software
	STNC Ltd.		Tegic Communications
	Sun Microsystems		Widget
	Teleca		X.soft
	Time Information Services		Yellow Computing

Source: Symbian ([www.symbian.com](http://www.symbian.com)).



Table 14. **Alliances in the pharmaceuticals sectors, 3<sup>rd</sup> quarter 1999**

	<b>Pharmaceutical company</b>	<b>Partner (Biotech company)</b>	<b>Value million USD</b>
1	Hoechst Marion Roussel	Vertex Pharmaceuticals	210
2	Glaxo Wellcome	Paratek Pharmaceuticals	95
3	Schering-Plough	British Biotech plc	60
4	SmithKline Beecham	Adolor	48
5	Novartis	Myriad Partners	34
6	Schering AG	LekoSite and Illex Oncology	30
7	Zeneca Agrochemicals	Maxygen	25
8	Warner-Lambert	Ligand Pharmaceuticals	13
9	Bristol-Myers Squibb	The Liposome Company	N.A
10	Pfizer	Tripos, Inc.	N.A
11	Becton, Dickinson&Co.	Quiagen	N.A
12	Warner-Lambert	Third Wave Technologies	N.A
13	Phone Poulenc Rorer	Celera	N.A
14	Pharmacia&Upjohn	OSI Pharmaceuticals	N.A
15	Abbott Labs	Chiron	N.A

Source: Burrill & Company.

Table 15. **Bilateral alliances of Japan Airlines (JAL)**

As of June 1999

	<b>Sharing FFP</b>	<b>Code sharing (passenger flights)</b>	<b>Code sharing (cargo flights)</b>
British Airways	Y		Y
Air France	Y	Y	Y
Canadian Airlines	Y	Y	
American Airlines	Y	Y	
Cathay Pacific	Y	Y	
KLM		Y	
Swissair		Y	
Thai Airways		Y	
Vietnam Airlines		Y	
Qantas		Y	
Air NZ		Y	
Turkish Airlines		Y	
SAS			Y
Lufthansa cargo			Y
Singapore Airlines			Y
Malaysia Airlines			Y

1. FFP: Frequent Flyer Programme.

2. "Y" indicates inclusion of the arrangement in an alliance. BA shares FFP and cargo flights with JAL, for example.

Source: JAL's corporate news ([www.news.jal.co.jp](http://www.news.jal.co.jp)).