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ALLIANCE CAPITALISM AND THE INTERNATIONALISATION OF FINNISH FIRMS

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ABSTRACT: The global surge in strategic alliances has led observers to coin the concept "alliance capitalism" and suggest that they amount to a new logic of international business organisation and strategy. From the viewpoint of Finland, as a small and open economy, these developments can have far-reaching implications for the internationalisation strategies of firms, industrial renewal and competitiveness. Extant research points to a high degree of internationalisation of Finnish firms as measured by high-tech exports, international patenting and FDI. Nonetheless, little is known about the extent, nature and challenges of their alliance activities. This paper applies international business theories to give new insights into the role that alliances play in the overall internationalisation of major Finnish firms, the main motives and challenges that firms perceive in this context. It uses a new database on strategic alliances and traces the broader developments and nature of the international alliances of these Finnish firms. This is complemented with in-depth interviews of R&D managers. The results point to a rapid increase especially in the number of explorative alliances of ICT firms, and suggest that Finland participates in "alliance capitalism" mainly as an explorer rather than exploiter of technologies. The main motives for forming alliances relate to risk and cost sharing and to complementary assets. Managerial and IPR issues provide the greatest challenges. The paper concludes with a discussion on implications for innovation policy.

KEYWORDS: strategic alliances, internationalisation, Finnish firms.

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TIIVISTELMÄ: Kansainvälisten strategisten allianssien voimakkaan kasvun myötä on alettu puhumaan "allianssikapitalismista". Tällä viitataan yritysrajojen hämärtymiseen ja kansainvälisen verkostoitumisen lisääntymiseen myös yritysten strategisissa ydintoiminnoissa. Suomen kaltaisen pienen avotalouden kannalta nämä kehitystrendit tuovat uusia haasteita yritysten kansainvälistymisen, teollisuuden uudistumisen ja kilpailukyvyn näkökulmasta. Aiempi tutkimus on osoittanut, että varsinkin suomalaiset suuryritykset ovat kansainvälistyneet merkittävästi viime vuosina korkean teknologian viennin, kansainvälisen patentoinnin ja ulkomaisten suorien sijoitusten avulla. Selvästi vähemmän tiedetään kuitenkin suomalaisten suuryritysten kansainvälisen allianssitoiminnan laajuudesta, tunnuspiirteistä ja haasteista. Käsillä oleva tutkimus paneutuu näihin asioihin ja analysoi allianssitoiminnan taustamotiiveja ja haasteita kansainvälisen liiketoiminnan teorioita hyödyntäen. Tutkimuksessa nojaudutaan uuteen suomalaisten suuryritysten alliansseista koostuvaan tietokantaan sekä yritysten teknologiajohtajien haastatteluihin. Tulokset osoittavat, että suomalaisten yritysten kansainvälinen allianssitoiminta on kasvanut merkittävästi, varsinkin ICT-yritysten t&k-toiminnoissa. Yleisvaikutelma on, että Suomi osallistuu "allianssikapitalismiin" pikemmin teknologian kehittäjänä kun teknologian hyödyntäjänä. Riskien ja kustannusten jakaminen sekä allianssikumppaneiden toisiaan täydentävät osaamisalueet ovat tärkeitä taustamotiiveja; allianssitoiminnan hallinnoiminen sekä IPR-kysymykset koetaan puolestaan merkittävimmiksi haasteiksi. Lopuksi keskustellaan allianssitoiminnan vaikutuksista innovaatiopolitiikalle.

AVAINSANAT: strategiset allianssit, kansainvälistyminen, suomalaiset suuryritykset.

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1. INTRODUCTION

Barely a day goes by without announcements of strategic alliances between firms. These strategic alliances range from bilateral to multilateral and complex constellations of alliances which typically are designed to exploit, or explore further, the in-house technologies of firms in various ways. They can be defined as formal collaborative agreements between firms, which are characterised by a longer-term commitment to reach a common strategic goal. Alliances thereby complement the in-house activities of firms, and often also extend to competitors. Defined in this way alliances delimitate a subset of inter-firm collaboration that excludes 'ordinary' buyer-seller or subcontracting relationships, unilateral licensing, franchising, and buyback arrangements where the partners often have opposing goals—i.e. the seller wants to sell expensively while the buyer wants to buy cheap (Glaister and Buckley, 1996).

The documented global surge in alliances, especially since the 1980s, has led analysts and researchers to coin the concept "alliance capitalism" to capture this development (Gerlach, 1992; Dunning, 1997; Dunning and Boyd, 2003). Alliance capitalism refers to the increasing interdependence of economic entities and the partial erosion of hierarchical control over value-added activities in favour of network-based collegial entrepreneurship. Dunning (1997) suggests that alliance capitalism is an integral part of ongoing globalisation and that it is reflected in intensified interdependences between shareholders, consumers, workers, firms and governments. Cross-border alliances are often portrayed as a means of firms to internationalise their activities in response to globalisation. They can contribute to the global presence of firms while possible negative liabilities of unilateral equity-based foreign direct investments (FDI)—as the traditional means of internationalisation—can be avoided (Narula and Zanfei, 2005).

This paper takes the viewpoint of interdependencies between firms and provides insights into alliance capitalism and internationalisation from the viewpoint of cross-border alliances of Finnish firms. The case of Finland is interesting since previous analysis points to a recent rapid internationalisation of firms as measured by high-technology exports, international patenting, and FDI (see e.g. Ali-Yrkkö et al., 2004; Palmberg and Pajarinen, 2004). These measures capture the international extension and

global dispersion of their in-house activities based on a unilateral commitment. Recently, Palmberg and Pajarinen (2005) have provided first quantitative insights into the extent and fundamental determinants in the involvement of Finnish firms in international alliances. This paper elaborates further on these first insights through a more extensive and in-depth analysis of the nature and challenges of international alliance activity of major Finnish firms. The overreaching aim of the paper can be broken down into the two following questions:

1. Which role do alliances play in the overall internationalisation of major Finnish firms, and what is the extent and nature of their alliances activities?
2. Which are the main motives of these firms to enter alliances and what kind of challenges do firms face in their alliance activities?

The paper is structured as follows. Section 2 provides general interpretations of the internationalisation of firms, suggests how "alliance capitalism" is affecting firms in this respect, and discusses the main motives for alliance formation. The empirical part of this paper relies on firm-level indicators on internationalisation, and on a combined analysis of a new database of alliances and firm-level interviews. Section 3 identifies internationalisation profiles of the firm sample, and analyses the trends and main features of their international alliances. Section 4 complements the statistical analysis with firm-level interviews to provide greater insights into the characteristics, motives, and challenges of alliances. Section 5 ends the paper with a summarising discussion and provides a couple of general policy implications.

2. THEORETICAL INTERPRETATIONS OF ALLIANCE CAPITALISM

2.1. ALLIANCES AND INTERNATIONALISATION

As suggested above "alliance capitalism" can be considered as a necessary reaction to the consequences of globalisation by providing a route for the internationalisation of firms. It therefore makes sense to briefly discuss general interpretations of the internationalisation of firms and consider more specifically how cross-border alliances con-

tribute to this. A seminal reference is the OLI theory, developed by Dunning (1981, 1997) (see also Lindström (2003)). The OLI theory is an eclectic synthesis of transaction cost economics, resource-based theories of the firm, market failure and trade theory. It aspires to provide an overall framework for interpreting the rationale for multinational firms in general, and the determinants of their engagement in value-added international activities in particular. The OLI theory identifies certain fundamental dimensions in this context and suggests that a firm will internationalise its activities when the following three conditions apply (Dunning, 1997):

1. It possesses ownership-specific (O) advantages in the particular markets it serves. These O advantages usually take the form of intangible assets which are, at least for a certain period of time, under privileged possession by the firm in question. The nature of such assets might vary, but typically relate to in-house technologies which constitute the basis for the product and business orientation of firms.
2. Assuming that this first condition applies, the second condition is that the firm itself also finds it beneficial to further exploit or explore these O advantages rather than to sell them. They are called market internalization (I) advantages. They reflect either greater in-house efficiency of the firm, or a better ability to exercise monopoly power over its O advantages.
3. If both conditions above apply, the firm has to find that a foreign location can add further value to its O advantages. These advantages are called locational (L) advantages. They range from the geographical distribution of natural and created resource endowments and markets, to some combination of input prices and qualities (e.g. labour, materials/components, capital), or trade barriers, tax incentives, and institutional contexts which are shaped by industrial and innovation policies.

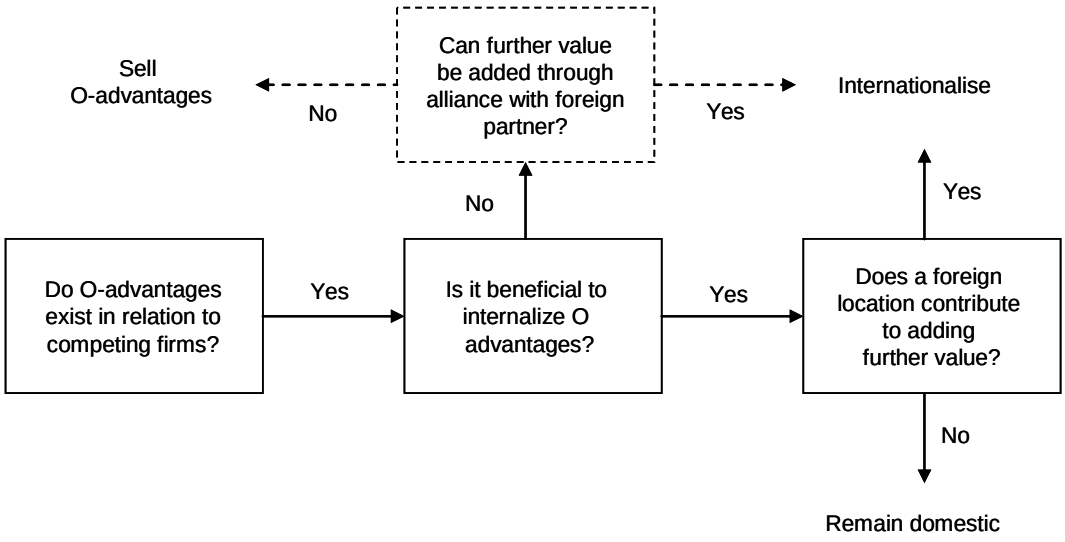
The predictions of the OLI theory are quite straightforward. At any given moment in time the greater O advantages a particular firm conceives itself of having in comparison to competing firms, the larger the incentives it has to further exploit and explore their O advantages on the markets, and the more a particular foreign location might add value to them, then the more likely this firm is to internationalise it's activities. Accordingly, the main crux of this theoretical framework is to highlight necessary (albeit not always sufficient) configurations of OLI advantages for internationalisation.

While the OLI theory is a useful overall framework in this respect, it has been criticized in the details. In the context of this paper, the primary limitation is the focus on the internationalisation of in-house activities at the neglect of internationalisation through collaborative action, e.g. through alliances.

Dunning (1997) has offered considerations of how ”alliance capitalism” affects the OLI configurations of firms and discusses how alliances contribute to their internationalisation. According to him the reasons behind the gradual emergence of ”alliance capitalism” since the 1980s are to be found in the intertwined consequences of globalisation and rapid technological change. First, products are increasingly technologically complex and systemic, as they often constitute a part of a broader product system (the ICT sector is a case in point). This raises R&D expenditures of developing new products and the related risks, while increasing the interdependencies between firms. Second, the significance of generic technologies, such as ICT, bio- and nanotechnologies, is increasing the need of firms to be present and coordinate their activities in various technological fields, some of which always will be outside the scope of their hierarchical control. Third, and perhaps most significantly, trade liberalisation and increasing competition on a global scale is shortening product life cycles and highlighting the importance for firms to monitor and be present on multiple geographical markets (Dunning, 1997; Narula and Zanfei, 2005).

As a consequence of these developments firms are, at least partly, forced to relinquish hierarchical control over their O advantages through alliances, and abandon what Dunning calls ”hierarchical capitalism”. Alliances emerge as an alternative route towards internationalisation. They offer new avenues for firms to acquire and build on their O advantages, albeit with lesser resources, liabilities and risks compared to what hierarchical capitalism would require. A theoretical distinction is also often made between vertical alliances that span the same value chain in which firms operate, and horizontal alliances that span different value chains and therefore often also involve competing firms. If this distinction is used, vertical alliance might be considered as a looser variant of internalisation even though the partners to an alliance remain formally separated (Nooteboom, 1999). For an illustration of the reappraisal of the OLI theory along these lines, see Figure 1.

Figure 1. A reappraisal of the OLI theory in the face of alliance capitalism



The reappraisal of the OLI theory leads to the insight that internalization and alliances are two alternative routes to internationalisation. However, it is not always clear how alliances can compensate for the advantages of internalization. Essentially, this is an empirical question which demands close analysis of the O advantages of specific firms. In Dunning (2003) some empirical guidance is given through introducing the concept of relational (R) advantages to capture the portfolio of alliances that firms are engaged in. These R advantages can, for example, be measured by the number of repeated alliances with the same partners, by the density of alliance networks, or through assessments of the degree of trust amongst the partners. The implications are then that the greater R advantages a firm possesses, the less likely a firm is to internalize their O advantages across national borders through FDI and vice versa.

Some additional insights might also be gained through a reassessment of L advantages of firms (compare with Dunning (1997)). In this context it would seem reasonable to assume that alliances add flexibility, and that the immobile assets of countries will not only affect the extent of internationalisation but also the way in which firms choose to approach foreign locations. Alliances enable firms to circumvent FDI, as their incentives to internalize value-added activities across borders diminish. But the opportunities for forming alliances with firms from a particular country might also increase inbound FDI due to spillovers and other types of externalities.

2.2. DETERMINANTS OF ALLIANCE FORMATION

The relevance of the OLI theory stems from its over-reaching scope in interpreting why firms internationalise their value-adding activities. It provides a framework for assessing the role of alliances in the overall internationalisation of firms. Nonetheless, it is clearly much too general to provide more detailed interpretations of why firms form alliances in specific circumstances, and what kind of challenges firms face in their alliance activities.

In the following we aim to synthesize the vast literature in the field of economics and managerial theories of the firm that discusses motives underlying alliance formation, especially in relation to exploiting or exploring the in-house technologies of firms. Our synthesis is summarized in Table 1 below in terms of five broader and partly overlapping alliance motives, including references to their theoretical counterparts. The synthesis draws on Glaister and Buckley (1996), and Hagedoorn et al. (2000).

Table 1. Strategic motives underlying alliance formation and their theoretical counterpart

Strategic motive	Theoretical counterparts
Risk sharing	TCE
Cost reduction	TT,IO
Shortening innovation/entry times	IO
Pooling complementary assets	RBV
Influencing market structure and competition	IO

Note: TCE=Transaction cost economics, TT=Trade theory, IO=Industrial organization, RBV=Resource-based view of the firm.

The *sharing of risks* is often considered one of the primary advantages of alliances over other means of internationalisation since neither partner thereby bears the full risks. Risk sharing might concern the direction and costs of R&D, the availability of component supplies during production, or market entry strategies. In these cases transaction cost economics is an important starting point (Williamson, 1985, 1999). Transaction cost economics considers how different attributes of transactions between firms relates to the way in which these transactions are optimally organized. If the transaction in question is subject to uncertainties, for example in the case of R&D, transaction costs will be higher and an alliance might be appropriate in so far as in-

house internalization is deemed unviable for various other reasons (compare with Casciaro (2003)). However, alliances can also contribute to risk sharing by enabling technological, product and/or market diversification into uncertain areas (see especially Giuri et al. (2002) and the discussion therein).

In this context *cost reductions* is usually understood in terms of product rationalization and economies of scale, although risk sharing also reduce costs (i.e. the transaction cost framework). Product rationalization enables economies of scale as a firm specializes in the development of certain technologies and a fewer number of products. Alliances can cover agreements whereby competing firms identify their comparative advantages with respect to each other and decide to coordinate production accordingly, agree on preferential access to particular foreign locations or markets, or achieve a division of labour through specializing in particular components of larger systems. These motives are typical in production-intensive industries, while cost reduction through risk sharing is more common in R&D-intensive industries. Theoretical counterparts to these types of motivations are mainly found in mainstream economic trade theories, although explicit reference to alliances seldom is made (see Caloghriou (2003)).

The motive of *shortening innovation/market entry times* finds backing in game-theoretic models of the variant where the timing of innovation or entry is emphasised (see Reinganum (1989) for a seminal contribution). Firms are modelled in the context of a technology race where the winner of this race, in terms of innovation/entry, earns a right to temporary monopolistic return. The analytical focus has been on determining the number of firms to enter the race, the aggregate R&D investment and its distribution across firms and time, as well as the effects of market power, technological advantage and uncertainty. Alliances enter the story by providing a shortcut to shorter innovation or entry times, for example through complementary assets (see discussion below) that collaborative partners can offer in terms of R&D inputs and access to foreign markets.

The importance of *complementary assets* for innovation is often taken as the main rationale for inter-firm collaboration. The exchange of complementary assets might be considered as another dimension of risk sharing, but it also underlines the strategic and bilateral nature of alliances. The discussion of complementary assets relates to the

resource-based view of the firm, originally presented by Penrose (1959) and subsequently developed by various contributions from economics and organizational sciences. Teece (1986, 1992) defines complementary assets as assets external to an innovating firm which nonetheless are important for the commercialisation of innovations. They have to be utilized in conjunction with the in-house assets of the innovation firm, and might comprise of complementary components, technologies, access to retail or after sales chains etc. In high-tech industries alliances often facilitate the mutual transfer of technologies or patents and thereby also offer a means to manage IPR issues through cross-licensing agreements between firms (Grindley and Teece, 1997).

In the industrial organization literature alliances are often implicitly interpreted as a mean for firms to *influence the structure of industries and competition* in a broader sense. The theoretical starting point here is that the alliance propensity of firms is determined by the market structures and competitive set-up, and thereby also influences these dimensions of industries. The theoretical models are also cast in a game-theoretic framework in which the decision whether to collaborate with another firm through an alliance depends on cost reduction and production/innovation output considerations from a welfare maximization viewpoint. These types of issues are analysed under various assumptions of competition, and nature of alliances (see Caloghirou et al. (2003)).

In the 'real world' these insights might explain especially why firms opt for entry into larger constellations of alliances, and thereby aspire to tilt markets and competition in their favour. The ICT industry offers a good example of the advantages that firms might achieve through alliance membership. Many alliances constellations in the ICT industry are institutionalised as standard-development forums or associations designed to promote a particular technological standard, and thereby shape the future evolution of markets and the industry at large (the Symbian alliance for developing software for smart-phones is a good example of this)(Palmberg and Martikainen, 2006). Nonetheless, standard-setting alliance constellations are also quite common in other industries.

3. INTERNATIONALISATION PROFILES AND ALLIANCES OF MAJOR FINNISH FIRMS

3.1. THE FIRM SAMPLE

The sample included in the ensuing empirical analysis consists of 24 major Finnish firms. Inclusion to the sample was based on firm size and industry affiliation. Our point of departure was the most recent ranking list of the 500 largest Finnish firms produced by the business magazine Talouselämä. We limited ourselves to the ICT, chemical, forest-related, and metals & engineering industries as the most important ones to the Finnish economy, and selected 4–5 of the largest firms in each of these industries. Further, the sample was complemented with the three largest diversified multi-industry firms in Finland which could not easily be assigned to a particular industry.

Table 2 lists the firms included in the sample along with a few basic indicators to capture their size, overall degree of internationalization by the share of foreign employees and R&D intensity. Nokia stands out in the table with the largest number of employees and size of turnover, as well as in terms of technology-orientation through the highest R&D intensity. Beyond Nokia and the forest-related firms, the size distribution levels out somewhat with a few smaller firms from each industry. By and larger the firms are relatively internationalized with a mean share of foreign employees of 55 percent, although there are some extreme cases with shares over 80 percent (Dynea, Uponor, Huhtamäki, Amer and Kone). It should be noted that the sample also contains a few firms with shared nationality due to cross-border mergers and acquisitions, such as Novo, TeliaSonera, Tietoenator, and Instrumentarium. Instrumentarium is nowadays wholly foreign-owned, although its activities largely remain in Finland. It nonetheless has a strong Finnish history and is thereby included in the analysis.

Table 2. Basic indicators of firms included in the sample (all figures are 1998–2004 averages)

Firm	Industry	Employees	Turnover, mill. euros	Foreign employees	Foreign sales	R&D intensity
Elisa	ICT	6414	1285	9%	8%	1.81%
Nokia	ICT	52353	26200	56%	98%	10.37%
Novo	ICT	2093	302	5%	11%	n/a
TeliaSonera	ICT	8466	1989	9%	3%	3.23%
TietoEnator	ICT	10265	1161	45%	54%	n/a
Dynea	Chemical	3278	1063	91%	91%	1.36%
Kemira	Chemical	10283	2538	54%	66%	1.80%
Orion	Chemical	5334	1362	16%	46%	5.80%
Raisio	Chemical	2677	793	40%	44%	2.25%
Uponor	Chemical	5919	1184	85%	87%	1.56%
Ahlström	Forest-related	8973	1953	76%	84%	1.50%
Huhtamäki	Forest-related	17479	2110	85%	96%	0.54%
Metsäliitto	Forest-related	26252	7504	60%	47%	0.39%
Stora Enso	Forest-related	42715	12143	65%	69%	0.72%
UPM-Kymmene	Forest-related	34464	9481	38%	39%	0.46%
Amer	Metals & eng.	4045	1003	86%	94%	2.16%
Hackman	Metals & eng.	2971	331	50%	51%	2.73%
Instrumentarium	Metals & eng.	4959	908	67%	87%	7.21%
KCI Konecranes	Metals & eng.	4268	679	66%	90%	1.14%
Kone	Metals & eng.	26565	3594	90%	94%	1.51%
Metso	Metals & eng.	25344	4090	59%	90%	3.24%
Outokumpu	Metals & eng.	17050	4776	62%	70%	0.86%
Rautaruukki	Metals & eng.	13133	2855	39%	47%	0.64%
Wärtsilä	Metals & eng.	12560	2532	72%	98%	3.12%

Note: n/a = not available.

As suggested previously this paper looks at alliances from the viewpoint of their exploitative or explorative role in the internationalisation of in-house technologies. With reference to the OLI theory our implicit assumption is thus that they possess technology-related O advantages which they have various incentives to exploit or explore internationally, either through internalization and FDI or through various collaborative arrangements with foreign firms, of which the focus here is on alliances.

Judging by their R&D-intensity, and common knowledge of the firms in questions, this assumption seems reasonable. Most firms have an R&D-intensity above 1

percent to classify them as medium-technology firms in commonly used technology-intensity taxonomies (see Hatzichronoglou (1997)). The main exceptions are the software developers Novo and Tietoenator which do not report their R&D. This is largely due to the specific nature of software patenting and development activities that usually do not count as R&D proper.

3.2. INTERNATIONALISATION PROFILES OF THE FIRMS

As we have seen, alliances represent one route to internationalisation among other, more traditional ones such as FDI. At the outset we thereby seek to establish the relative role that international alliances play in the overall internationalisation profile of the in-house technologies of the sample firms. One useful taxonomy towards this end is the one developed by Archibugi and Iammarino (2002), based on a set of variables that we will also use. The taxonomy makes a distinction between i) the international exploitation of nationally developed technology, ii) the global exploration of technology through innovative activity abroad, and iii) international collaboration to complement in-house technological development whether exploitatively or exploratively.

Archibugi and Iammarino (2002) propose that the share of exports and international patent applications cover the international exploitation of in-house technology of firms in so far as these indicate the degree to which in-house technological developments aim for international markets. Further, they propose that the share of patents of firms with international inventors as well as FDI indicate the extent to which a firm is engaged in the exploration of new technology and innovations abroad. The size of international inventor teams of patents and share of international alliances capture international collaboration in a reasonably extensive way. In our case these variables are gathered at the firm level and the resulting data is presented based on a principle component analysis to identify profiles through cross-correlations between the variables.[1]

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[1] Principle component analysis is a multivariate method for reducing cross-correlations in a dataset (see Hair et al., (1992) for more). It divides the dataset into so-called principal components, each of which summarizes the correlations between variables as their linear combination. The variables receive a loading under each principle component to indicate their relevance under the component. As a rule of thumb, loading over 0.3 are considered as noteworthy. An important feature of the principle components is that they are orthogonal, or uncorrelated, with each other.

The analysis produces three relatively clear so-called principle components which account for 74 percent of the cross-correlation between the variables to capture the taxonomy by Archibugi and Iammarino (2002). The results are presented in Table 3.

Table 3. Principal component analysis: internationalisation profiles of large Finnish firms

Taxonomy	Variable	Multiple sources	Export-oriented	Alliance-based
International exploitation	Share of foreign patents	**0.5298**	0.1828	0.0281
	Share of exports	0.2042	**0.7508**	-0.0542
Global exploration	Share of patents abroad	**0.4962**	-0.2727	-0.077
	Share of foreign M&A	**0.3631**	0.1199	**-0.6815**
International collaboration	Share of int. alliances	**0.3292**	0.2096	**0.7177**
	Share of foreign inventors	**0.4374**	**-0.5198**	0.1043
Cumulative explanation		38%	57%	74%

We label the first component 'Multiple sources'. It captures firms which are involved in internationalisation of technology on a broad front, and essentially covers all three routes of internationalisation included in the taxonomy by Archibugi and Immarino (2002). This first component receives the highest scores for patent-related indicators. Firms with this profile are characterised by a high share of patents applied for abroad. They also explore new technologies through their foreign affiliations as indicated by the high share of inventors with foreign addresses in their patent portfolios. Further, they are engaged in international collaboration as indicated by the large average size of their foreign inventor teams. In this profile international alliances are also significant. Nonetheless, alliances do not appear to play a very pronounced role when compared with the other internationalisation routes.

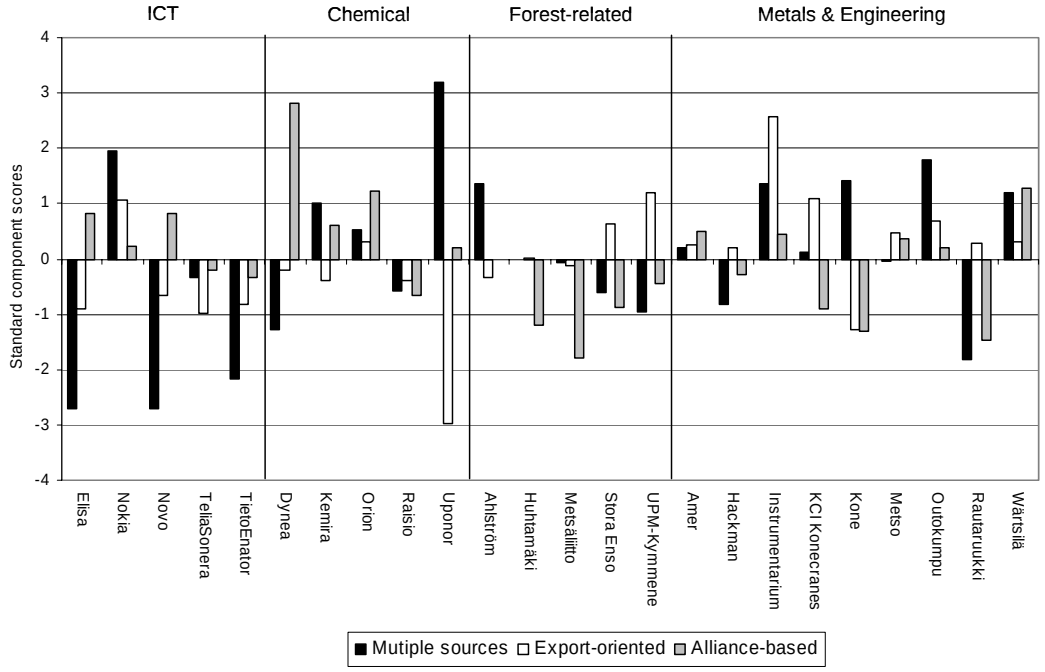
We label the second component 'Export-oriented' internationalisation. It has a markedly different structure when compared with the first one, and reflects a profile where firms mainly internationalise through exporting their in-house technology abroad from their national base in Finland. The other variables do not load significantly under this component, although international alliances appear to play a somewhat greater role than international patenting and acquisition of foreign firms. This component thereby captures firms which mainly engage in exploitation of their technology-related O advantages through exports as a very traditional internationalisation

route. We label the third component 'Alliance-based' internationalisation. It also has a distinct structure through the high loading for the variable on the share of international alliances. Judged by the high but negative loading for the share of foreign acquisitions it seems that foreign acquisitions and alliances have a diametrically different role in these types of firms and industries. The other variables do not contribute to this profile in any noteworthy way.

The identified internationalisation profiles can be given further content by investigating how they are distributed across the firms and their industrial affiliations. In a principal component analysis this can be achieved through calculating the so-called standardised component scores for each firm in the sample to indicate how it positions itself in terms of the three principle components identified above. Since the scores have an overall mean of 0 and standard deviation of 1 they should be interpreted as deviations from the average standardised internationalisation profile of the firms (Figure 2).

The distribution of the components across firms and industries suggests a relatively clear pattern. The ICT industry stands out with high scores for the 'Alliance-based' internationalisation profile. As can be seen from the figure, this is largely due to Elisa, Novo, and Nokia. Nonetheless, Nokia has also internationalised through other routes when compared with the other ICT firms and scores high in terms of the 'Multiple sources' and 'Export-oriented' profile. In general, the result concerning the ICT firms is compatible with the nature of this industry. Due to rapid technological change, standardisation and the systemic nature of innovation, alliances become important (Palmberg and Martikainen, 2006). The negative loading on all components for TeliaSonera and TietoEnator is mainly due to a measurement problem as these firms do not patent abroad and hence are not appropriately captured by our variables.

Figure 2. The distribution of internationalisation profiles across firms and industries



The 'Alliance-based' profile is also prevalent in the chemicals industry, although the 'Multiple sources' profile stands out significantly more due to the specific profile of Kemira and Uponor. It thus seems that the internationalisation of firms in this industry occurs on a broader front. When the profiles for the ICT and chemicals industries are compared with the forest-related and metal & engineering industries, some broader differences emerge. International alliances appear to be relatively less prevalent in these latter, more traditional, industries as suggested by a relatively larger share of firms with negative component scores for the 'Alliance-based' profile. The forest-related and metals & engineering industries are characterised by a combination of Multiple routes' and the 'Export-oriented' internationalisation profiles. This result is compatible with extant research that points to a greater role of alliances in R&D-intensive industries (Hagedoorn, 2002).

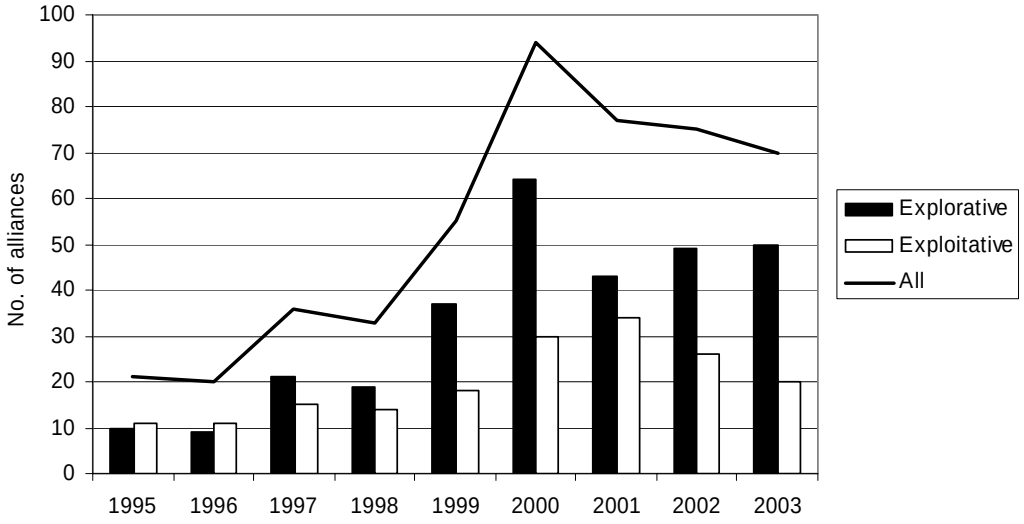
3.3. TRENDS AND CHARACTERISTICS OF ALLIANCES

We now move over to analysing in greater detail the trends and characteristics of the international alliances of the sample firms as a quantitative backdrop for qualitative interpretations based on the interviews. The data on alliances was collected through sys-

tematic reviews of the press reports of these firms, complemented with a review of relevant articles in the largest Finnish business newspaper during 1995–2004. The data contains information on the partners and characteristics to the alliances (see appendix 1 for further details of the SAFIF database).

The first viewpoint here is the development in the total number of newly formed international alliances, and by main types in terms of whether they are explorative or exploitative in nature. We define an explorative alliance as one which contains an R&D component as it involves the joint development of new technologies with the purpose of commercialisation through innovation. Explorative alliances can thereby be of the R&D type only, or various combinations of R&D, production and/or marketing. In contrast, exploitative alliances cover those alliances which do not contain an R&D component. They thereby assumedly mainly aim to exploit the technology-related O advantages of firms through joint production or marketing efforts.

Figure 3. The number of newly formed international alliances 1995–2003



Judged by the number of newly formed alliances there has been a steady increase in international alliance activity over time, reaching a peak in 2000 with over 90 new alliances (Figure 3). After this peak there is a relative decline which appears to level out to around 70 alliances per year. These figures sum to a total of 481 alliances. Upon breakdown by type of alliances, it becomes clear that this foremost is due to the drop in the number of exploitative alliances, while the number of newly formed explorative al-

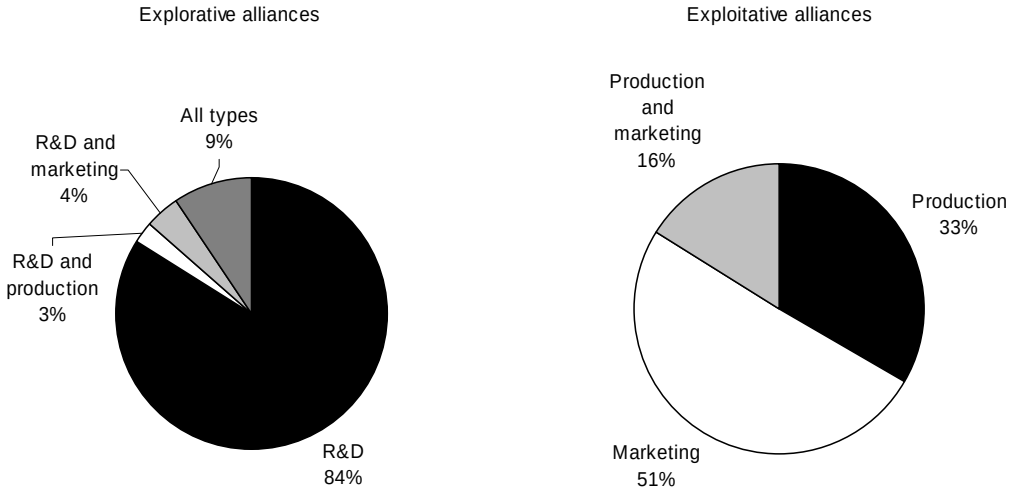
liances remains at a level of around 50 per year. It thus seems that the firms increasingly favour explorative over exploitative alliances as time goes by. This trend is compatible with the overall rise in R&D intensity in Finnish industries.

When looking at the distribution of alliances across the sample firms, the dominance of Nokia is also quite evident. According to our data Nokia has been involved in 230 (48% of the grand total) international alliances. The remaining ICT firms have been involved in around 30–40 alliances on average during this time period, followed by the rest of the firms with 8 alliances on average. The ICT firms are also those characterised by the most rapid increase in the number of new alliances over time, which largely explains the total figures. The majority of the alliances of the ICT firms are of the explorative type, while the share of exploitative alliances is relatively much higher especially in the more traditional chemicals and forest-related industries. By the face of, the entry of Finland into alliance capitalism is thus primarily explainable by the increasing alliance-intensity of major ICT firms in Finland, and by exploration of their technology-related O advantages (compare with Palmberg and Pajarinen (2005)).

The content of exploitative and explorative alliances can be examined in some greater detail through their classification into R&D, production, and marketing alliances, or some combination of these types of activities (Figure 4). Judged by this distribution, explorative alliances mainly comprise of R&D alliances. These R&D alliances range from equity-based R&D joint ventures to looser types of non-equity based R&D pacts, to joint development and cross-licensing agreements. The remaining share is distributed across a mixture of R&D, production and/or marketing alliances with the highest share comprising of all these components. Again, these observations hold true especially for the ICT firms.

In the case of exploitative alliances, the distribution across alliances types is more even. A slight majority of all these alliances are of the marketing type, followed by production alliances. Nonetheless, alliances which cover both production and marketing are also relatively numerous, with a percentage share similar to combinative alliances of the explorative type. These results indicate that a noteworthy share of all alliances combine R&D, production and marketing activities in various forms.

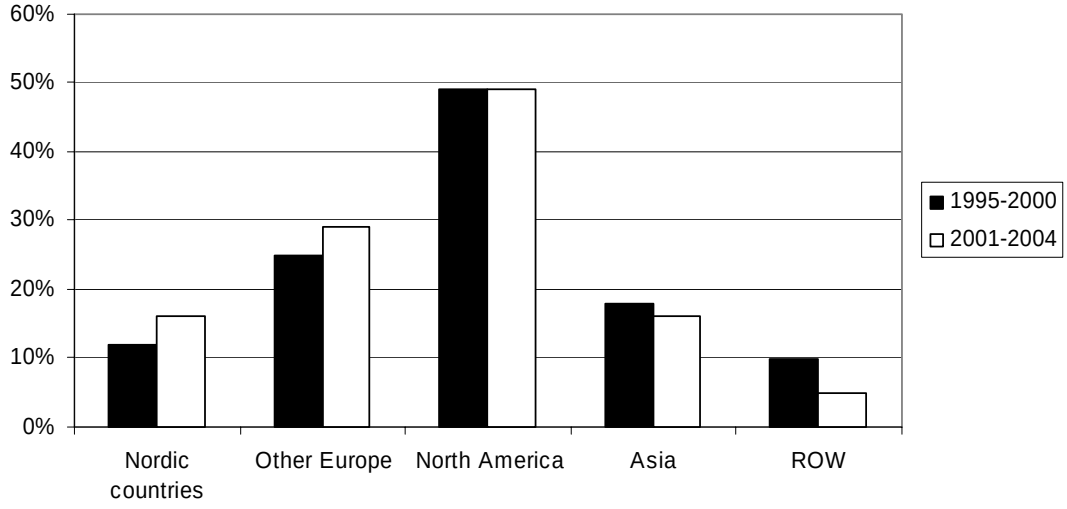
Figure 4. The distribution of alliances by type



3.4. THE DISTRIBUTION OF ALLIANCES BY PARTNER CHARACTERISTICS

As suggested by the OLI theory there are grounds to assume that locational (L) advantages in terms of the country of origin of the partners, also affect the alliance activities of firms. Certain locations host advanced firms due to various favourable combinations of input prices, trade barriers, tax incentives or other institutional context related to the industrial and innovation policies of specific countries. Hence, just as such L advantages will affect the decision of firms to internalize their O advantages through FDI, it is conceivable that they will also affect the cross-border alliance activities of firms. Although our data does not allow for a detailed analysis of such L advantages, we can use the country affiliation of the foreign partners to highlight the changing geographical distribution of the alliances over time. We do this be dividing countries into five main regions, namely the 'Nordic countries', 'Other Europe', 'North America', 'Asia' and 'Rest of the world (ROW)'.

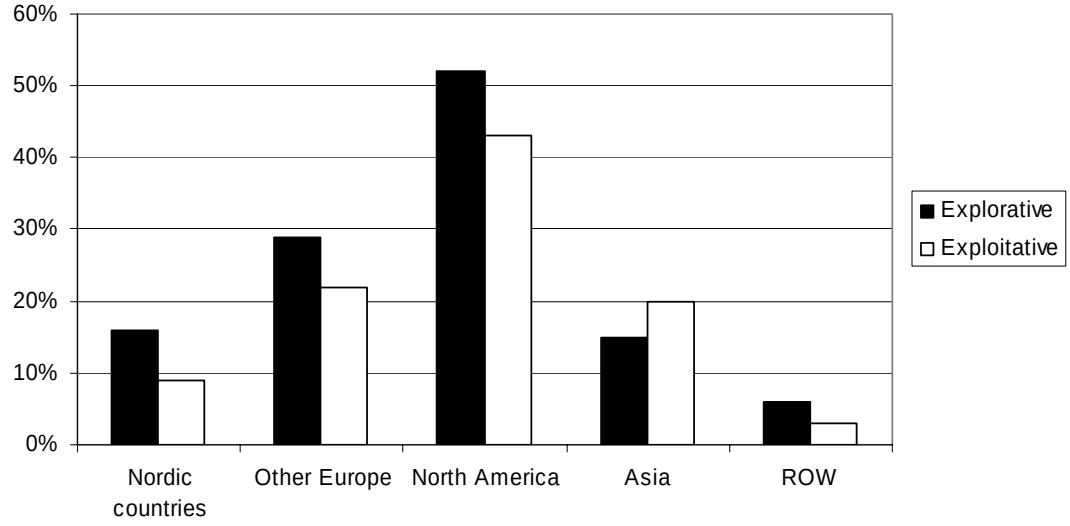
Figure 5. Geographical distribution of alliances by country affiliation of partners



From the distribution it is clear that North American partners are the most frequent ones, and mainly firms with a US affiliation (Figure 5). US firms are seconded by firms from Europe, as well as Asian firms. Again the case of Nokia drives the results due to its intense involvement in alliances especially with US firms. If Nokia is left out, the share of firms from the Nordic countries and other European countries increases relative to that of North American firms. In other respects the distribution remains relatively similar.

Over time only slight shifts can be noticed. The share of North American firms remains unchanged, while a slight increase in the share of firms from the Nordic and other European countries is visible. The share of Asian firms drops somewhat in the 2000s, although this trend is the opposite in the case of the Finnish ICT firms. By and large, the geographical distribution of alliances is compatible with the direction of exports and FDI of Finnish firms with the exception that the share of North American and Asian partners is larger here when compared especially with FDI (Bank of Finland, 2003; Suhdanne, 2005). Hence, it seems that different kind of L advantages matter in the case of alliance activities when compared with traditional routes to internationalisation.

Figure 6. Geographical distribution of alliances by type and country affiliation of partners



The geographical distribution of alliances by country affiliate of partners does not change to any greater extent when the figures are broken down by the type of alliances, even when the case of Nokia and the other ICT firms is accounted for (Figure 6). In the case of explorative alliances the dominance of North American (mainly US) partners is again quite clear, followed by European and Nordic partners. Further, over time only marginal shifts are evident, although with the similarly specific pattern for ICT firms which extend their alliance activities towards Asian firms.

In the case of exploitative alliances the dominance of North American partners persists, followed by Nordic and other European partners. However, the geographical shifts over time are more marked when compared with explorative alliances. Our sample firms increasingly appear to become engaged in European alliances in their exploitative activities, while the share of such alliances with North American and Asian firms, and ROW, appears to decline quite rapidly. This is an interesting result since it seems to contradict the prevailing trend of out-locating manufacturing to low-cost Asian countries through FDI. Hence, it also seems that different types of L advantages come to play in exploitative alliances when compared with explorative alliances.

4. TRENDS, MOTIVES AND CHALLENGES IN ALLIANCE FORMATION

4.1. A BRIEF NOTE ON THE METHODOLOGY

The interviews covered 15 firms, of which 10 also are included in the SAFIF database of alliances. They should thereby provide a relatively representative qualitative interpretation of the broader trends and characteristics of alliances that we analysed in the previous section. The interviews were semi-structured based on a predefined framework which sought to capture the overall organisation and internationalisation of R&D of the firms. Special focus was given to the role of mergers, acquisitions and alliances in the exploitation and exploration of technology-related O advantages of the firms. The interviews lasted around one and a half hour on average. They were all recorded and transcribed to enable in-depth analysis.

The interviews were conducted in various constellations of three researchers, thus enabling ex-post researcher triangulation. The questions related to the alliance activities of the firms focused on the issues discussed above, i.e. on the recent surge and pervasiveness of alliances in the overall internationalisation of firms, on various motives that firms allude to in alliance formation, as well as on the major challenges that firms face during their alliance activity. The quantitative analysis of the broader trends and characteristics of the alliances thereby guided the design and interpretation of the interviews, and vice versa, to achieve complementary functionality between the methodologies (for a further discussion of multi-method research see Tashakkori and Teddlie (1998)). We have also chosen to use citations from the interviews to back-up our interpretations. These citations are presented anonymously throughout the ensuing text to retain the confidentiality of the interviewees.

Since the interviewees primarily were persons in charge of R&D or technology developments, either at the corporate or divisional level. Therefore there might be a partial bias in their interpretations of alliances against non-R&D related issues that nonetheless might be important, especially in the case of exploitative alliances which have a stronger focus on developments in the downstream markets (see appendix 2 for a list of the interviewees). Sometimes it was apparent that the interviewees could not reveal sufficient details about the nature and challenges of the alliance activities due to

non-disclosure agreements that they have with their partners. This might also introduce a partial bias in their interpretations of highly explorative alliances which often fall into the non-disclosure category. By and large we nonetheless feel that the interview data provides a valid picture of the alliance activity of the firms.

4.2. INTERPRETATIONS OF THE SURGE IN INTERNATIONAL ALLIANCES

The recent surge in the alliance activity of firms that is evident in the quantitative analysis of this paper is also clearly acknowledged by an overwhelmingly majority of the interviewees. Alliances have become a natural part of the R&D and business strategies of the firms that we covered. Generally speaking, firms engage in alliances as a necessary response to globalisation and rapid technological change. Strategic alliances represent a new mode of internationalisation in this context, which appears to complement rather than displace FDI. The interview results are thereby broadly in line with the discussion in Dunning (1997) on the erosion of hierarchical capitalism, although some scepticism can be raised against the idea that a 'new' mode of alliance capitalism is replacing the 'old' mode of hierarchical capitalism. The firms covered here do still value hierarchical control highly, especially concerning their most distinct O advantages.

The explorative component of a majority of the alliances is also clear from the interviews. Nonetheless, it makes sense to distinguish between vertical and horizontal alliances in a more detailed analysis of the nature of explorative activities that the firms engage through alliances. Vertical alliances cover collaboration between upstream suppliers of raw-materials, services, or components and downstream customers along a relatively clearly defined value chain. The general impression is that firms involved in these types of alliances are more prone to truly share their O advantages for the development of new technologies or innovations and thus engage in exploration proper. Typically these vertical alliances are organised as joint development agreements or research joint ventures. They appear to be relatively more common between firms in engineering and the traditional industries. Concrete examples include alliances between pulp & paper conglomerates and papermaking machinery providers, or between ICT process software providers and manufacturing firms.

"…in the case of the commercialisation of specific technologies, we have many examples of cases in which we collaborate with equipment suppliers on a regular basis…they are based on common goals in R&D projects…" (Firm A)

"…very close collaboration with key customers related to specific deliveries, but also to R&D…especially in areas where there are only a few customers…"(Firm A)

"…we call them 'solution-partnerships'. They cover system integration services, state-of-the art technologies, and very demanding applications. This type of activity is very knowledge-intensive" (Firm B)

"…vertical alliances increase in importance over time…i.e. collaboration with firms, customers, suppliers, raw-material providers, machinery producers etc….they typically have joint projects…" (Firm C)

Horizontal alliances cover collaboration that span different value chains and hence often comprise of competing firms. In horizontal alliances the explorative element comes through the creative combination of existing technologies, or O advantages, rather than the joint development of new ones. These creative combinations are sometimes a necessity, especially in the ICT and related industries where the interoperability of components, products and systems is important. They often involve cross-licensing agreements between firms, whereby firms exchange the rights to use each others technologies in the definition and development of common interfaces between products. Horizontal alliances of this kind are thereby also often related to standardisation, which is a primary feature of the ICT industry. Sometimes these types of alliances might amount to quite complex constellations, or pacts, of inter-firm collaboration which become institutionalised into dedicated forums. One example of such a forum is the 3GPP, which is set up to facilitate the development of third generation wireless telecommunications standards. Nonetheless, cross-licensing and standard setting is also relatively common in other types of industries, for example in cases where firms have to comply with various construction or environmental norms and regulations.

"…we certainly do not make everything ourselves. With competitors…we have out-licensed [technologies] *to competitors in cases were we have deemed it viable and outside Europe we have done it quite often…we have also engaged in pre-competitive R&D with competitors e.g. related to performance measurements of various competing material…"* (Firm D)

"…[the alliance] *typically have a duration of 2-3 years, indeed through these cross-licensing agreements we operate in quite large alliance networks in which it is also possible to do things together in a deeper sense when viable…"* (Firm D)

"…we perceive an alliance as an arrangement which truly contributes to the development of new technologies on a longer term basis, an arrangement that has significant goals. What we have might rather be described as collaborative consortia which finance R&D in certain fields. Sometimes these consortia might lead to an alliance with the aim of commercializing a breakthrough technology". (Firm A)

"…standards imply that we collaborate with competitors throughout alliances…these are long-term issues. Yes, we are involved in many such alliances. Then, in cases when we develop new products, these are other types of arrangements. In these cases there are alternatives, sometimes we give the suppliers greater degrees of freedom…" (Firm E)

The data is not conclusive on whether vertical or horizontal alliances account for the largest increase in the number of alliances of the firms included in the analysis. Nonetheless, given the large share of newly found alliances by firms in the ICT industry an insightful estimate is that horizontal alliances have become the dominating type in recent years. This is a direct consequence of the rapid development and growth of Nokia since the mid 1990s, and the specialisation of Finland in ICT-related technologies. The dominance of explorative alliances also suggest that large Finnish firms foremost participate in alliance capitalism as technology suppliers rather than technology users, or exploiters, and that this trend is strengthening over time. Having said this, it should also be noted that many alliances comprise of various elements related not only to explorative R&D, but also to production and marketing. These variegated features of alliances are difficult to identify especially in the statistical analysis.

4.3. MOTIVES IN ALLIANCE FORMATION

The motives in alliance formation that the interviewees raised are in line with those identified in Table 1 in the conceptual discussion. The interviews thereby essentially confirm insights from previous research, as well as the related theoretical frameworks available for interpreting the reasons for why firms engaged in alliances. Nonetheless, the interviews also show that there typically are multiple motives behind the formation

of alliances, and that the motives might vary quite a lot depending on the strategic orientation and industry of the firm in question. We can therefore not pinpoint any particular motives as more important than others. But on a general level we can identify a certain hierarchical ordering in their relevance as firms contemplate on their R&D and internationalisation strategies.

Following up on this hierarchical ordering, we noticed that all interviewees highlighted strategic alliances as a means to reduce or *share risks* in one way or the other. This is compatible with insights into the fundamental drivers of "alliance capitalism", the intertwined consequences of globalisation and rapid technological change. Alliances offer a flexible means for firms to enter new technologies and markets without excessive unilateral liabilities that arise e.g. through FDI. This appears to be especially pronounced in explorative alliances in which firms engage in R&D activities where the outcomes are highly uncertain (see also Palmberg and Pajarinen (2005). Some interviewees also suggested that alliances reduce the risks of organic growth of the firm since they facilitate partial diversification into new technology and business fields.

> *"…the world is moving in a direction…whereby all significant technological developments are so risky and expensive that the trend is towards…the sharing of risks…i.e. firms engage in alliances and develop these things together"*(Firm F)
>
> *"…these* [alliances] *contribute to the organic growth of the firm, the equipment and tools for growth. Growth in collaboration with our customers…"* (Firm B)"
>
> *"…R&D is risky business, it's a risky investment to acquire a firm…ownership is not the most important thing, but rather to get things under way…we can source technologies and other things also through alliances…"*(Firm G)

Apart from risk sharing as a general motive, various combinations of lower-level motives were highlighted. *Cost reduction* motives often go hand in hand with the aspiration of firms to *shorten innovation and/or entry times* to new markets in a competitive environment. In increasingly competitive and fast-paced markets the speed at which firms develop and commercialize technologies becomes an important prerequisite for success (Palmberg, 2006). If the firms manage to speed up the development times of new technologies and innovations they also often have better possibilities to reduce the costs of R&D. Foreign alliance partners can provide easer access to new markets, e.g.

by sharing a brand name known to local markets or by providing access to an established retail network, and thereby make excessive FDI unnecessary.

> *"..it is a big conglomerate, and naturally our competitors, but as I suggested…if we want to be on the Japanese markets we also have to collaborate with this firm…*(Firm G)
>
> *"…*[through the alliance] *the technology was transferred to our firm…otherwise the development of such technology, and the first customer reference, would have taken from 4 to 5 years and would have cost us tens of millions of Euros…it was a clear strategic move…"* (Firm G)
>
> *"…it is in the interest of both firms to be able to apply both of our results quickly, to get the quickly to the market…"* (Firm I)

As suggested earlier, cost reduction can also imply that the partners to an alliance agree on a certain division of labour along their areas of specialisation to avoid duplication of R&D, production and marketing. This brings us to the issue of *complementary assets* needed during innovation that many of the interviewees regarded as an important motive. Again it makes sense to distinguish between vertical and horizontal alliances in a more detailed analysis of the role played by complementary assets. Further, their role varies by characteristics of the broader technological and industrial contexts (see also Teece (1986)).

In vertical alliances, which often are associated with a stronger element of exploration proper, complementary assets arise due to the different positioning of firms in the same value chains. In these cases the firms typically appear to form alliances to access the R&D, production or marketing assets that they do not possess. Alliances thereby enable the firms to extend their activities across various parts of the value chain on an international basis without the liabilities associated with FDI. Some of the interviewees acknowledged that lack of knowledge of foreign markets or a strong global brand is a typical problem for Finnish firms, especially in consumer markets, even though they might be strong in technology-related O advantages. This observation supports further the impression that Finnish firms participate in "alliance capitalism" mainly as explorers rather than exploiters of technologies.

"…these [alliances] *explicitly cater to our marketing and branding needs, because from here there are no possibilities to enter European markets. There is not enough money, there are no possibilities…"* (Firm H)

"…it [alliance activity] *is increasing in the sense that we do more and more collaboration with firms which already have control over the markets in Europe…through this they understand the functionality of our technologies at an earlier stage, and can commercialise them more rapidly."* (Firm J)

"…we of course have very close collaboration with a few selected raw-material suppliers…might they be defined as alliances…but anyway our R&D requires deep collaboration in that direction" (Firm D)

"..it's a kind of a concept, we have developed the equipment, but there is also a related service concept…they operate the services and bill their customers, and deliver the personalized service through our equipment…" (Firm K)

In contrast, in horizontal alliances complementary assets arise through the different technological specialisation of the partner firms. They typically relate to the cross-licensing of technologies which are necessary for firms to gain access to for the sake of interoperability of products. Complementary assets enable firms to creatively combine existing technologies throughout alliances, and this appears to be an especially important motive for firms in the ICT and related industries. In these industries firms have better possibilities to protect their technologies through patents, and these patents themselves often constitute the complementary assets that firms trade amongst each other through cross-licensing.

"…we offer many such solutions…in which the technologies of a foreign firm are embedded. It's very common. If the customer wants 'turn-key deliveries', then there usually is foreign hardware and platforms included…" (Firm B)

"…the core technology comes from us…and firm X, in turn, supplies a lot of knowledge related to production, and there is also specific technologies that they of tradition are particularly good at…" (Firm L)

"…both have their own technologies…or lets say that we might have a core component and they might have some other technological competence, and then we take a look at how they might be combined…in these cases we take advantage of the R&D of both firms and respective countries as well…" (Firm H)

"…this issue of interoperability raises it's head all the time. It drives us into these alliances." (Firm E)

With the risk of over-generalizing it seems that the interviewees at least not explicitly recognised *influencing market structures and competition* as an important motive behind alliance formation in specific cases. However, there were discussions on the disadvantages of alliances from this perspective. Some firms expressed their concern

that long-term alliances with a few customers might distort competition and limit their opportunities to enter new markets. Further, some recognised a trend towards competition between larger constellations of alliances, whereby the O advantages of specific firms will matter less in the future. In this sense one might raise concern that "alliance capitalism" is having adverse effects on market competition. This has indeed been an issues much discussed and analysed especially in the industrial organization literature. However, with the exception of ICT firms, it seems that the Finnish firms that we have covered here do not perceive themselves as having a major influence on market structure and competitive constellations through their alliance activity.

4.4. CHALLENGES RELATED TO ALLIANCES

The principal component analysis of the internationalisation profiles of the firms revealed that alliances indeed constitute an important dimension of all three profiles that we identified. From previous research, and the recent rapid growth in their numbers over time, we also know that alliances represent a new dimension of internationalisation from a Finnish viewpoint (Palmberg and Pajarinen, 2005). The interviews with the R&D managers of firms clearly acknowledged these observations and could indeed identify a range of new challenges that emerge in this context. The most general of these challenges related to the *management of alliance portfolios* once firms start to accumulate multiple alliances with various firms in the same or different industries.

"…just the other day I sketched an alliance network map to actually find out with whom we work together…I have this feeling that a lot of time goes into merely managing these networks, and there are very may firms and research organisations involved…" (Firm K)

"…two completely different worlds collide [throughout our alliance networks], *i.e. our traditional customers and new competencies which are new to the industry, and there is the probability that new alliances emerge which are a threat in the sense that a new player might enter this business…"* (Firm L)

"…participation in alliance networks require more effort on managerial issues…its important to be aware of why this [a particular alliance] *is necessary, what we can get out of it, and whether the interests of both partners truly converge…"* (Firm D)

"We have one person in charge of each alliance. But our corporate management team is also quite aware of the alliances that we take part in and might intervene in the details if necessary. We have special meetings to deal with these issues" (Firm E)

"…management is sometimes very tricky…in one alliance we are head to head competitors, while in another we collaborate full-out…it is a very complex and dispersed activity…" (Firm F)

As has been suggested ”alliance capitalism” implies that hierarchical control over value-added activities is yielding to network-based collegial entrepreneurship that can give rise to quite complex and multidimensional constellations of inter-firm collaborative agreements across value chains and national borders. It is quite understandable that firms face various challenges in coordinating their multiple collaborative activities in alignment with their individualistic strategic and business goals. The interviewees highlighted the importance of keeping track of all collaborative obligations and opportunities, a task that might be especially challenging in rapidly changing industries. This monitoring is important in order to mitigate unintended knowledge spillovers to third parties as well as to avoid hostile entry into their own markets through back doors. Alliance portfolio management practices also differ quite significantly across the sample depending on the extent of their involvement in alliances. Some firms have centralised their management on an ongoing basis. Others bring up the issue sporadically, especially if they are involved in a fewer number of longer-term alliances.

The choice of alliance partner is also a tricky task. On the one hand firms must signal their complementary assets in order to attract the most viable partners. On the other hand, they must avoid to become engaged in an alliance that is characterised by strong asymmetries with respect to the market power, IPR claims or strategic positioning of the foreign partner which often is the bigger one. This implies that the viability of each alliance agreement has to be carefully analysed in terms of the positioning in value chains and networks, a consideration that is challenging especially in the field of ICT where technologies and markets are converging. Trust is often a key issue in decision making, and quite often alliances are formed based on close personal ties between firms. Many interviewees mentioned cultural barriers as the main reason for the failure of alliances.

"You cannot enter technology alliances if you do not have some specific assets and competencies, you have to be an attractive partner, if you do not know anything you will not gain anything…" (Firm F)

"The motivations [behind the alliances] *are very diverse, somebody offers you something that is already developed…other sketch their ideas in the corner of a tablecloth…here I give you a good idea. Sometimes they do not even reveal their idea…the diversity is huge."* (Firm K)

"Everybody engages with everybody…it's a wild situation" (Firm F)

"Personal ties, they are very important. Trust, that is very important in international activities in general, the world is huge… you have to know the right people." (Firm E)

"It would be very hard to imagine an [alliance] agreement…at least in the longer term…with a firm within which we do not have a trustful relationship"(Firm D)

"Well…cultural issues and personal issues are often the trickiest, not the technology itself…we know how to deal with the technology-side of things in both firms…in the end it failed because of these cultural barriers" (Firm L)

The most concrete issue that the interviewees highlighted was the challenges related to sharing intellectual property rights (IPRs) and they were of the opinion that these challenges are increasing over time. Almost everyone suggested that IPR issues over technologies were the most demanding ones during alliance negotiations, and that these issues tended to dominate in vertical explorative alliances where two or more firms have to settle how the commercial rights to a jointly developed technology should be divided. The problems are compounded in situations where the foreign partner firm is the dominating one in terms of market power, which give leverage to its negotiation position as the alliance is formed. Such positional asymmetries imply that the Finnish firms that we covered presently are putting a lot of effort into strengthening their IPR and management capabilities.

"Yes, and they [IPR issues] are, in fact, the most difficult part of the negotiations, that is how the results of the alliance are to be appropriated…those IPR issues as a general trend are increasing in importance all the time."(Firm D)

"When innovating together, then we come to questions about who own what…IPR issues are important and their importance are, in a way, increasing quite significantly over time. In discussions with our legal department…they clearly indicate that these things are becoming even more demanding as time goes by." (Firm M)

" The situation is relatively straightforward if the partner firm is from another industry, whereby they normally do not have anything against selling or buying IPRs through licensing."(Firm D)

"[These positional asymmetries imply that] *the best possible partner is number 2 or 3 in the field, not the most dominating one…"* (Firm H)

"Yes, IPR issue always arise. In the case of larger competitors we rely on cross-licensing. We do not have to deal too much with IPR issues in those cases. But in certain other technological choices IPR issues become very significant, easy cases are those where firms from the same industry collaborate." (Firm E)

In horizontal alliances IPR issues are also important but offer less challenges, and they tend to be settled through relatively clear-cut cross-licensing agreements. These agreements concern the exchange of already enforced IPR on a mutually beneficial basis. Again a typical example is the ICT industry in which firms often trade patents in order to promote the development of a standard and secure interoperability between products.

5. A SUMMARISING DISCUSSION

5.1. ALLIANCES INCREASINGLY IMPORTANT FOR INTERNATIONALISATION

This paper applies international business theories of the firm to give new insights into the role that alliances play in the overall internationalisation of the in-house technologies of major Finnish firms, and the main motives and challenges that firms see in this context. We use a new database on strategic alliances and apply multivariate and descriptive statistics to trace the broader developments and nature of international alliances, complemented with in-depth interviews of R&D managers. The paper thereby relies on methodologies common to a multi-method research approach, and seeks validation from ex-post researcher triangulation and functional complementarities between different methodologies.

International business theory, developed especially by Dunning (1981), suggests that the documented surge in international alliances mounts to a new mode of ”alliance capitalism” that is replacing traditional modes of capitalism in which firms mainly strive to retain hierarchical control over their cross-border activities through internalization. This paper shows that also Finnish firms to an increasing extent engage in international alliances, especially since the late 1990s. Nonetheless, alliances merely offer one complementary route towards internationalisation along many others. The role of alliances appear to be especially pronounced in the ‘high-tech’ ICT and chemicals industries, while being lesser in the more traditional metals & engineering and forest-based industries. Hence, the entry of Finland into ”alliance capitalism” is primarily explainable by the increasing alliance intensity of major ICT firms in Finland, amongst which Nokia stands out with the largest number of international alliances by far.

We make a distinction between explorative alliances with an R&D component, and exploitative alliances which comprise of production and marketing elements. The underlying assumption is that all of these types relate to the in-house technologies of firms (their O advantages to refer to the OLI theory) albeit in different ways. By this distinction it is clear that firms increasingly seem to favour explorative over exploitative alliances as time goes by, especially due to the strategies of ICT firms. A major share of these alliances cover R&D activities, and they range from R&D joint ventures and joint development agreements to cross-licensing schemes. The share of exploitative alliances is relatively much higher in the more traditional industries, and these alliances are equally distributed across production and marketing activities. More generally, these trends and other results also suggest that Finland participates in "alliance capitalism" mainly as an explorer rather than exploiter of technologies.

The quantitative data on alliances is also analysed in terms of the geographical distribution of the foreign partners to the alliance. North American partners appear as the most frequent ones, seconded by European and Asian partners. Over time we can see increase in the importance of Nordic and other European partners while the share of North American firms as partners remains stable. When these results are compared to the geographical distribution of exports and FDI, the importance of Asia is noteworthy. This holds true especially in exploitative alliances where there is an increase in the share of Asian partners, set against a corresponding decline in the share of partners from other regions of the world. These results suggest that in so far as locational (L) advantages of the origin of partners of alliances matter in alliance formation, these appear to be of different in nature when compared especially with FDI. Further, the significance of Asian partners underlines identified trends of globalisation from a Finnish viewpoint (see e.g. Valtioneuvosto, 2004).

5.2. MOTIVES AND CHALLENGES DEPEND ON THE NATURE OF ALLIANCES

The qualitative interviews deepen our insights into trends, motives and challenges of international alliance activity from the viewpoint of Finnish firms. By and larger the interviewees confirm the surge in the number and importance of alliances. Alliances have

indeed become an integral part of the international R&D and business strategies also of the Finnish firms covered here, although they still value hierarchical control highly. An additional insight revealed by the interviews was that the distinction between vertical and horizontal alliances largely appears to explain how they perceive the motives and challenges.

A characteristic of vertical alliances is that firms are more prone to truly share their technology-related O advantages for the development of new innovations and thus engage in exploration proper. They are typically formed based on the identification of complementary assets that arise from the different positioning of firms in the same value chains. Apart from complementary technology assets, firms often also seek to access e.g. large-scale production expertise, knowledge of foreign markets, or strong global brands that they might lack despite strengths on the technology side. In contrast, horizontal alliances typically concern the creative combination of existing technologies (O advantages). These creative combinations frequently relate to interoperability demands and standardisation, especially in ICT. Therefore cross-licensing agreements are quite common, and the partners primarily identify complementary assets in each others unique technology specialisation profile.

The sharing of complementary assets is often considered a prime explanation for alliance formation in managerial theories of the firm (see especially Teece (1986)). When extending the viewpoint to mainstream economics risk sharing and cost reduction, shortening innovation/entry times, and influencing market structure and competition also emerge as important issues. Our interviews also highlight these motives. Risk sharing emerges as an overreaching motive for most alliances. This motive is especially pronounced in explorative alliances that cover uncertain R&D activities. Cost reduction and the shortening of innovation entry times often go hand in hand in this context. Influencing market structure and competition was not explicitly mentioned by the interviewees, although there is a general acknowledgement of the fact that competition partly is shifting from the firm level to the level of competition between complex constellations of alliance networks. However, the general impression is that many of these motives interact and jointly determine the motives behind specific alliances.

The main challenges relate to overall alliance management issues. There was a clear acknowledgement that alliances present new challenges as the alliances portfolio grows in size. Further, the choice of partners is of crucial importance for the success of an alliance. This choice requires that firms find a balance between attracting the best partners through signalling their competencies and complementary assets, while avoiding asymmetric relationships in which the foreign partner firm has a dominating market power or IPR position. The sharing of IPRs is a big challenge in such asymmetric relationships, especially in the case of vertical alliances in which firms tend to engage in exploration proper. In horizontal alliances IPR issue arise more seldom as these mainly cover the combination of already enforced IPRs e.g. in the case of the cross-licensing of patents.

5.3. IMPLICATIONS FOR INNOVATION POLICY

A national system of innovation is typically defined through the various national institutions and organisations that support innovation and technology diffusion in the economy (see e.g. Edquist (1997)). Large and R&D-intensive firms are therefore obviously at the core of any such national system. Nonetheless, in terms of "alliance capitalism" and the pervasiveness of international alliances it is clear that even the strategic activities of these core actors of the innovation system are increasingly international in scope. On a general level this paper therefore once more highlights the limitations of viewing innovation policy from a national perspective, and we wish to highlight a couple of policy issues from this viewpoint.

As the national element also of the strategic activities of these core firms is eroding, increasing emphasis should also be given to institutional and organisational adaptation within the public policy sector. This implies that increasing emphasis should be given to explicit internationalisation strategies throughout public institutions and organisations that support innovation and technology diffusion. On the one hand such strategies should acknowledge that cross-border collaboration is a game of give and take in the sense that strategic alliances per definition aim to promote common strategic goals amongst the partners. On the other hand, it is clear that innovation policies

also should foster unique features of Finnish technologies and innovations while avoiding excessive knowledge spillovers abroad.

Public technology programmes are probably the main settings in which balanced strategies towards internationalisation should be considered. Indeed, this paper lends support to policy conclusions made in a recent evaluation of the means and mechanisms of internationalisation in technology programmes commissioned by the National Technology Agency (Tekes) (Halme et al., 2004). However, new policy initiatives could also be considered. Due to data limitations this paper has focused on the alliances of major Finnish firms. But smaller firms do also engage in this type of strategic activity albeit with much lesser resources. It seems that Finnish technology centres and incubators abroad could offer important lateral support and guidance for such firms in their search for viable foreign partners. One recent example of this type of initiative is the founding of the FinChin Innovation Centre in Shanghai, China.

Apart from these general policy implications the challenges related to sharing IPRs in asymmetric relationships raise specific issues which also could be addressed through new policy initiatives. Clearly even the largest Finnish firms face resource-constraints in negotiating and managing IPR issues during their alliances activities. Assumedly the situation is even tougher for smaller firms. Hence, there is clearly room for more attention to IPR issues in the public support of technological development and innovation. It should be noted that IPRs might be protected through various means, of which patenting is the most visible and straightforward one. As we have seen in this paper, patents are also often the explicit focus of alliances. New financial and regulatory public initiatives should be considered to strengthening the IPR position especially of smaller firms so as to support also their possibilities to take part in, and benefit from, ”alliance capitalism”. Further research would be needed to pinpoint the specific needs of firms in this context.

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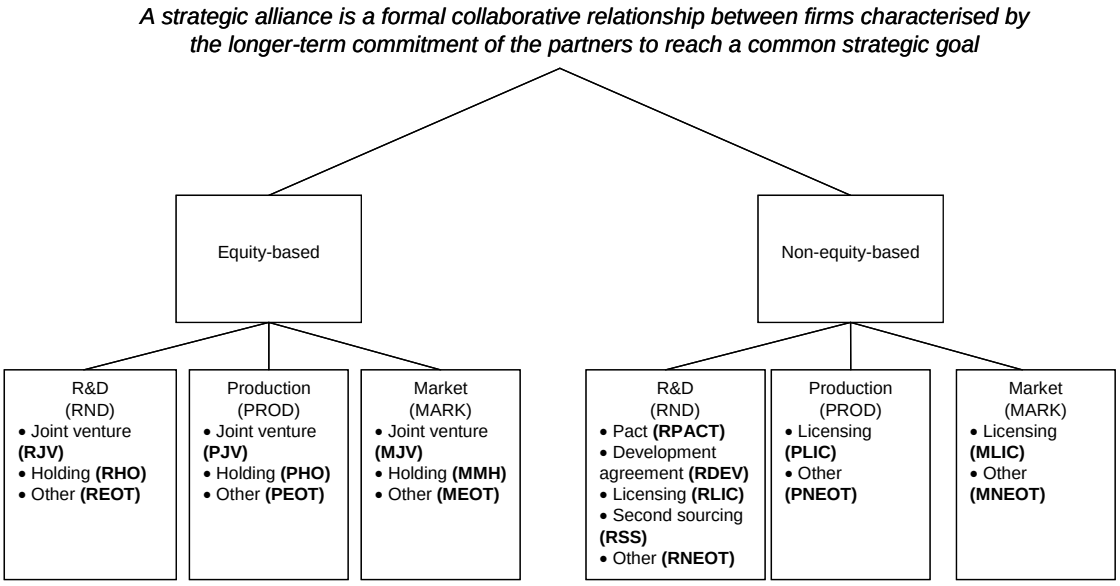
APPENDIX 1: THE SAFIF DATABASE

The SAFIF-database (Strategic Alliances of Finnish Firms) consists of 36 firms that were selected on the basis of their size, innovative activity and industry affiliation. Through this selection of firms the database gives reasonable coverage of the ICT (information and communications technology), chemical, forest-related, metals and engineering industries in terms of R&D, turnover and share of employment in Finland. The identification and data collection of alliances relies on the relatively common literature-based alliance accounting methodology originally developed by John Hagedoorn and his colleagues at MERIT research institute at the University of Maastricht in Holland (see Hagedoorn and Schakenraad (1989); Hagedoorn et al. (2000)). A strategic alliance was defined as *"a formal collaborative relationship between firms characterised by the longer-term commitment of the partners to reach a common strategic goal"*. Adhering to this definition the alliances of the selected firm during the period January 1995 to April 2004 were identified through company press and stock exchange releases and Kauppalehti-online news archive. From these sources information concerning the nature, technology field (when applicable), and general description of the alliances was gathered. Complementary information on each firm was also collected from Hoovers Online firm database, Talouselämä 600 dataset and patent information from the Delphion online patent service. Based on this public information each alliance has been classified in terms of whether they involve equity-investments or are of the non-equity type. Further, they have been distinguished into R&D, production or marketing alliances. This classification has been flexible by allowing for on alliance to cover many of these types if multiple components of the nature of the alliance could be identified. The typology is illustrated below.

Figure A1. The SAFIF typology



These data sources cover all feasible information that is publicly available. The primary limitation relates to the fact firms have different communication policies in terms of the degree to which they report publicly on their alliance activities. Further, the application of the definition of a strategic alliance proved practically tricky in some borderline cases. These are common limitations of the literature-based alliance accounting methodology. As for now the database consists of 778 alliances and 739 individual firms that were related to the alliances.

APPENDIX 2: LIST OF INTERVIEWEES

Matti Kleimola, Wärtsilä, 12/5 2004

Ilkka Kaartovaara, Stora Enso, 24/5 2004

Juha Jakkula and Ilpo Pesola, Fortum, 25/5 2004

Petri Rolig, Huhtamäki, 31/5 2004

Heikki Leppänen, Kone, 1/6 2004

Matti Lehti, Tietoenator, 2/6 2004

Yrjö Neuvo, Nokia, 21/6 2004

Eero Punkka, Suunto, 22/6 2004

Christer Pihl, Ahlström, 11/11 2004

Eero Haarla and Heikki Peltola, UPM-Kymmene, 8/12 2004

Pekka Rauhala, TeliaSonera, 21/12 2004

Annika Mäyrä-Mäkinen, Raisio, 7/12 2004

Jyrki Huovila, Metso Paper, 4/1 2004

Juhani Pylkkänen, Valtra, 4/1 2004

Jussi Mykkänen, Vaisala, 31/3 2005

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