

EVOLUTION OF ALLIANCE NETWORKS AND
RESOURCES OF FIRMS IN
TELECOMMUNICATIONS AND
INFORMATION TECHNOLOGY INDUSTRIES

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Dem ressourcen-basierten Ansatz und der strategischen Netzwerktheorie sind in den letzten Jahren zunehmende Beachtung durch die strategische Managementforschung geschenkt worden. Im Rahmen dieser Dissertation werden die bis jetzt vernachlässigten dynamischen Perspektiven der beiden theoretischen Konzepte weiter vertieft.

Durch sieben Fallstudien über die Partnerschaftsnetzwerke von Unternehmen der Informations- und Kommunikationswirtschaft werden mit Hilfe des Grounded-Theory Ansatzes Hypothesen zur Weiterentwicklung und Dynamisierung der genannten theoretischen Konzepte entwickelt. Die relevanten Forschungsfragen decken hierbei drei Themenbereiche ab: Evolution von Partnerschaftsnetzwerken, Ressourcenaustausch und -verbindung innerhalb von Partnerschaftsnetzwerken und Auswirkungen von Partnerschaftsnetzwerken auf Wettbewerbsvorteile von Unternehmen.

Die Evolution von Partnerschaftsnetzwerken umfasst Fragestellungen von der Sequenz von Partnerschaftsaktivitäten und dem Vergleich von Partnerschaften über den Zeitablauf in Intensität, Standardisierung, funktionaler Ausrichtung und Ressourcenaustausch. Dieser Themenkomplex befasst sich auch mit den iterativen Wechselwirkungen von Ressourcenbedarf, Ressourcenbefriedigung durch zukünftige Partnerschaften, Ressourcenbildung durch aktive Partnerschaften und gewachsene Unternehmensattraktivität für zukünftige Partnerschaften durch erhöhtes Ressourcenangebot. Die zweite Themenstellung des Ressourcenaustausches und deren Verbindung innerhalb von Partnerschaftsnetzwerken deckt die Fragen der Unternehmenskompetenzen zur Führung von Partnerschaftsnetzwerken, der Internalisierung von Partnerressourcen durch Lernen sowie Faktoren, die Lernen zwischen Unternehmen beeinflussen, ab. Nach dem Erlernen von Ressourcen werden auch Fragen nach der zukünftigen strukturellen Weiterentwicklung von Partnerschaftsnetzwerken untersucht. In der letzten Fragestellung werden abschließend die wechselnden Effekte von dynamischen Partnerschaftsnetzwerken auf Wettbewerbsvorteile von Unternehmen untersucht.

Aus den sieben Fallstudien werden 16 Hypothesen entwickelt, die sich folgendermaßen zusammenfassen lassen: Unternehmen starten mit einfach strukturierten Partnerschaften auf operativer Ebene und bauen dann schrittweise ein komplexeres Allianznetzwerk auf. Im Rahmen dieses Aufbaus entwickeln Unternehmen über die Kumulierung von Partnerschaften die Fähigkeiten zum Management ihres Netzwerkes und konzentrieren dann ihre Aktivitäten auf ausgewählte hochwertige Allianzen. Diese Allianzen zeichnen sich durch eine höhere Intensität und genauere Definition des Ressourcenaustausches aus. Die Formierung von höherwertigen Allianzen hängt jedoch von der Bereitstellung eigener Unternehmensressourcen als ‚Tauschwert‘ ab, die durch Informationsaustausch und Lernen entwickelt werden können. Das Erlernen von Ressourcen hängt von dem Konfliktlevel und der Ähnlichkeit der Ressourcenbasis zwischen den Partnern im Netzwerk ab.

Dieses integrierte System von Hypothesen wird in Rahmen des ressourcen-basierten Ansatzes und der strategischen Netzwerktheorie diskutiert. Ein Modell auf Basis der theoretischen Konzepte ermöglicht den Abgleich mit den entwickelten Hypothesen und zeigt weiteren Forschungsbedarf für die dynamische Betrachtung von Partnerschaftsnetzwerken auf. Sowohl Hypothesen als auch theoretisches Modell erlauben einen Ausblick auf die Handlungsanweisung für das Management von Partnerschaftsnetzwerken.

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LIST OF ABBREVIATIONS

API	Application program interface
ARPU	Average revenue per user
BIC	Business Innovation Center
DLR	German Aerospace Research Center and German Space Agency [Deutsches Zentrum für Luft- und Raumfahrt]
EBITDA	Earnings before income tax depreciation and amortization
GPRS	General packet radio service
GSM	Global system for mobile communications
HSCSD	Highspeed circuit switched data
IVR	Interactive voice response
KBT	Knowledge-based theory
MMS	Multi-media messaging service
MNO	Mobile network operator
MSISDN	Mobile subscriber integrated services digital network
NTBF	New technology-based firm
PRN	Premium rate numbers
RBV	Resource-based-view
SMS	Short message service
TCE	Transaction cost economics
UMTS	Universal mobile telecommunication standard
WAP	Wireless access protocol
WASP	Wireless application service provider
WLAN	Wireless local area network
XML	Extended markup language

1 Introduction

Interorganizational alliances between firms are of major importance for firms' competitive advantages across a large number of industries (Harrigan 1986). During the past two decades, empirical evidence indicates that strategic alliances have grown extensively in response to industry deregulation, globalization, technology changes and an increasing emphasis on product innovation (Harrigan 1985). Since dependence on strategic alliances has grown significantly in recent years, partnership formation with external parties for variety of reasons has become a central strategic activity for many firms across multiple industries (Badaracco 1991; Nohria and Eccles 1992; Gulati 1995a; Mowery, Oxley and Silverman 1996).

On the industry level for example, competitive intensity, market development stage, demand and competitive uncertainty affect partnership formation (Harrigan 1988; Shan 1990; Burgers, Hill and Kim 1993; Hagedoorn 1993; Eisenhardt and Schoonhoven 1996; Chen 1997; Dickson and Weaver 1997). Findings support a positive relationship between alliance formation activities and demand changes, level of competition, new technological developments, innovation time span reduction, market access and convergence of industry segments. On the firm level for instance, attributes such as size, age, scope, innovativeness, product diversity, financial resources, competitive and technological position and prestige have also shown to impact the alliance formation rate (Oliver 1990; Shan 1990; Barley, Freeman and Hybels 1992; Powell and Brantley 1992; Burgers, Hill et al. 1993; Hagedoorn and Schakenraad 1994; Shan, Walker and Kogut 1994; Chen 1997; Stuart 1998).

While alliance formation can be observed across multiple industries, the number and the average value of partnerships have increased, especially in IT, media and communications sectors (Anonymous 1995). In high technology industries, characterized by factor described in the previous chapter, firms utilize alliances to exchange complementary resources and capabilities, because they can no longer develop, manufacture, and market products independently. Therefore, new technologies provide both a stimulus to and focus on a variety of alliance formations that seek to reduce inherent uncertainties with novel products and markets. Several studies have revealed a positive correlation between research and development activity and alliance formation intensity, especially in knowledge intensive industries (Freeman

1991; Hagedoorn 1995). Empirical findings from these sectors have generated evidence that alliances contribute to firm growth (Powell, Koput and Smith-Doerr 1996), innovation rates (Hagedoorn 1993), facilitate organizational learning (Hamel 1991) and effect corporate reputations (Stuart, Hoang and Hybels 1999). Apparent inducements for interorganizational partnerships in these industries have significantly increased alliance formation rates and established cooperative relationships as a routine strategic activity (Stuart 1998).

Consequently, routines of alliance formation activities have developed a web and a variety of relationships around firms in high technology industries, in which almost all firms are linked to each other by direct or indirect ties (Duysters, De Man and Wildeman 1999). The sheer volume of partnerships, the variety of governance forms and multiplicity of functional dedications impose considerable complexity for firms at the center of these relationships. Besides complexity, a combination of cooperation and competition in partner behavior increases the risks of exploiting valuable internal firm resources. In this environmental context, the formation of new strategic partnerships represents more than the addition of dyadic relationships. Knoke and Kuklinski (1982) note that changes in the structure of relationships have behavioral, perceptual and attitudinal consequences for all firms involved. Therefore, a recently added cooperative relationship shifts an entire alliance network with intriguing and complex implications for and alliance management research. Management implications of alliance networks in high technology industries originate from the complexity of partnership interests, the portfolio of resource contributions and need for dynamic adaptations.

(1) In their alliance formation activities, firms can no longer make strategic choices based exclusively on their self-interest. Strong relationships require feedback mechanisms on the interests of strategic partners, because independent and unformed unilateral action could lead to a deterioration or discontinuation of partnerships. In considering both current relationships and internal capabilities, firms also have to define their reliable role either as integrator or specialist in the network of cooperative relationships. Whereas integrators combine products or resources into complete offerings, specialists supply a limited variety of products and services for the network.

(2) The network perspective on the entire alliance portfolio extends the scope of collaboration benefits from dyadic relationships to the network of collaboration. Since

partnership networks influence the flow of resources and the exchange of information, and smart alliance network management aims at access to a combination of complementary resources (Duysters, De Man et al. 1999), alliance management on the firm level needs to leverage the entire portfolio of relationships to gain the maximum advantage. Therefore, partner selection has to consider the fit of potential partners with the entire collection of partnerships, which depends on the expected and complementary contribution to the entire network. Especially in high technology industries, knowledge contributions across a web of partners play a significant role in improving the competitive advantage of firms. (Lorenzoni and Baden-Fuller 1995) suggest that the diffusion of knowledge across partners improves the quality of the entire network and the competitive position of all firms involved in the alliance network. Availability, diffusion and utilization of knowledge, however, depends on the overall alliance network structure: Centrally located firms with strong ties to multiple partners may enjoy a trustful exchange of valuable knowledge, but at the same time, they suffer from low knowledge diversity which can only be generated by renewed and replaced alliance relationships.

(3) As environmental factors in high technology industries demand continuous adaptations to new technology standards or product applications, changing requirements for firm and partnership resources are transformed into dynamically evolving alliance networks. Adjustments in alliance networks have an impact on the overall relationship structure and in turn the availability of resources, but at the same time, they are constrained by interests of partner firms currently involved.

Constant adaptations of alliance network structures embedded in the interests of existing relationships impose tremendous managerial challenges for firms in the high technology industry. Both the capability to manage a portfolio of alliances and the development of a valuable sequence of alliances into a web of partners may represent a differentiating factor for organizations in this industry. By exploring the longitudinal evolution of firm resources and the sequence of partnerships, this dissertation study aims at developing recommendations that support management in developing cooperative structures.

Studying the longitudinal evolution of alliance networks in the context of firm resources extend current theoretical perspectives on alliances, the resource-based view

of the firm and the strategic network theory. Although scholars have already covered the issues of strategic alliances to some extent, important areas require further empirical investigation and theoretical attention, especially from the perspective of strategic management research (Osborn and Hagedoorn 1997).

Scholars have proposed a range of frameworks to analyze strategic alliances or networks: As the partnership progresses through a sequence of events, the strategic choices cover key behavioral issues such as (1) the decision to enter into an alliance, the selection of an appropriate partner, (2) the setup of governance structures and (3) the dynamic evolution as collaboration develops over time. Important issues also concern the factors that determine performance consequences for (4) the partnership itself and (5) the firms entering into it (Gulati 1998). Exhibit 1-1 provides a framework and classification of issues in the research of strategic alliances and networks.

	Research issues
Formation	<ul style="list-style-type: none">▪ Firm resource characteristics▪ Partner selection
Governance	<ul style="list-style-type: none">▪ Ex-ante factors influencing the choice of governance structure
Evolution	<ul style="list-style-type: none">▪ Ex-ante factors and evolutionary processes influencing network development
Performance of networks	<ul style="list-style-type: none">▪ Performance measurement indicators▪ Factors influencing performance
Performance advantages for firms	<ul style="list-style-type: none">▪ Social and economic benefits for firms participating in networks

Exhibit 1-1 Alliance research: Classification of issues adapted from Gulati (1998)

In the well developed literature on **alliance formation**, scholars have emphasized three main firm inducements for the existence of alliances (Hennart 1988, 1991; Chi 1994; Ingham and Thompson 1994; Zaheer and Venkataramen 1995; Singh 1997): (1) Transaction cost reduction resulting from small numbers bargaining, (2) strategic

behavior induced by potential improvements in the competitive position or market power (Berg and Friedman 1978) and (3) pursuit of organizational knowledge or learning when firms want to obtain critical resources from other partners (Kogut 1988a). With the dominant dyadic perspective on alliances, the research scope has largely remained on strategic behavior and underlying factors, because the empirical analysis of inducements from transaction costs or the transfer of organizational knowledge has been more difficult to explore. In their studies of underlying factors, scholars have widely explored the impact of a broad variety of industry and firm-level factors on alliance formation.

In the specific application of network perspectives to research on alliances, scholars have examined the implications of key industry events (Madhavan, Koka and Prescott 1998). Studies have also linked networks to the extent of R&D and non-R&D alliances (Powell, Koput et al. 1996) and the frequency of future alliances by firms (Kogut, Shan and Walker 1992; Eisenhardt and Schoonhoven 1996). Empirical evidence of biotechnology firms or semiconductor firms suggests that firms with more prior alliances and that are more centrally situated in the alliance network, or with more focused networks, are more likely to set up new partnerships with higher frequency (Shan, Walker et al. 1994; Podolny and Stuart 1995; Eisenhardt and Schoonhoven 1996; Powell, Koput et al. 1996). Also, the experience with previous partnerships strongly supports the establishment of additional ties (Gulati 1995b; Garcia-Pont and Nohria 1999).

All these studies have developed initial insights into the formation of strategic alliance networks, but have not concentrated on a dynamic model of evolving networks, changing inducements or adapting enabling conditions on a longitudinal basis (Oliver 1990).

Applications of the resource dependency theory have covered the inducements for dyadic alliance formation on the firm level (Galaskiewicz 1985; Oliver 1990). This model of resource procurement suggests that organizations set up alliances with other organizations when they observe critical strategic interdependence as well as beneficial and non-possessed resources (Levine and White 1961; Aiken and Hage 1968; Pfeffer and Salancik 1978). Hagedoorn (1993; 1995) has shown resource complementarities in the case of technology partnerships which explains that a large share of joint ventures

perform activities outside the firm's core business. Complementary capabilities can later support firm specialization, when resource gaps can be filled by divergent partners in multiple alliances (Mowery, Oxley et al. 1996).

Strategic interdependence may be helpful to explain alliance formation between some firms, but not all opportunities for firm relationships are turned into actual partnerships and not all resource needs can be satisfied with appropriate partners. Consequently, alliance formation is influenced by the previously mentioned important enabling conditions of currently available partnerships and resources:

(1) Information on potential alliance opportunities is not freely available and easily accessible, and not all alliance opportunities are presented exogenously. Alliance networks channel valuable information for participating firms and reduce the risks of moral hazards originating from opportunistic behavior: Integrating firms in alliance networks leads to receptivity to changes in market environments and partner goals (Granovetter 1985). Active relationships with current partners facilitate familiarity with mutual goals and capabilities, which can be leveraged for the setup of additional partnerships. However, the very integration of firms in relationship networks can also limit the access to information about potential alliances by extensively relying on information from current network firms.

(2) Central location of firms within alliance networks provides status cues: Both improved reputation and external visibility extend the firm's reach to potential alliance partners. Conveying status is extremely important in uncertain environments of high technology industries where companies turn to highly attractive partners of high status with established ties to other firms with higher reputation. Reputation, status and trust positively influence partner selection (Shane 1994; Zaheer and Venkataramen 1995; Dollinger, Golden and Saxton 1997; Chung, Singh and Lee 2000).

(3) Alliance formation requires that a firm with its available resource base appears as an attractive partner to others (Kogut, Shan et al. 1992; Shan, Walker et al. 1994). A firm with greater resource offerings has richer collaboration opportunities (Ahuja 2000b) available. Partners' resource availability tends to increase their attractiveness, which may have a positive impact on the quantity and quality of presented alliance opportunities. At the same time, resource endowed firms may see reduced needs for external collaboration.

As diversity and flexibility requirements of alliances have increased over time, the study of **governance structures** in alliances has become more critical. The research on governance structure between organizations, mainly viewed as mechanisms to manage uncertainty, has been largely influenced by transaction cost theory. Scholars have focused to a great extent on the diversity of alliance structures as governance forms between the dichotomy of markets and hierarchies. Uncertainty originates from appropriation concerns in alliances due to contracting hazards and behavioral uncertainty at the time of formation (Pisano, Russo and Teece 1988; Pisano 1989; Balakrishnan and Koza 1993). Backing criticism on the transaction cost theory approach, studies have shown that emerging processes may lead to learning (Ring 1996) and coordination costs (Gulati and Singh 1998), which are not fully taken into account in the transaction cost theory. The focus on a single and static transaction disregards learning and innovative processes distributed across a network of inter-organizational relationships (Zajac and Olsen 1993; Powell, Koput et al. 1996).

A range of industry, firm and alliance level factors seem to affect the choice of governance structure on the dyadic level (Hagedoorn 1993; Hagedoorn and Narula 1996; Hagedoorn and Sedaitis 1997; Osborn and Hagedoorn 1997). On the issue of knowledge exchange in alliances, this resource transfer can be better facilitated by hierarchical control or equity ownership of alliances than by market-based contracts, because the knowledge to be transferred and embedded in organizational routines cannot be defined easily in unambiguous contracts. Therefore, researchers found that equity-based alliances promote more extensive knowledge transfer than contract-based alliances (Mowery, Oxley et al. 1996). Partnerships for the development of technology components raise appropriation concerns and drive coordination costs, which both require more hierarchical structures (Gulati and Singh 1998).

Surprisingly little empirical research has covered the **evolution** or the process influencing the course of individual alliances or partnership networks. From the dyadic perspective, alliances can transform tremendously beyond their initial considerations after their initiation. Consequently, case study research has explored factors influencing formal and informal processes and intermediate evolutionary stages of alliances (Hamel 1991; Larson 1992; Ring and Van de Ven 1994; Doz 1996): Alliances do not strictly develop towards a set of objectives based on the earlier implementation of initial designs, but they are also not independent from initially

defined conditions. Initial 'static' or 'generative' conditions can block or foster learning and adaptation (Doz 1996). Researchers expanded their scope from initial conditions to adaptive behavioral processes and their impact on performance in alliances (Hamel, Doz and Prahalad 1989; Doz 1996). Learning skills and environmental factors seem to impact the development of an alliance, which in some cases follows discrete changes due to discontinuous environmental adjustments (Hamel 1991; Gray and Yan 1997). Continuous information exchange on the incentives to cooperate facilitates the parties' comprehension of alliance benefits and helps to understand options to unilaterally impact the partnership's outcome (Gulati, Khanna and Nohria 1994). The 'relative scope' of firms in partnerships, which refers to market opportunities outside the alliance, increases the likelihood of competitive dynamics and potentially detrimental effects on the partnership (Khanna 1998). Regarding the aspect of the learning process, Simonin (1997) has suggested that experience from collaboration must be internalized first in order to develop know-how and to contribute to additional future collaborative benefits.

Previous research on alliance network dynamics to date has identified some factors like critical industry events, information transfer in the network and firm resource changes, that impact or are influenced by relationship structures. Key industry events triggered by technological progress, the entry of competitors or a dramatic change in consumer preferences can increase the value of current partnerships or force a firm to establish new ties that allow access to newly required capabilities (Barley 1986; Madhavan, Koka et al. 1998). In this environment, a group of horizontally or vertically connected firms with dense connections could also aim at collective strategies in conjunction with their individual competitive strategies (Astley and Fombrun 1983; Bresser 1988; Nohria and Garcia-Pont 1991; Gomes-Casseres 1994). As network structures influence the flow of information, dynamic changes at the network level may effect the information content over time. Studies showed that with an increase of network institutionalization the nature of transmitted information changes from technical to more institutional elements (Westphal, Gulati and Shortell 1997). Researchers have also investigated the supply chain of large manufacturing companies and examined how vertical partnerships and their networks have shown clearer structural patterns over time (Helper 1991; Dyer 1996). In a longitudinal analysis of the Italian packaging industry, (Lorenzoni and Lipparini 1999) have found a clear focus on a limited number of first tier suppliers and an increase in quality and content of the

respective relationships. The capabilities of first tier suppliers have been focused on a more specialized set of activities and components. High familiarity and trust has reduced transaction and coordination cost and has facilitated the transformation of relationships.

Findings from these studies have generated some insights into the evolutionary dynamics of firm partnerships. However, behavioral processes in alliance networks or decisions for the entire group of firms have not been systematically explored. In these processes of alliance network evolution, centrally located firms may intentionally utilize their information, control and negotiation benefits by learning from, playing off or complementing a network of partners and their competencies. Although alliance network research has explored structural changes to some extent, the underlying factors influencing growth and development of interorganizational relationships leave many research questions open (for a review: Grandori and Soda (1995)). In consideration of the limited understanding of network dynamics, alliances as an empirical phenomenon offer a valuable area in which action and structure are closely intertwined and the dynamic co-evolution can be investigated (Gulati 1999). Exploring the dynamic co-evolution, the longitudinal analysis also enables path dependencies of alliance formation to be explored.

The **performance of alliances** and networks has been researched by scholars to a very limited extent due to the insufficient data availability on partnership performance: Many empirical studies focused on the termination of alliances (Beamish 1985; Harrigan 1985; Levinthal and Fichman 1988), which serves only as a mediocre performance proxy, since successful alliances can also be terminated intentionally when the objectives are met and its mission is completed. Uncovering other financial and non-financial indicators for alliance performance requires detailed surveys and careful observations covering multiple objectives, complex indicators and viewpoints of all partners involved (Harrigan 1985, 1986; Heide and Miner 1992; Parkhe 1993). Previous research results mainly focused on the dyadic alliance level identifying ex-ante conditions and developing processes that effect performance.

Regarding ex-ante conditions, partner reputation (Saxton 1997), multilateral resource contributions from all involved parties (Hatfield and Pearce 1997), partner similarity and related diversification (Harrigan 1988; Saxton 1997) result in higher partnership

benefits. On the operational management level, management flexibility, trust between partners, regular information updates, constructive feedback mechanisms, continuity of personnel at the interface between alliance and firm contribute to alliance performance (Kanter 1989; Bleeke and Ernst 1991).

Although studies have identified some factors for increased alliance performance on the dyadic level, few researchers have covered the implications of multiple alliances and performance in their analyses. The management of multiple alliances and the entire portfolio has raised new questions about the cooperative capabilities of firms. The development of beneficial alliance management experience (Barkema, Bell and Pennings 1996; Barkema, Shenkar, Vermeulen and Bell 1997) is confronted with the challenges of increasing complexity in the alliance portfolio and the challenge of possibly conflicting objectives from different alliance partners: A firm in the center of an alliance network has to focus its attention on a series of organizational and strategic issues (Lorenzoni and Baden-Fuller 1995). Systematic experience with alliances can be developed with an increasing number of alliances formation activities (Lyles 1988). Anand and Khanna's study (2000) suggests that firms with greater experience in alliances create enhanced capabilities by generating more value from these partnerships. This alliance experience has been conceptualized by the capability to identify valuable alliance opportunities, use appropriate governance mechanisms, develop inter-firm knowledge-sharing routines, make requisite relationship-specific investments, initiate necessary changes to the evolving partnership and manage expectations of partners (Doz 1996; Dyer and Singh 1998).

A limited number of studies have explored the **performance advantages of strategic alliances for firms** involved. Since many other effects besides alliance formation can also influence the performance of firms, empirically linking alliance activities with firm performance faces difficult measurement obstacles. Scholars have looked at a variety of direct and indirect ways to test this relationship:

The likelihood of business survival (Singh, Tucker and House 1986; Baum and Oliver 1991; Baum and Oliver 1992; Hagedoorn and Schakenraad 1994; Mitchell and Singh 1996; Zaheer and Zaheer 1997; Baum, Calabrese and Silverman 2000; Rowley, Behrens and Krackhardt 2000), firm growth (Powell, Koput et al. 1996) and innovation output (Shan, Walker et al. 1994), or abnormal stock market returns (Koh

and Venkatraman 1991; Balakrishnan and Koza 1993; Chan, Kensinger, Keown and Martin 1997; Das, Sen and Sengupta 1998) have been linked to participation in inter-firm networks. A more detailed study of stock market reactions to alliance announcements suggests that technological alliances under certain conditions of either related or unrelated diversification have resulted in higher abnormal returns than other cooperative agreements. Research on vertical alliances (Helper 1990; Cusumano and Takeishi 1991; Helper 1991; Heide and Miner 1992; Dyer 1996) suggests that close vertical alliances supported by rich information exchange, long-term commitments with greater cooperation and higher levels of asset-specific investments generate performance advantages for the firms that form these partnerships.

Previous research has paid limited attention to the overarching alliance network structure in which firms are embedded. Rather than focusing on the firm's position in the overall structure of multiple differentiated relationships, analytical focus has remained largely on the cumulative participation in certain partnerships. The demonstrated positive relationships between alliance formation and firm performance also raise the question: Why do all firms not use a partnership to enhance performance? The variation in alliance formation could be explained by differences in partnership opportunities, which in turn depend on the dynamically changing resource base as an important enabling condition.

This multifaceted review of dyadic and alliance network research clearly identifies issues for further research. Theoretical and empirical gaps can be identified across the whole "cycle" of alliance research issues (Exhibit 1-1) and can be transformed into questions for this research study:

(1) Evolution of inter-firm alliance networks: Alliance formation consequences and causes in the great majority have been studied on the dyadic level. The introduction of entire inter-firm network structure of strategic alliances – typical for high technology industries – in the investigation of alliance formation and development allows for a more comprehensive understanding of inducements, opportunities and constraints of firm partnerships.

Despite the intensification of partnership activities, a narrow body of research has explored the evolutionary processes in the formation of interfirm ties (Doz 1996). In addition to the research contributions mentioned above, theory building is required for

network evolution and change (Nohria and Eccles 1992; Lipparini and Sobrero 1997). Studying the alliance networks in a longitudinal setting can provide unique insights into both endogenous and exogenous factors of a possible path-dependent evolution.

In what sequence do firms develop their alliance networks over time?

In the sequence of alliance formation, how do early partnerships compare to later partnerships in terms of intensity, degree of standardization, functional dedication, resource exchange and strategic relevance? In case of any differentiation between partnerships, how can these changes be explained in the longitudinal setting?

To what extent can a portfolio of relationships be used for complementing resource gaps, achieving negotiation leverage or other benefits?

(2) Resource exchange and combination in alliance networks: As discussed in the review of alliance formation, joint capabilities of resource-based interaction between interdependent firms have only recently received limited attention by researchers. Especially in high technology industries, alliances serve as an important mechanism to access, acquire and develop resources that a firm does not already possess. Interorganizational partnerships represent a viable option for the creation of sustained competitive advantages by idiosyncratic and complementary resource bundling (Kogut 1991; Kogut and Zander 1992). The emerging theory of strategic alliances from a resource-based perspective (Eisenhardt and Schoonhoven 1996) requires further conceptual extensions: Alliance formation could be driven by the firm's strategic vulnerable position in need for additional resources or the strong position with the resources available to attract, know and engage partners.

Therefore, the future research agenda centers on the analysis and measurement of the capability to detect, develop, integrate, and transfer knowledge across different network participants. Early empirical investigations on the relational capabilities show that their conceptualizations merit further research: Theoretical constructs cover the ability to absorb competencies from others (Cohen and Levinthal 1990), to combine and coordinate technical dimensions of a large population of firms (Kogut and Zander 1992), to 'architecturally' combine existing competencies in order to generate new knowledge (Henderson and Cockburn 1994).

How do resources including the capability to manage a portfolio of cooperative relationships develop within focal firm boundaries?

To what extent are capabilities leveraged by the external cooperation with other firms or internalized by learning?

Across a network of partnerships, what factors determine the focal company learning?

How does quality of operational coordination, functional dedication, intensity of partnerships and overall network structure effect firm-level learning?

After internalization of learning, what feedback mechanisms exist for alliance network objectives, subsequent alliance formation and evolution across the entire existing portfolio?

(3) Linkage to competitive advantage: Empirical literature on interfirm alliances has highlighted the importance of a firm's relational capability but has failed to establish the link to achieving a sustainable competitive position in full consideration of the entire set of relationships (Gulati 1998; Lorenzoni and Lipparini 1999).

Can both the alliance network and focal company resource evolution be linked to performance indicators? If that is the case, what factors determine the performance of the alliance networks and can their contribution be differentiated from other sources of value creation?

2 Case studies and analyses

This section on case studies and analyses focuses on this study's research design, case study descriptions and analyses. Research design description elaborates on the grounded theory approach, which uses qualitative and quantitative data to extend emerging theoretical concepts. Extensions depend on the contributions of tentative propositions, which suggest new relationships between theoretical constructs. These tentative propositions are drawn from case study observations through multiple data review iterations.

Case studies in this dissertation study are drawn from information technology, fixed-line telecommunication and Internet/mobile service industries. The cases of *Intel Capital* and *Sun Microsystems/DLR* represent examples of alliance networks for business development in the information technology industry. Although both alliance networks differ in their maturity, alliance relationships in both cases intend to support initial development stages of emerging new technology based firms through financial investments and technical support. At the center of a network of fixed-line telecommunications providers, *Elisa Kommunikation* and *Tropolys* focus on alliance network formation to generate economies of scale. Although market liberalization has given emerging city carriers the opportunity to provide alternative home access lines in Germany, decreasing prices and underestimated investments have made consolidation of cost structures a vital requirement. The network formed by *Elisa Kommunikation* and *Tropolys* organizes a joint path towards best practices, tighter cost structures and unified marketing approaches. *MSN*, *Lycos Mobile*, *E-plus* and *Sonera Zed* provide innovative online Internet and mobile services with the help of alliance partners. As services are developed and deployed through web of partners, customer feedback is continuously utilized to sort out attractive service offerings, which has subsequent and immediate feedback on alliance network structures. All four online cases are influenced by the changing and uncertain customer preferences, which impose significant challenges for the flexibility of cooperative structures.

2.1 Research design and method

This dissertation study focuses on theory building in the area of firm resources and alliance networks from the perspective of the integrating focal firm or actor. By selecting this specific empirical phenomenon, this research project aims at extending existing theory on strategic networks and a resource-based view of the firm through novel hypotheses. Both the empirical phenomenon studied and the nature of the theoretical contribution define the requirements of an appropriate research methodology. As this study covers both motivation and subsequent firm behavior in alliance formation activities on a longitudinal basis, an explorative case study methodology to develop grounded theory appears to be the most appropriate approach. The broad, but clearly defined scope of research questions and the investigation of current firm behavior in high technology industries also require an explorative research design (Yin 1994).

In the formal description of the approach to handle and interpret qualitative data, Glaser and Strauss (1967) have characterized the grounded theory approach as one oriented towards the inductive development of theory from systematic data gathering and analysis. During the past decades, the general approach to qualitative data analysis and theory generation has been applied in disciplines outside its originating domain of sociology. In studies of organization and management, case study analyses cover macro, organizational or industry levels of analysis and can be instrumental in providing particular insight or in advancing theory (Locke 2001). Much of the theoretical focus in management and organizational research concentrates on substantive issues around decision-making and change. As in this dissertation study, grounded theory approach is very helpful for studying the evolution of alliance networks, since large parts of managerial decision-making are usually executed in complex organizational settings. In line with this thinking, scholars have frequently suggested that the grounded theory is particularly suitable for studying managerial and organizational behavior for a number of reasons (Locke 2001).

(1) Capturing complexity: The grounded theory approach adapts flexibly to capturing the complexities of the alliance networks in which firm behavior unfolds. Multifaceted accounts across several units of analysis allow for a focus on contextual and process elements of the particular substantive issue at hand.

(2) Linking well to practice: Concentration on the substantive issues of alliance network management resulting in theoretical, but empirically based frameworks adds value to managerial implications of the phenomenon studied. With emphasis on pragmatic usefulness as quality criterion, grounded theory frameworks are helpful in bridging theory and practice, providing executives with options to identify and prepare for changes that might lead to higher performance.

(3) Supporting theory development in new substantive areas: Data gathering and theory building orientation allow for the exploration of new substantive areas. Both the challenges of managing alliance networks as described in chapter 1 or effects of high technology application on managerial and organizational behavior (Eisenhardt and Bourgeois 1988; Eisenhardt 1989b) represent good examples of these emerging substantive areas. In the domain of strategic management research, zu Knyphausen-Aufseß (1995) identifies an increasing popularity of rich, contextual and qualitative case study based research due to the increasing importance of contingency-based paradigms and focus on the firm as the dominant unit of analysis.

As another example of a novel theoretical domain, management and organization scholars have been expressing an increasing interest in process-oriented theories. Researchers are describing process-oriented research in various ways – but all relating to one common element: time. Researchers with a strong process orientation (Pettigrew 1997: 338) define process as ‘a sequence of individual and collective events, actions and activities unfolding over time in context’. Pentland (1999) suggests that process research is concerned with stories as abstract conceptual models that explain the sequence of events. As all these understandings of processual research share the focus on changing managerial and organizational realities, the overriding objective of a ‘process analyst is to catch the reality in flight’ (Pettigrew 1997: 338). (Glaser and Strauss 1967) argue that the grounded theory style of research is especially suited to generating theories of social process.

(4) Reviving mature theoretical areas: Grounded theory approach has been frequently used to introduce a new perspective to mature theoretical domains, which has the potential to modify already existing frameworks. Applying the perspective of network dynamics has the potential to extend the well-developed frameworks on dyadic alliance formation. Utilization of the grounded theory approach ensures that theories remain up to date with organizational realities they assert to explain.

The grounded theory approach is designed to help researchers to make the transition from empirical observation, to compose conceptual categories and to derive ways in which the categories relate to each other. When researchers in the theory-building mode move towards proposed relations between concepts, the plausibility of the theorized elements needs to be proven. The framework of conceptual categories achieves analytical generalization when it can plausibly account for a larger number and range of empirical observations.

However, grounded theory does not specifically address the qualitative research's data gathering operations. Although the sampling issues that precede data gathering are considered at great lengths and are central to the approach's analytical logic, the mechanisms of obtaining data and composing data documents are largely ignored. While only limited advice is given on data gathering practices, Glaser and Strauss do advocate the collection of data from multiple sources that are relevant to the phenomenon studied.

Covering multiple data sources potentially across several units of analysis through multiple iterations in the process, grounded theory approach summarized in Exhibit 2-1 frequently draws on case studies – a research strategy that concentrates on dynamics presented within single settings (Eisenhardt 1989a). The objects to be studied can range from single or several organizations, one or more organizational sub-units to particular organizational practices such as decision-making.

Research questions	<ul style="list-style-type: none"> ▪ Definition of research questions and a priori constructs to focus efforts 	
Case selection	<ul style="list-style-type: none"> ▪ Theoretical, but not random selection of case studies to sharpen external validity 	
Data gathering & interviews	<ul style="list-style-type: none"> ▪ Selection of data collection methods (qualitative and quantitative) ▪ Combination of data collection and analysis (flexible and opportunistic) 	
Data analysis	<ul style="list-style-type: none"> ▪ Within and across case pattern analysis using divergent techniques to foster divergent perspectives and to quickly adjust data gathering 	
Hypothesis development	<ul style="list-style-type: none"> ▪ Iterative tabulation of evidence for each construct to sharpen construct definition, validity and measurability ▪ Replication logic across cases to confirm and extend theory ▪ Collection of evidence for causal (“why”) relationship 	
Literature review and closure	<ul style="list-style-type: none"> ▪ Comparison with conflicting and similar literature ▪ Summary of results and quality review 	

Exhibit 2-1 Overview: Ground theory building from case study research adapted from Eisenhardt (1989a)

Since the case studies chosen by the researcher are considered an investigative object, issues of sampling are of major importance to this approach. The choice of cases reflects purposeful sampling that provides the opportunity to learn a substantial amount central to the research. In the process of selecting information-rich cases, several approaches such as sampling of deviant cases, sampling for maximum variation or sampling for a specific criterion may be useful (Yin 1994). The case study approach does not favor either qualitative or quantitative information, but seems to share the practice of producing first-hand and fact-based accounts of its units of analysis (Eisenhardt 1989a). So far, only limited and loosely integrated empirical work has studied and defined the network structure with which to study alliances. As examples, alliance networks have been investigated as previous ties (Gulati 1995b), director interlocks (Mizruchi 1992), structural holes (Burt 1992), and technology similarity (Stuart 1998). Empirical studies of alliance networks in particular industries have focused on the automotive (Dyer 1996), biotechnology (Powell, Koput et al. 1996) and computer workstation industry (Gomes-Casseres 1996).

Guided by **research questions**, the grounded theory approach is committed to emerging research and the discovery through directly contacting units of analysis

coupled with a rejection of a-priori theorizing. Glaser and Strauss (1967) argue vehemently for the rejection of preconceived theories, because these theories have the effect of obstructing the development of novel theory by intervening between the researcher and the subject. However, case study research should embark on its studies with the general guidance provided by some type of orienting theoretical perspective. Therefore, grounded theory makes the assumption that researchers are clear as to their purpose for the study, the issues to illuminate, and perhaps the practices it might influence. In summary, the grounded theory approach assumes that researchers have defined their research question. In this study, the analysis research review in chapter 1 provides the required guidance through clearly defined research questions and some preconceived constructs to data gathering and analysis.

Case selection: Sampling data is an issue throughout the study, as in-process analytical categories and preliminary theoretical frameworks directly and iteratively shape further sampling activity. In the sense of being integrated in various forms of analytical processes, grounded theory sampling is described as being theoretically driven. In active search for sampling data, theoretical sampling represents one of the foundational processes of this research style that provides the best possible information for theorizing a substantive empirical phenomenon (Glaser and Strauss 1967). Therefore, sampling in this study is guided by the rationale of gathering information that will best develop the theoretical framework and has followed an iterative flexible process. Following this process, flexible data gathering in terms of flexible selection of case study companies supports the category development to the point of theoretical saturation and a stable theoretical framework.

Although statistical generalization and representation of an entire population are not required for case study based research, the number of case studies has an effect on the opportunity to generalize from empirical findings. Eisenhardt (1989a) recommends four to ten case studies to develop a theory of certain complexity with a convincing empirical basis. Doz, Olk and Ring (2000) suggest that a small number of case studies is ideally suited to identify emergent processes of alliance network formation and their relationships to idiosyncratic outcomes. Given the resource constraints of every study, the trade-off between the number of cases and the degree of detail in each case study description has been decided in favor of presenting exhaustive information for all units of analysis. Eisenhardt (1989a) recommends selecting contrasting case study examples

that enable a good description and multiple perspectives on the empirical phenomenon, which allow for high potential of meaningful analyses.

Pettigrew (1990) has also argued for providing a rich context, which has the capability of exploring the embeddedness and temporal interconnectedness of longitudinal change processes on the alliance network and firm level. He further suggests a selection of case studies that promises high levels of proficiency of the studied phenomenon. Consequently, firms in both the information technology and telecommunications industries have been selected as case study objects. Proficiency in forming and managing a portfolio of alliances – common for firms in both sectors – generates rich findings on interorganizational collaboration and its subsequent evolution due to several reasons: First, firms in both industries face intense competition and increasing innovation rates, which generates the need for alliance formation. Second, the established interfirm partnerships are of strategic relevance for all firms due to increasing requirements for collaborative product development with ever shorter time-to-market cycles.

Within firms of both sectors, different levels of experience in alliance formation, the maturity in partnership portfolios and differing business scopes (Exhibit 2-2) generate the necessary variation in the sample to derive relationship between emerging conceptual categories.








Company	Primary Interviewee (s)	Business context
Intel Capital	Investment Manager	Intel Capital investments in Europe
	Member Executive Board	Alliance for technology, content and co-marketing
	Member Executive Board & Project Managers	Investments in regional fixed-line city carrier operations
 	Member Global Visioneer Council & Project Manager	Business incubation for seed start-ups
	Manager Venturing/Partnering	Launch of i-mode mobile data portal for information and entertainment
	Director Lycos mobile	Launch of mobile information channel
	Managing Director	Launch of mobile services for young user group

Exhibit 2-2 Overview: Case studies and business contexts

In general, the selection of appropriate additional case study firms which are different as well as similar to ones already sampled help in the theory development process through a number of mechanisms:

- (1) The analytical process is facilitated by comparing particular features across many groups, which increases the awareness for the extent that behaviors under scrutiny are similar or different.
- (2) By investigating not only comparative firms but also comparative situations, analytical results can uncover how conceptual categories or properties might be affected by different conditions.
- (3) Sampling different and similar firms and situations will collect enough information to stabilize and saturate conceptual categories in the developing theoretical framework.
- (4) Sampling across diverse groups and situations outlines the boundaries and applicability of the theory.

In the **data gathering and interview** phase, the information base in this study draws on two instruments: archival documents and semi-structured interviews. Providing a

variety of perspectives from which to understand a potential conceptual category, the utilization of both archival documents and face-to-face interviews enables the triangulation of information by depending on the specific advantages of each instrument. To increase the reliability of the data, interview results were compared to archival data such as press clippings and annual reports. Although not eliminating the possibility of a bias, secondary sources lend credence to the interview data's accuracy in describing alliance network formation processes and focal company resources. Although retrospective data suffers from the biases in the recollection of company executives, comparing multiple qualitative data sources (refer to Exhibit 2-3 for an overview) ensures the substance of finding, the validity of developing constructs and the generalization of propositions. The archival sources in this study include annual reports, articles from business and trade press, and internal documents such as presentations and available press releases. Although the amount and relevancy of the documents varies from case study to case study, archival sources in their comprehensive description have proven to reduce interviewer bias. Based on the complexity of studied phenomenon and the availability of secondary sources, a fixed number of interviews with case study companies has been requested.

All interviews, which lasted between 2 and 4 hours, have followed a semi-structured interview guide, which facilitates comparison and gives respondents enough flexibility to elaborate on the specific areas. In order to collect data on alliance formation processes from a focal company perspective, this study surveyed managers involved in the historic development of partnership structures. Thus, the data are retrospective and have the limitations inherent in such surveys.

Although the exploratory nature of grounded theory research questions does not allow for a focus on specific variables at the beginning of the research effort, the complexities of alliance formation on a longitudinal basis and interaction effects with focal company resources demand a very targeted and focused approach for interview data gathering. To limit the overwhelming volume of data, scholars have also used prior specifications of existing theory to narrow and direct the analysis. In a similar approach, Eisenhardt and Bourgeois (1988) have also applied a number of constructs from literature on decision-making into their research sites, measuring them in interview protocols and questionnaires. On the other side, Pettigrew (1990) suggests a broad exploration of multiple contexts – namely economic, structural, cultural and

political environments – to fully account for and analyze multifaceted processes of changes with feedback loops.

In balancing these two conflicting requirements, the interview questionnaire explores the research questions outlined in chapter 1. On the research issue of ‘evolution of inter-firm alliance networks’, the process of developing an entire alliance portfolio around focal case study firm within the described business contexts has been explored: Name of alliance partners, functional dedications of partnerships, nature of resource exchange, intensity of relationships, formalization of contractual arrangements, redundancy in the alliance network and transitional activities to provide the wider context. In the following description of case studies, findings in this area are described in two sections: Whereas the section ‘Network structure’ describes the staged and sequenced evolution of alliance network structures from an outside perspective according to the criteria mentioned above, the section ‘Network adjustment’ covers transitional activities between network stages. Findings on transitional activities include lead generation for additional partnership opportunities, firms’ due diligence processes and criteria, involvement of functional departments as well as network firms’ internal transition towards a higher operational integration.

On the research issue of ‘resource exchange and combination in alliance networks’, the interview guide has helped to explore issues of operational coordination and changing levels of focal company resources. The nature and quality of operational coordination is captured in partners’ similarity of views, focal firm’s dominance and the level of conflict regarding certain alliance management issues in the network. Covered alliance management issues include overall network goals, targeted network structure, selection of future network companies, divestiture of current network companies, probability of consortiums success, financial contribution by the focal company, technical contribution by the focal company, annual budget levels, appointment of top alliance executives, employee/staffing procedures, product development agenda, technology transfer policies and market/business development agenda. In more detail, support processes to manage alliance conflicts, share knowledge and access partnership relevant knowledge have been discussed with management of case study companies to complement the perspective on operational and daily coordination. Findings on these aspects in the later case study descriptions are covered in the section of ‘Operational coordination’. Changing levels of focal company resources with reference to the earlier

described and defined stages of alliance network evolution have been explored for all case study firms along financial, technological, physical, managerial, human, organizational dimensions. However, interview respondents in all case have used own qualitative categories appropriate to their case study setting to describe the evolution of focal firm resources. Study results on this topic are described in the section ‘Initial resource base and development’.

On the remaining research issue of ‘linkage to competitive advantage’, case study firms have provided information on their performance matrices used to assess the performance of either an individual alliance or the entire network of partnerships. Discussed performance matrices qualitatively assess the overall network performance, financial indicators (profit and loss statements, absolute sales, sales increases, market share developments), cost reductions (in technical research and development, human resources and people development, training), project result improvements (quality and timeliness of joint product development, establishment of industry standards) or company resource improvements (focal firm’s technical research and development, corporate culture, alliance management capabilities) and quality and quantity of communication within the alliance network. Besides this multi-factor qualitative assessment, quantitative information on the total number of companies, the personnel employed in the alliance network and number of products launched have been requested, but only the first indicator has generally been available for the case study firm. However, due to the diversity of business contexts, firm sizes, time horizons in alliance evolution, performance indicators in this study have proved to be very difficult to compare between all cases.

Although emerging strategic moves (Mintzberg and Waters 1985) and changes in organizational structures (Miller and Friesen 1982) can be better explored in a longitudinal research setting, continuous records of alliance network changes are often hard to collect and methods for using longitudinal data are quite complex (Tsai 2000). As an additional complication, networks are dynamic structures, which are influenced by the alliance structure of prior and current partnerships. When observed in a longitudinal analysis, the formation of new partnerships as an example for embedded organizational behavior changes the network structure that had an effect on their creation. The considerable degree of complexity requires clear focus on and definition of empirical phenomenon, especially for the alliance as important unit of analysis:

Strategic alliances are partnerships among firms in order to attain specific strategic objectives (Berg, Duncan and Friedman 1982; Killing 1983). However, partnerships can be driven by a variety of motives and goals, manifest in the range of governance forms across vertical and horizontal boundaries. Consequently, alliances have also been described by the concept of sharing control and benefits between participants (Badaracco 1991; Chi 1994; Gomes-Casseres 1996) and classified on a spectrum between short-term contracts and equity investments (Contractor and Lorange 1988). Over the evolution of alliance research, the focus of early empirical studies on the formation of alliance has been expanded from joint ventures involving shared equity to alternative forms such as marketing arrangements, R&D partnerships or licensing. To provide a reliable reference point for all interviewees, strategic alliances in this study are defined by “voluntary arrangements between firms involving exchange, sharing and co-development of products, technologies and services”(Gulati 1998) and are assumed to be of major importance for resource exchange and performance.

To further limit the complexity in the data-gathering phase, this study purposely focuses only on the firm’s egocentric network, which directly influences the flow of resources across interorganizational boundaries. This egocentric network of firms consists of a set of direct, dyadic partnerships and relationships between these ties with the firm at the center of the network as the focal actor. This type of network perspective excludes the indirect or secondary ties to which the firm is connected through its direct partnerships. In line with this approach, Ahuja (2000a) found in a recent study that indirect or secondary ties only marginally contribute to performance, compared to their direct counterparts.

For the purposes of examining interorganizational egocentric networks, this study differentiates tie strength by the frequency of interaction between partners and their level of resource commitment to the relationships (Rowley, Behrens et al. 2000). Strong alliances such as equity arrangements, manufacturing arrangements or joint R&D projects are broader and deeper in terms of the investment and interaction than marketing joint ventures and technology licensing, which require less coordination and understanding of partners’ organizations.

Senior level interviewees as interview respondents are all highly involved in the formation and ongoing management of cooperative relationships. All conversations

were conducted in ‘face-to-face’ meetings in English or German, taped and later transcribed. Taping interview content gives the interviewer the advantage of concentrating his or her full attention on the conversation and extending the scope of interest where necessary. All interview respondents have been given ample opportunity to review interview transcripts to increase internal validity and reliability. Changes, additions and clarifications have been requested only in one case with direct changes in the transcript file. All interview transcripts are included in the case study database.







Company	Primary Interviewee (s)	Interviews		Press research pages	Annual report
		Pri- mary	Sec- ondary		
Intel Capital	Investment Manager	2	1	150	✓
	Member Executive Board	1	1	50	
	Member Executive Board & Project Manager	3	1	10	✓
	Member Global Visioneer Council & Project Manager	2	0	100	
	Manager Venturing/Partnering	1	1	120	✓
	Vice President & Director Lycos mobile	1	1	230	✓
	Managing Director	1	1	70	
Total		17		730	

Exhibit 2-3 Overview: Case studies and database content

In the subsequent **data analysis** phase, emerging concepts organize the world described in data documents, observations or interviews by highlighting what things go together and what things are distinct from each other. The descriptive world captured in primary and secondary interviews and archival documents is transformed into an organization, a shape and general coherence that can only be achieved through the act of conceptualization. Aimed at understanding a particular substantive problem, these concepts are developed to account for perceived patterns in the data sets and to assign a common ‘meaning’ to a set of empirical observations.

To stay close to the context under investigation and fully inform the conceptualizations, all preconceived notions, expectations and previous theorizing

should be suspended. Brainstorming on possible interpretations ensures a broad scope of suitable meanings for the specific observation. Subsequent comparing ensures the development of a common name for multiple data observations and promotes the creation of more general conceptual categories. It also clarifies and sharpens the conceptual categories in their interpretation of the data. In the review process of similar and different data, incidents as well as respective categories clarify uniformity and stability in the data. The comparative process refines and even discards conceptual categories, and helps to develop the robustness of the categories with clear properties and a limited dependency of other conditions. This process reaches a stage of theoretical saturation, when subsequent data observations provide no new information, either in terms of refining the categories, its properties or its relationships to other categories.

To handle the diversity, complexity and volume of the data set especially in this longitudinal research setting (Van de Ven and Huber 1990), each case study is concluded by within-case study analyses. This type of analysis identifies relevant conceptual categories for alliance formation, evolution and resource adaptations. Later, cross-case analysis is used for the identification of similarities and differences in the data set within the previously identified categories. Together with within and cross case analyses, drafts of conceptual categories are integrated with all their data properties and dimensions. Core and central conceptual categories are then analyzed in their relationships and arranged in a consolidated draft theoretical framework.

With developed content categories and composed theoretical formulations, **developed hypotheses** define boundaries and components of the theoretical framework to clarify the meaning of an underlying empirical phenomenon. This comparative process draws up the boundaries of the theory development on two levels: on the level of broader theoretical framework and on the level of content categories derived from data observations. At this stage, highly developed content categories with their properties and dimensions seem to account for the data observations indicating that concept. In parallel, conceptual reduction on the level of theoretical framework facilitates the focus on particularly important aspects of the analyzed phenomenon. Also on the level of the conceptual categories, further delimiting ensures the commitment to describe specific relevant relationships with the help of robust and relevant categories. In this process, earlier naming and comparing results that prove irrelevant in some conceptual

categories can be excluded from the final conceptual framework. With the understanding that all fragments of the data can be reflected in the conceptual framework, theory development as an emergent process can always be taken further. However, when substantive explanatory value for the empirical phenomenon has been reached, analysis can be concluded with a theoretical framework of both relevant and robust conceptual categories. In a final step, theory with focus on important categories and relationships will be presented in written format, which guides through the extension of discovered categories to higher levels of abstraction, their arrangement and relationship to each other.

Basic analytical guidelines support the development of the theoretical framework: The egocentric alliance network as an integral component of this study requires two levels of analysis – the network dyads and their compilation into a larger network. Simultaneous analysis of both levels explores evolution in the dyadic partnerships and its effects on the aggregated network. In addition to these network level effects, developing focal firms' resources supplement substantial co-evolution or feedback mechanisms: Co-evolution is set in motion when resource needs require networks to adapt, because network adaptation then reduces resource needs, which consequently increases the firm's chances of successfully progressing to more advanced stages. As the firm reviews and adapts its network to meet changing requirements, the firm will be better positioned to obtain additional resources and asset stocks for continued growth. Therefore, resource needs may not only have an effect on network evolution but also on future resource needs.

As the final stage in the research process, **literature review** concludes with the comparison of case study findings with the body of alliance literature. Informed by both a review and a discussion, theory building depends on the comparison of tentative propositions with existing literature. In this study, theoretical perspectives and findings from the resource-based view of the firm and network theory are contrasted with the set of tentative propositions and case study findings. Theoretical concepts help to substantiate tentative propositions and important contributions are integrated in a final set of propositions.

In evaluating the quality of the developed theoretical framework, Eisenhardt (1989a) argues that there are no generally accepted guidelines for assessment of theory building

research. Initially, Glaser and Strauss (1965) have offered two terms in the assessment of the overall soundness of the theoretical framework: 'Pragmatically useful' and 'credibility'.

Reflecting its pragmatic approach, grounded theory results have to fulfill the requirement of having practical utility in the course of daily events. Following this perspective, grounded theory is tested 'on the ground'. Glaser and Strauss assess the value of the developed theoretical framework using four terms: 'fit', 'understandable', 'general' and 'control'. The framework must fit the situation at the center of the researched phenomenon by being compatible with empirical data and needs at the same time to be readily apprehensible. General theoretical frameworks are relevant to a number of different conditions and situations in the practice setting. A good theoretical framework also provides the person using it with a degree of control over every day issues. These four criteria underline the close relationship between the developed conceptual framework and the social situation analyzed.

Credibility as the second term mainly refers to the research practices during the analytical process and can be achieved through sound theoretical sampling of comparison groups and a variety of data in order to extend the general applicability or analytical generalization of the theory. Yin (1994) has detailed these requirements into construct validity, internal validity, external validity and reliability. The research design of this study has fulfilled these requirements extensively. Construct validity has been ensured through triangulation of data sources. Rich case study descriptions provide enough empirical evidence for each construct to allow independent assessment of the fit with the theory. Although thorough reporting of information shows confidence in the validity of the developed framework, even theory building research can hardly achieve a perfect fit with the data. Multiple feedback loops in data gathering and analysis increase internal validity. Reliability has been addressed by fulfilling very strict documentation and transcription standards. External validity referring to aspects of generalization of developed theory is not of integral importance to case study-based research. Case studies help generalize empirical results into testable propositions, but not represent a sample of an entire population. Therefore, the derived propositions contribute to development and their analytical generalization of theories, but cannot make assertions on statistical frequencies of entire populations.

2.2 Alliance networks for the development of new technology based firms in information technology industries

After stages of extremely high industry growth, information technology providers need to remain continuously active in developing new business opportunities. *Intel Capital* and *Sun Microsystems/DLR* develop new technology-based firms to access business opportunities, which in total improve the decreasing margins of their traditional core business.

2.2.1 Industry context

During the late 1990s, the deployment of information and communication technology has made significant contributions to the productivity growth. Despite sharp decline in technology shares and demand in technology equipment industry since the late 2000, the outlook for the industry remains favorable, as service and product innovations such as broadband data transmission continue to drive demand from firms, households and governments. Therefore, the economic activity of telecommunications and information technology firms accounts for a growing share of manufacturing, employment and trade (OECD 2002).

Technically and economically converging industries of telecommunications services, telecommunications equipment, information technology hardware, information technology software and audiovisual services (TV, video, cinema) underline their relevance with growing market volumes: In the year 2001, market volumes for all five segments accounted for a total of € 2,587 billion, which has increased by 13% annually since 1995. All industry segments represent 8.6 % of the global gross national product – a strong increase from 4.6 % in the year 1995 (Idate 2001). Western European market volumes based on regional consumption have grown from € 451.2 billion in 1995 to € 669 billion in 2001 at an average annual rate of 7%.

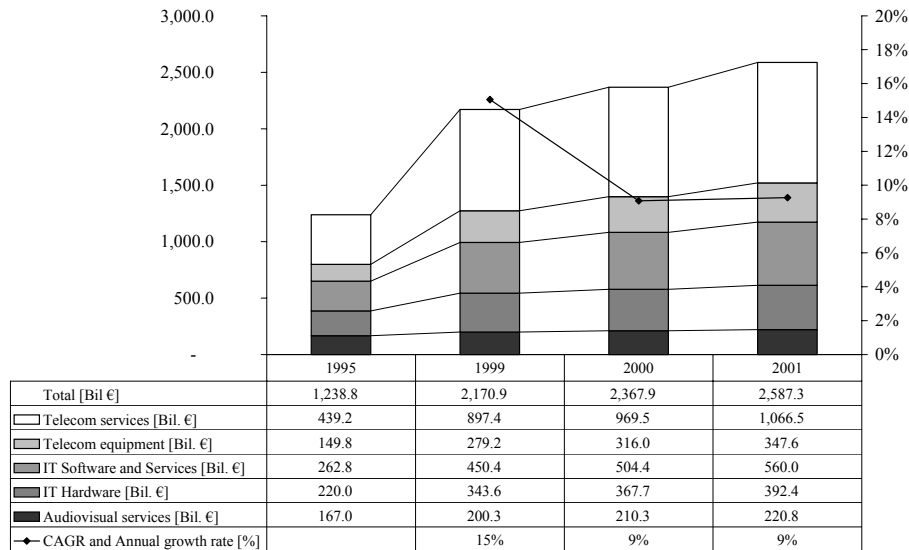


Exhibit 2-4 Market volumes: Global telecommunication, information, media and entertainment industries [Bil. €] (Idate 2001)

In Germany, the total of all market segments has grown from € 94.2 billion in 1995 to € 134.6 billion in 2001 at compound annual average growth rate of 6%. The combined market segments of information technology hardware and software currently expect a modest growth of 1 and 2 percent (EITO 2002). Whereas market segments for information technology hardware will have to face an expected decline of 6.8 and 1.5 percent in 2002 and 2003, software products and information technology services reverse this trend with growth rates between 2 and 5 percent over the same time period. From an economic perspective, service investments in packaged software and software related services rank among the most rapidly growing sectors with strong increases in value added, employment and R&D-investments. Integration, interconnection and compatibility are of major importance. Network computing and the availability of the Internet facilitate novel software supply strategies by application service providers, also driven by outsourcing activities adopted by user firms of all sizes (OECD 2002). Under the term digital convergence, the deployment of digital technology has led to the synthesis of telecommunications and information technology. Typical for industries with high uncertainty and absence of rules, the forms of digital convergence follow constant changes. Digital convergence allows for interactivity, integration of media types and access to dispersed source of information over wide-area networks. Wide-area network integrate the data transmission over wireless, cable TV or fixed-line telecommunications infrastructures.

With new data transmission channels being available and innovations supported by information technology, separated applications will increasingly communicate directly with each other: The Internet, increasingly used as a vital infrastructure for communication, collaboration and information sharing, contributes to efficiency improvements and productivity gains. More widely available computing power and information transfer capacity shift the dominant model of information exchange towards a decentralized and equally distributed model. Open source software development, Internet protocol version 6, wireless and peer-to-peer services are examples for a shift in the structure and nature of information exchange. Emerging decentralized information flows have only begun to profoundly effect established structures. Although many of these Internet based innovations have been discontinued in the stock market meltdown, the volume in electronic commerce transactions – although less than initially projected – is increasing gradually: Internet-based sales and purchases so far are concentrated on a few industry sectors, where the nature of economic activities in these sectors strongly determine characteristics of Internet transactions. Major concerns are related to the security in handling payments, the uncertainty over contracts, the variety of technical standards and the insufficient customer base. Innovative software products for payment, security and verification of electronic commerce enhance and upgrade these Internet-based services.

With most of technology knowledge residing in software, information technology hardware for storing and processing digitized content will reach commoditization in the near future. Historically high growth rates in information hardware technology markets results from technological advances in components such as microprocessors, memory, and storage devices rather than from operational changes undertaken by hardware manufacturers. These technical improvements can be traced back to the simplification of computer architectures and the standardization of components. Design simplification, the integration of many analog and digital components into a few standardized semiconductors, and higher levels of outsourcing have increased the productivity of information technology manufacturers.

On the supplier side and in particular the semiconductor industry, productivity increases have resulted from acceleration in the performance of sold microprocessors. Shortened time cycle of Moore's Law, which originally assumes a doubling of transistors on single chip only every 18 months, has led to an increasingly frequent

release of affordable chip generations recently and moved the average chip performance closer to that of the most cutting-edge ones (Yoffie 1996; Cho 2002). Earlier in 1995, microprocessor companies have decided to improve their manufacturing processes by exploiting technological advances in manufacturing equipment, simulation, and wafer inspection that reduce the number of production runs needed to get to a marketable yield. As the production of microprocessors is highly sensitive to environmental disruptions, flaws in chip design, and mistakes in the fabrication process, improvements in manufacturing processes allow semiconductor manufacturers to earlier reach profitable scale.

Increasing demand for more powerful computers driven by advances in semiconductor components represents an important factor for market volume growth. Accelerating memory and speed requirements of new application software and of *Microsoft's* Windows operating systems have raised the frequency of computer upgrades. Increasing competition in the supplier markets for memory chips have resulted in rapid price declines and upgrades in the amount of memory on more powerful computers. Only a smaller fraction of market growth can be traced back to extraordinary events such as Year 2000 investments, the growing penetration of personal computers driven by Internet access and the creation of corporate networking infrastructures. At this stage, fewer software upgrades and the near saturation in PC markets can be identified as major causes for declining market volumes in information technology hardware. Demand stagnation and reduction in turn leads to strong competitive behavior in both information technology hardware and the semiconductor industry.

Increased competitive behavior between participants in the information technology industry can be understood as an attempt to reallocate market shares. In a first step, stagnant demand mandated to strong declines in information technology prices. As an example, gross profit margins for personal computer manufacturers fell from an average of 25.6% in 1998 to 20.9% in 2001, which has created an enormous pressure to reduce costs (Dedrick and Kraemer 2002). Although increased rate of innovation in key components as described above softens the price impact with extended product values, cost pressures triggered significant changes in firm and industry structure.

Decreasing contribution margins and growing product complexity triggered the emergence of the direct sales, build-to-order manufacturing. Under this business

model, IT hardware manufacturers especially for personal computer systems assemble systems as orders come in, usually allowing customers to choose from a set of configurations on basic models, and ship the product directly to the customer without the involvement of distributors and retailers. Across the information technology industry, business processes were fundamentally altered by the shift from traditional supply-driven to this new demand-driven production. As accelerating innovation cycles result in rapid product depreciation, these capabilities proved critical, and the direct vendors' market share grew steadily at the expense of traditional indirect vendors. At the industry level, build-to-order manufacturing has created a modular production and distribution network. For individual information technology providers, modular production provides more flexibility in tailoring value chains for different products and markets. Interorganizational information networks based on the Internet or EDI have played a critical role in the aligning complex business processes across company boundaries and along the entire industry value chain. As companies apply information technology to develop interorganizational efficient electronic linkages with external parties beyond those of earlier proprietary systems, the ubiquity of the Internet lowered the cost of interfirm partnerships, which impacts their organizational structure. The modular nature of the information technology manufacturing facilitated the creation of an industry structure that can be characterized by high degree of specialization and separation of functions. Originally, this industry paradigm was formed by IBM's decision to utilize outside suppliers for most of the parts in its original PC in 1981. Firms generally compete in selected horizontal value chain segments from component manufacturing to technical support (Grove 1996).

Competition behavior was amplified in 2000-2001, when continuing price wars and a precipitous drop in demand staggered the whole industry. As a result, information build-to-order technology provider *Dell* gained market share and became the number one personal computer manufacturer in the world in 2001, but saw its profit margins and return on equity decline. Other PC makers reported losses and number two PC supplier *Compaq* merged with number three *HP* in 2002. Meanwhile, *Intel* and *Microsoft* were able to sustain pricing power and gain an ever-greater share of the industry's total profits.

As outcome of this industry transition, information technology hardware providers reassess their core capabilities: Manufacturing has been the important competency in

the past, but managing a portfolio of products and services delivered to the end customer is of major importance in the future. Besides managing a network of partnerships, information technology hardware manufacturer continuously maintain and strengthen the customer relationship.

As innovation remains an important driver of change and creates new markets, incumbent firms in both telecom and information technology sectors have been actively involved in market development activities. As required technological and managerial competencies are broadly distributed as described above, strategic alliances, joint venture and acquisitions focus on reducing know-how insufficiency. Technology-oriented M&A and strategic alliances in these industries are mainly driven by fast technological change and shortening product life cycles. In addition, increasing price competition and the threat of commoditization have motivated vertical alliance activity. In an initiative to explore new market potentials, telecommunications service providers, IT hardware manufacturers and media companies have engaged vertical alliances to ensure traffic for network, utilization of computing power and distribution of content. Through technology-oriented M&A and alliances, firms in these sectors explore emerging technologies such as IP networking, radio and optical communications and broadband data transmission and prepare the market launch (OECD 2002). Supporting the establishment of new technologies, especially American companies are actively involved in driving the proliferation of so-called 'de facto' standards, which are created by industry leaders, forums or groups instead of institutionalized standardization organizations. These standards for transmission, encoding, compression and storage can be established quicker and more efficiently than traditional standards originally set by telecommunications companies. The establishment of universal standards represents an important step for market penetration of multimedia applications. In addition, electronic commerce transactions also require a legal framework for regulation on content, security, electronic payments, electronic signatures and multimedia copyright selection (Gerpott and Heil 1996).

2.2.2 *Intel Capital Europe Middle East Africa (EMEA)*

In its long history, *Intel Capital's* corporate venture capital program has developed clearly defined alliance relationships to its equity investments that follow predefined frameworks. Among others, these frameworks and guidelines for *Intel's* corporate venture capital investments regulate the level of management involvement, technical support and financial investment. Clearly defined relationships help to manage expectations and limit the required management attention.

Business Background:

Intel's long-term experience in corporate venture capital activities

Intel's strategic investment program – initially described as Corporate Business Development and founded in 1991 – focuses on equity investments and acquisitions in new technology-based firms (NTBFs) (Hurley 2000). From 1999 to 2001, *Intel Capital's* equity portfolio of \$ 3 billion (Brull 2001) was invested in 600 companies worldwide. Meanwhile, portfolio gains in 2000 soared to \$ 3.76 billion from \$ 883 billion in 1999 contributing nearly one third to *Intel's* 2000 earnings of \$ 12.1 billion.

In the 2001 valuation meltdown of NASDAQ shares, *Intel Capital's* value of over 475 portfolio companies decreased from \$ 10.8 billion in 2000 to \$ 1.5 billion as of June 30, 2002. *Intel Capital* typically invests in private companies and typically follows them to successful initial public offerings or trade sales. As part of careful management of a large portfolio, equity holdings are reduced in some companies over time to recoup capital for new investments. However, strategic activities may continue with the company after its sale (Intel Capital 2002b).

Since pure maximization of financial returns is not the primary goal, *Intel Capital's* main motivation for developing a technology equity portfolio is driven by the goal of rapid access to and establishment of innovative technology as well as to help develop 'eco-systems' for *Intel* products. Developing innovative technology supports the establishment of industry standards, drives Internet infrastructure growth and advances computing platforms in support of *Intel's* strategic interests (Intel Capital 2002b). Fulfilling strategic interests finally creates and expands markets for hardware, software and services based on *Intel* technology. Other environmental factors such as coping with increasing competitive intensity or achieving economies of scale have only minor

influence on investment decision or alliance formation with the new technology-based firm (NTBF).

Integrated in business units' technical strategy (Wong 2001) and based on the technology area, both the *Intel* research council and *Intel Capital* determine time-to-market lags and development and assign responsibilities and business activities (Lai 2001).

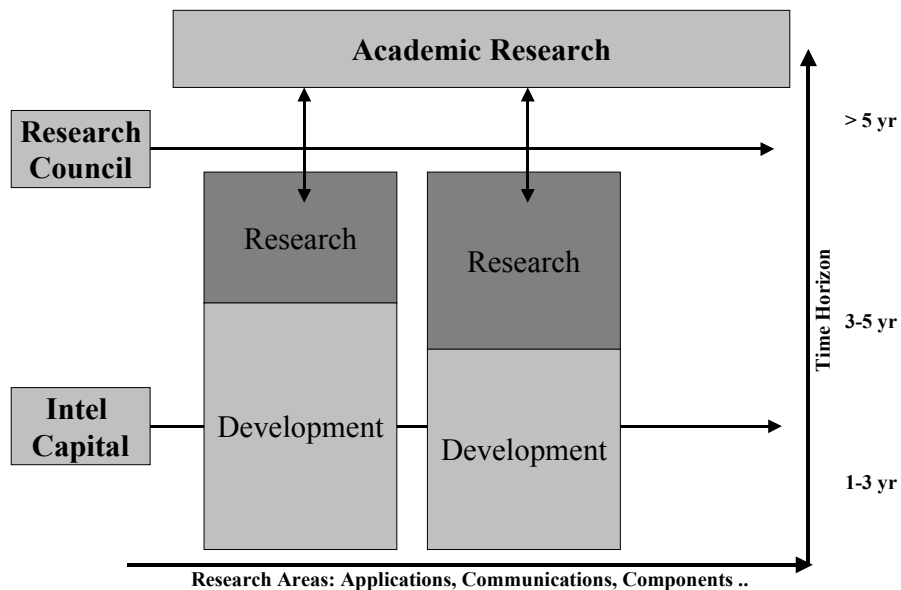


Exhibit 2-5 Intel Capital: Responsibilities by technology area and time horizon (Wong 2001)

Depending on the technology area, *Intel* creates a market ecosystem from end-to-end to set standards and optimize the performance of *Intel* hardware. Ecosystem development certainly calls for systematic and extensive investment decisions based on a clear definition of technology roadmaps:

"You can hardly see an Intel business initiative without an investment component [...] We're working to create a market ecosystem from end-to-end, to accelerate its development."

(Leslie L. Vadasz, President, Intel Capital & Executive Vice President Intel, in (Brull 2001))

Investment and technology areas range from Internet infrastructure, Internet content services to global adoption of the Internet. The area ‘Internet infrastructure’ includes client/server products and technology, networking, and communications as well as design and manufacturing technology (Intel Capital 2002b).

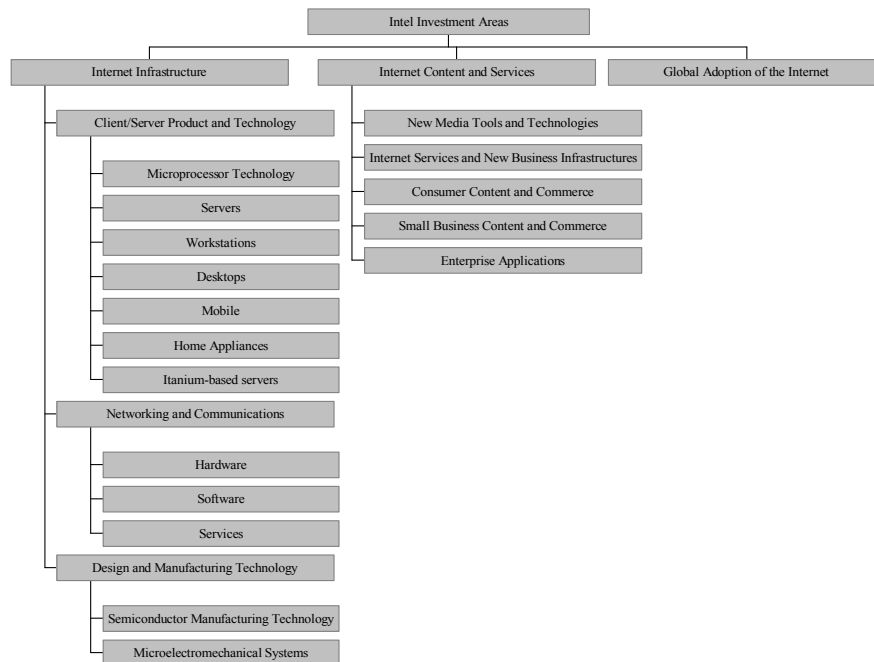


Exhibit 2-6 Intel Capital: Investment and technology areas (Intel Capital 2002b)

In addition to *Intel Capital's* core financial resources, the Intel 64 fund for solutions on Itanium-based servers and the Intel Communications Fund add to the basic financial strength (Hurley 2000). The Intel 64 Fund invests in workstation solutions such as Internet infrastructure, supply chain management and enterprise resource planning. Total funding coordinated by *Intel Capital* has been provided by co-investments from

Compaq, Dell, Hewlett-Packard, Intel, NEC and SGI. Morgan Stanley Dean Witter manages other investors from the financial, retail, aerospace, automotive, pharmaceutical and media industries. Since 1999, the Intel Communications Fund has been investing in technology companies that develop innovative networking and communications solutions. Networking and communications solutions utilize *Intel's* Exchange Architecture, CT Media telephony server, personal Internet client architecture and Xscale microarchitecture.

Intel Capital investments in emerging areas such as the bluetooth wireless protocol are regarded as clear commitments to certain technology standards or exchange protocols. In a specific case, technical developments have to extend current *Intel* standards such as *Intel* 802.11 wireless LAN system into new application areas (Nelson 2001). Similar patterns can be detected in *Intel Capital's* investment in IEEE-1394 Fire Wire technology ventures – a technology that initially was only promoted by *Apple Computer* as Fire Wire and by Sony as iLink (Brown 2000).

In a regional breakdown, 35 percent of all *Intel Capital* investments on a financial basis have provided funds to companies outside the United States of America – mainly in the Asian-Pacific region, Europe and Israel. In 2000, *Intel* invested \$ 700 million in 55 technology companies throughout Europe (Anonymous 2001b). *Intel Capital* EMEA investments span 18 countries including Israel, Belgium, Czech Republic, Finland, France, Germany, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Sweden, Switzerland, Dubai and the UK. In the long term, *Intel Capital* expects investments outside the United States to reach 50 percent of the total investment sum (Brull 2001).

Network structure: Intel Capital as a central hub in the network of new technology-based firms

Relationships after the equity investments in the new technology-based firms are very much focused on *Intel* with its responsible business unit and corporate venture capital program as the central and focal actor. Although on a general basis facilitated by an alliance program, relationships *between individual* portfolio companies tend to be rather the exception than the rule. However, if concrete synergies between portfolio companies (e.g. complementary technologies for solution bundles) can be leveraged to

the benefit of all, then these opportunities are systematically exploited with the *Intel* business unit typically initiating and facilitating the effort.

”Overall, this system of rather centralized relationships can be described as “hub-and-spoke” network

(Heiko von Dewitz, Investment Manager, Intel Capital)

As part of delivering value and resources beyond limited financial equity investments, *Intel Capital* has developed an alliance program, provides development assistance through business unit exchange, provides insights into future technology trends, opens up relationships to other sources of venture capital financing and leverages the general corporate association with *Intel*. The alliance program formalizes and structures the alliance relationship by offering standardized services, networking and information sharing (Intel Capital 2002a):

1. Interfirm informal networking between portfolio companies through industry trade fair as well as targeted educational workshops and conferences
2. Newsletters and marketplaces for higher visibility within the *Intel* portfolio to post, browse and retrieve product and alliance offerings
3. Trainings and tools to run and to develop new venture businesses ranging from key employee and management training to market research, procurement and government relations
4. Procurement discounts for additional *Intel* services

Technological assistance provides portfolio companies with *Intel* research and development lab support on technology issues and the development towards horizontal industry standard solutions. This form of cooperation also ensures the compatibility with *Intel* software and hardware solutions. Insights into future trends may include sharing the *Intel* architecture roadmap and anticipated industry developments as part of the long-term research and development strategy. Other sources of financing for the NTBF are made available through *Intel Capital*'s relationships with major parties in the venture capital industry. The corporate association with *Intel* helps portfolio companies gain higher visibility in the IT industry. The high frequency and number of

equity investments contributes to the relational experience, which has been used to standardize the relationship with proven frameworks.

“The relationships [to NTBFs] are based on a certain framework. With different companies the interaction varies based on technology. Software companies are treated differently than semiconductor companies. But, these relationships are not renegotiated in every case. Based on the goal structure and the Intel business unit involved, companies are mapped and positioned accordingly in the framework. [...] A best-practice model is offered to the venture with room for variations being quite limited.”

(Heiko von Dewitz)

As part of the experience in defining the relationship to the new venture in *Intel*'s portfolio, the mentioned technological assistance of *Intel* business units is clearly identified, aligned with the start-up's requirement and specified in a 'letter-of-intent' like business agreement prior to the equity investment. Milestones, deliverables and timetables define the ongoing interaction between *Intel* and the portfolio company to ensure commitment, to reduce technological uncertainty and to warrant contract compliance after completion of equity stake investment:

“From the start, the strategic relationship [to the portfolio company] will be clearly defined. Dynamic evolution and growth of the relationship beyond the initial scope are desirable but do not occur very often [...] If we have already established a relationship (e.g. supplier-customer), this relationship remains active or [in other cases] we make equity investments in the first place.”

(Heiko von Dewitz)

Therefore, in the majority of cases of equity investment, the definition of mutual technical contributions remains rather static and is jointly executed with the *Intel* business units as previously defined. Alliance network redundancies in terms of ventures with similar technologies or applications can occur in case of undetermined and competing standards and regionally focused, market development driven investments. Uniqueness of the relationships ensures the commitment of both the new venture and the business unit in the alliance.

“[In each investment decision], we are trying to invest in best-in-class technology. Only in rare cases of unclear technological dominance, or if the goal is to develop regional markets [for Intel products], would we place multiple bets [in software applications and services].”

(Heiko von Dewitz)

In addition to a unique relationship, technological assistance and development support can be facilitated in the case of technological relatedness of the venture's technology base with *Intel's* core technological capabilities in silicon microprocessors (Wong 2001).

Network adjustment: Replicating successful relationships

Intel business unit and technology strategies set the long-term development agenda and in this process also identified technology gaps to be filled by internal research and development as well as investments with NTBFs. *Intel Capital* considers it a core competency to transform the respective business unit technology strategy in a dynamically changing industry environment into consistent equity investments:

“A strength [of the due diligence process] is the consistent implementation of an investment strategy based on defined and articulated business unit requirements. This is extremely important in dynamic environments, which require frequent investment strategy adaptations. Downsides of this approach are its high complexity,

possibly conflicting interests of multiple parties, wide geographic distances and anonymity of personal interaction.”

(Heiko von Dewitz)

As portfolio companies mature over time, *Intel* business units face changes in corporate agendas and transitory pressures on earnings. However, *Intel Capital* remains to some degree tactically independent from corporate center decision-making (Brull 2001). As an additional source of independence, *Intel Capital* investments are always accompanied by venture capital co-investments to ensure the financial rigor and independent second perspective on the investment proposal without alignment to any *Intel* business unit interests.

External equity investments to fill *Intel*'s technology gap involve access to investment proposals and a thorough due diligence process for sound decision-making. Although in existence for a long time and integrating a strong network of active investments, *Intel Capital* receives the majority of investment proposals as unsolicited applications. However, when comparing the years 2000 and 2002, contacts to *Intel* business units and co-investing venture capitalists play an increasingly important role as deal flow generators. Over two years of *Intel Capital* equity portfolio development, channels for investment proposal lead generation are broken down as follows:

Year	2000	2002
Unsolicited contacts	70 % - 75 %	50 %
VC Network	20 % - 25 %	35 % - 40%
Intel Business Units	5 %	10 % - 15 %
Total	100 %	100 %

Exhibit 2-7 Intel Capital: Channels for new equity investments (Interview: Heiko von Dewitz)

Intel Capital screens, evaluates and defines all investment proposals with the support of a detailed and well proven due diligence process to select the right targets, to ensure stability of the relationship and to maintain business unit commitment after the investment decision.

As a clear prerequisite and important first due diligence criterion, *Intel Capital* requires the large majority of investments to support specific business unit strategies. Supporting business unit strategies requires the technology venture to be aligned with *Intel* innovation and to fill the white-spot in specific business unit technology strategies. Non-compliance with *Intel*'s technology standard is only accepted if the degree of product innovation is exceptionally high:

“Standard compliance is almost always a must and a requirement. For a technology to prevail globally and for customers to trust a technology base, adherence to standards must be the requirement. If not standard compliant, the technology has to be superior at least by the factor 5 or 10.”

(Heiko von Dewitz)

Only so called ‘eyes & ears’ investments do not have to directly support business unit strategies; with these deals *Intel Capital* deliberately aims at discovering potentially great disruptive technologies beyond current roadmaps and horizons. In addition, the fund requires new ventures to meet the criteria of a unique product and technology offering, an experienced and successful management team, financial history and projection as well as accredited co-investors.

With roughly 5 percent of investment proposals being funded, *Intel Capital* is known for a very thorough, systematic and rigorous financial and technical due diligence process. Although other venture capital funds co-invest in early financing rounds, they mainly provide business advice in terms of management direction, exit strategy and board of director input and clearly appreciate *Intel*'s collaboration in the due diligence process. The internal process reviews the venture's technology, strategy, and finances and concludes with deal concept meetings and final presentations to *Intel Capital* business unit, treasury and legal executives (Hurley 2000). In this process, business

development, marketing and engineering functions are involved to a large extent. If required by the nature of the technology, legal advice for intellectual property protection also participates in the due diligence process. The due diligence process within *Intel Capital* is well defined, completely implemented and continuously tracked for performance improvements. This detailed due diligence process does not only improve the quality of the selection process but also ensures business unit commitment, which reduces the level of possible conflict and needed adaptations subsequent to the investment decision.

“Goals of both sides are aligned and expectations are managed and consolidated. A business agreement defines scope and content of the collaboration. Only in rather rare cases of unforeseen business unit strategy adaptations, Intel roadmap changes, reconsiderations of the new venture [...] commitment from both sides may be lost.”

(Heiko von Dewitz)

Operational coordination and performance:

Implementation of defined goals and milestones

In the process of cooperation and joint technical development, continuous mutual contributions between *Intel* business units and the NTBFs represent the basis for implementing the strategic investment case. Precise deliverable definition prior to the investment decision facilitates the fulfillment of joint and agreed upon milestones and goals. As execution and achievement of the joint agenda lies in the interest of both the *Intel* business unit and the new technology-based firm, *Intel Capital*'s incentive structures tie variable compensation to the success of the alliance relationship.

“Implementation of technical contributions is not guaranteed per se from both sides – the venture and Intel. Therefore, we track the ‘voice of the portfolio company’ or ‘customer satisfaction survey’ [...] as a

continuous improvement approach, which also has an impact on our individual bonus compensation.”

(Heiko von Dewitz)

Although technological uncertainties, internal dynamics in NTBFs and a high degree of industry competition pose significant challenges for the stability of the cooperation, daily operations of contributing technical know-how, setting the product development agenda and defining technology transfer policies has reached a certain ‘best-practice’ maturity: To ensure good understanding and buy-in from both sides, technical contribution, product development agenda, technology transfer policies, the market/business development agenda and top alliance executives are negotiated and decided together with the management of the NTBF.

“The model [for daily operations] exists, has been refined and further developed, and represents best practice. Basically, the new ventures are very satisfied with what they receive. [The joint collaboration] with major implementation milestones is always defined in agreement with the new venture. [... Investment agreements] are not dynamic structures with many open parameters. We try to reduce the potential for risk and conflict as much as possible. There is enough of it in the system already: High degree of innovation, dynamic changes and competition are unknown parameters which I cannot fully assess in advance.”

(Heiko von Dewitz)

As the portfolio company follows an outlined ‘development lifecycle’, joint technology innovation and compliance to the collaboration agreement is facilitated by clear intellectual property protection guidelines and additional financial resources depending on the successful achievement of milestones. Intellectual property rights are defined (e.g. jointly developed IP is owned by both, independently developed IP

remains solely owned by the inventing party) and legal clauses regulate future commercialization in a win-win-relationship for both. Emerging ventures are sometimes concerned that *Intel* as a big and powerful player is able to completely absorb intellectual property. Since *Intel* would clearly like to avoid this concern, property rights are detailed and clarified in unambiguous legal contracts.

In the exceptional case of potential conflicts, *Intel Capital* works as a mediator between business unit and new venture to reach consensus in negotiations. However in the long term, product development results need to be compatible with the previously agreed upon business and investment agreements to obtain the incentive of further financial support:

“Joint technology development with business units is typically milestone-based which has an effect on additional financial investment contributions (e.g. participation in further funding rounds). Reviewing the business case, we [as Intel Capital] expect the technology/product development to follow our requirements as a prerequisite for the case. If [the new venture team] changes direction, shifts and refocuses the business model, we would not exercise pressure on the company not to do so. That is up to the company to decide. But that, of course, has repercussions on Intel’s support: If a shift in product development makes the strategic investment case obsolete, we would say that we are no longer bound to our resource commitments.”

(Heiko von Dewitz)

As one of the largest corporate venture capital investors, *Intel Capital* looks back on a decennial history of successful activities. In spite of necessary write-offs and write-downs due to stock market devaluations, *Intel Capital*’s financial success can always be described as an absolute success story. In addition to that, complementary cost reduction targets in technical R&D, HR development as well as quality and timeliness of joint product development meets ambitious internal targets.

Initial resource base and development:

Learning relational capabilities to leverage a stable core technology base

Besides positive financial results and project-related development successes, *Intel Capital* has generated and developed valuable resources mainly to establish successful and dependable relationships to portfolio companies.

“[The development of resources and core competencies] is an important aspect: We certainly understand the eco-system much better through Intel Capital activities. In this regard, we are a much better sensor for innovations and markets and understand [new venture] people better.”

(Heiko von Dewitz)

As the clear focus of *Intel Capital* activities is concentrated on corporate venture capital activities, development and refinement of tasks and processes make up the majority of learning and capability growth: Detecting and screening new technologies, understanding internal changes within NTBFs, conducting due diligence and mediation processes and aligning incentives to support execution of the joint agreements. With a maturing portfolio, *Intel Capital* now faces the challenge of extending the relationship – if beneficial for both sides – well into the post-investment phase. Since more established and advanced companies independently define their product development agendas and strategies, relationships between them and *Intel Capital* do not follow the proven and predefined frameworks of the earlier equity investment phase. Consequently, the complexity of these relationships and missing experience explain learning requirements for extended relational capabilities:

“During the course of development, an investment manager performs more and more lifecycle management [...] with a greater exposure to supporting the deal well into the post-investment phase. [...] [Post-deal support] is definitely required and there are new challenges for Intel to contribute value-added. In addition to strategic engagement, we try to

use the base case scenarios to generate additional synergies with Intel and to function as a door opener.”

(Heiko von Dewitz)

Minority equity investment relationships to start-up companies depend on a maximized level of stability and trustful enhancement of portfolio companies' technical and managerial capabilities. Clearly defined contracts, intellectual property agreements and *Intel's* reputation in the technology community ensure limited external distribution of intellectual property to the potential disadvantage of the portfolio company.

If *Intel* wants to complement its capabilities with the start-up company's technology base, then this is typically implemented through a licensing contract. The magnitude of technical knowledge contributions and strategic relevance of the overall investment case tend to increase with the technological relatedness of the NTBF with *Intel's* core silicon technology base. In these extraordinary cases, the technology base of the venture is more relevant for *Intel's* core capabilities and learning can be more obviously integrated in an already existing knowledge base.

2.2.3 *Sun Microsystems GmbH and DLR*

Sun Microsystems and the German Aerospace Research Center and German Space Agency join forces to develop new technology based firms from multiple technological domains. With a focus on business initiatives from scientific backgrounds at very early stages of their development, alliance relationships to these new technology based firms are very much tailored to the individual firm.

Business background:

Transformation of basic research into new venture business models

The *DLR* (German Aerospace Research Center and German Space Agency) and *Sun Microsystems Germany* combine their resources to support the conceptual, technological and managerial venture teams and young technology-based firms. After years of informal cooperation, both companies jointly incorporated an incubator for pre-seed and seed start-up companies at the *DLR* location in Oberpfaffenhofen. Although different in business scope and industry, both organizations are committed to attaining a leadership position in their technology domains.

Since its incorporation in 1982, *Sun Microsystems* has developed into a leading provider of hardware, software and services, driven by its singular vision “the Network is the Computer”. From the beginning, the company’s corporate philosophy was based on network computing, because *Sun*’s goal was to produce powerful, open, standard-based and network-compatible computer systems. *Sun* is represented in over 170 countries and currently employs approx. 40,000 people worldwide.

With a 38 percent share in the German server market in the year 2001, *Sun* is the leading provider of Unix workstation and servers as platforms for SAP R/3’s relational databases. *Sun*’s technological advantage makes the company a leading supplier in numerous markets including electronic engineering, mechanical engineering, software engineering, print and electronic media, telecommunications and financial services. *Sun*’s total product portfolio includes high-performance UltraSPARC III workstations, Internet/intranet, workgroup and departmental servers, server appliances, open and intelligent storage solutions, data center servers equipped with up to 106 CPUs, Java technologies, the 64-bit Solaris operating environment and Internet security solutions.

Development and integration tools as well as comprehensive consulting and services complement this product portfolio.

Sun's hardware and software solutions are known for reliability, scalability, security and openness. Committed to these guidelines, the Sun ONE (Sun Open Net Environment) provides on-demand software architecture for stable, successful network computing and the secure information exchange within companies and between business partners. Software services created with Sun ONE fully use the various features offered by open technologies such as the XML and the Java platform. When introducing the platform-independent Java technology, *Sun* has created a de-facto standard for network computing applications. Initially designed as a specific programming language for the Internet, Java rapidly established itself in the business world and the data center environments due to its technical robustness, security, ease of use and networking capability. *Sun Microsystems* offers the implementation of web services, including products for service creation, service assembly, service deployment, and professional services.

Openness in software standards is required and complemented by active alliance formation. Examples of *Sun's* alliance activities include relationships to professional service firms, industry-wide consortiums around the liberty alliance and the Sun Developer Connection (SDC). As a founding member of the Liberty Alliance, *Sun* works towards establishing industry-wide standards for network identification. The rapidly growing Sun Developer Connection supports independent software vendors in their development of solutions based on Solaris servers.

Germany's *Sun Microsystems GmbH*, headquartered in Kirchheim-Heimstetten near Munich, with local branches across Germany, was founded in 1984. *Sun Germany* employs around 1,600 people. In fiscal year 2001, *Sun Microsystems GmbH* generated revenues of € 862 million.

The *DLR* (German Aerospace Research Center and German Space Agency) conducts research to explore the earth and the universe for protecting the environment and for promoting mobility, communication and safety. As aeronautics, aviations and space flight make substantial scientific and technology contributions, *DLR* facilitates the knowledge transfer between basic research, future technologies and innovative applications in its four research program sectors: Aeronautics, Space, Energy

Technology and Transport Research and Technology. Key industries ranging from materials technology to medical equipment and software engineering benefit from their technology innovations. *DLR*'s main objective focuses on basic and fundamental research without immediate focus on product applications and developing prototypes for subsequent mass production.

Although a largely publicly funded, non-profit, private research organization, *DLR* aims at applying management tools and at emphasizing performance and goal orientation. Financial controlling and external auditing ensure continuous monitoring of all projects and achievements. *DLR* strives towards achieving flexibility in response to the demands of clients and partners. As a "research enterprise", *DLR* integrates the knowledge of its institutes and external partners through multiple networks. These networks share workload and exchange knowledge for research and technology development on both a national and an international level. On the national level, *DLR* contributes research results and technology innovations in consortium projects and leads joint research endeavors with universities and industry participants. *DLR* forges public-private partnerships to achieve cost efficiency, to minimize risks in new product development and to integrate aerospace into partners' value chains. *DLR* employs 4,500 people across eight locations and 30 research institutes in Germany. *DLR*'s total budget accounts for € 360 million, of which one third is provided by third parties' research grants.

Besides its research scope on aeronautics and space flight, *DLR*'s entrepreneurial objectives focus on converting its wealth of knowledge and technology into competitive innovations. This innovation model handled by the department of 'Innovation and Technology Marketing' aims at combining scientific research and economic exploitation for the creation of marketable products and services to a broad range of industries. Embedded in the scientific environment, regional offices at *DLR* locations assist in start-up business development with the objective of rapidly and quickly channeling innovative and marketable innovations. The department of 'Innovation and Technology Marketing' contributes to entrepreneurial initiatives, supports market entry strategies and develops customized concepts for the development of innovations and the foundation of start-up companies. In Germany, 35 employees coordinate R&D cooperation agreements, steer innovation processes, communicate research results, assess the market potential of innovative projects, out-

license DRL patents and support the transfer of scientific knowledge to product applications. Despite unfavorable stock market conditions and a decrease in IPO activities in 2001, the support of Innovation and Technology Marketing in Germany has established eight new businesses, in which *DLR* employees have transformed their know-how from research into product innovations and enterprises.

Sun Microsystems, *DLR* and the Bavarian Ministry of Economic Affairs, Transport and Technology sponsor the joint program for the incubation of new technology-based firms in selected technological areas: Navigation, Communication, Geographical Information and Avionics. The so-called ‘*Sun Business Innovation Center*’ (*BIC*) provides 1000 m² office space at *DLR*’s site in Oberpfaffenhofen and supports services for new venture foundation and development for both pre-seed venture teams and seed start-up companies. Pre-seed projects are defined by the project partners as a team in the process of developing a business plan, whereas seed companies based on already established business plans focus on developing products and markets for their applications.

“We target to focus the entire pre-seed or seed [entrepreneurial activities and companies]. [...] If someone [in the pre-seed phase] would like [to provide a service to the telecommunications company], then he or she gets access to the required infrastructure to develop this service. In this case, you define that as a project without necessarily founding a new company. However, the start-up company will also be supported in the subsequent seed phase, but we do not know exactly what happens after that.”

(Thorsten Rudolph)

Affiliated project partners cover supporting management consulting, legal and tax advisory services. *Sun*, *DLR* and other supporting project partners supervise the activities of the *Sun Business Innovation Center (BIC)* within the legal form of an association (‘*Verein*’). Board memberships include the manager of the *DLR* site in Oberpfaffenhofen, a representative of the consulting organization *RKW*, a legal and

tax advisor, Thomas Groth of *Sun Microsystems* and Thorsten Rudolph of the *DLR*. Both Thomas Groth and Thorsten Rudolph serve as joint project managers for *BIC* from two main sponsoring organizations *Sun* and *DLR*.

Network structure:

Establishing a network of seed companies in selected technological areas

Both *DLR* und *Sun Microsystems* have supported fourteen entrepreneurial projects from the beginning of 2000 until March 2002. Although September 2001 marks the official kick-off date for the incorporation of the Sun BIC as described above, cooperation between Sun and the DLR for incubation services and other projects in a related industry context started earlier.

“Contact to Sun was made two and a half years ago through a project of ‘High-Tech-Offensive Bayern’ (Bavarian High-tech initiative). Funded with five or six million German Marks, Sony, Thyssen Group Information System, start-up companies, the Technical University Munich, Sun and the DLR as consortium leader have joined forces for a project on indoor data transmission via bluetooth. In this environment, we have both test beds and showcases for these services available [...] to demonstrate how bluetooth, local area networks and GPRS GSM networks can be integrated.”

(Thorsten Rudolph)

Since 2001, 14 entrepreneurial projects have been sponsored by DLR and Sun and can be broken down into four pre-seed teams in the process of developing a business plan, eight teams with a completed business plan in the process of developing businesses, markets and products and two spin-offs of larger organizations. 8 projects out of the 14 use the services provided by the SUN BIC. Roughly 20% of all projects have been founded as spin-offs from DLR research institutes. DLR research uses the opportunity of developing patents and technological innovations into potentially marketable

products. The remainder – 80 percent of all start-up projects – however, has been acquired externally, mainly from out of Bavaria, to relocate to DLR and BIC site in Oberpfaffenhofen.

“With the pull effect in full swing, companies from Baden-Wuerttemberg and North Rhine-Westphalia relocate to Bavaria to get access to the very attractive research infrastructure.”

(Thomas Groth, Member Global Visioneer Council, Sun)

As a jointly integrated service offering, the incubator provides teams in the pre-seed phase with office space for a 3 to 6 month timeframe and external coaching for the process of developing a business plan. The new venture team is expected to commit to a timeframe for completion of the business plan and receives 10 consulting days’ coaching and office infrastructure for DM 2500 – one daily rate for professional consulting services. The remainder of nine days of consulting and advisory services is funded by the state of Bavaria.

More mature seed teams and companies with a completed business plan in the process of further developing markets and products have the autonomy to freely source services they need for future growth. These more established start-up companies team up for expected synergies with DLR institutes or due to prior contact with project sponsor Sun Microsystems.

“In general, these firms join because they expect advantages from a research or industry perspective for their project, or because they have had prior contact to Sun. [...] Other companies join with three or four people on a project basis for half a year or even a full year to develop a product or a service with the support of locally offered services.”

(Thorsten Rudolph)

Besides cooperation with and technical contribution of *DLR* institutes in research programs, support services of *Sun Microsystems* or the centrally located *DLR* site in

Oberpfaffenhofen represent inducements for new venture companies and teams to establish their business development operations at the *Sun BIC*. In fulfillment of their technical contributions, local *DLR* institutes in Oberpfaffenhofen cover matching and complementary technological areas like navigation, high frequency technology, communications engineering and robotics.

Although neither *DLR* nor *Sun* pursue equity holdings in pre-seed or seed start-ups, monetary compensation for licensing contracts, research consortiums, and development agreements represent the financial incentive for *DLR* institutes to cooperate with *BIC*'s new ventures. Access to novel product applications, market knowledge and industry contacts for additional partnerships represent another intangible advantage in cooperating with the NTBFs.

Network adjustment: Tailored new venture project acquisition and cooperation

In their demand for external business development support, until the beginning of 2001, new venture teams in almost all cases directly contacted the *DLR*. Only a small percentage of new project proposals was forwarded to the department of 'Innovation and Technology Marketing' through other personal contacts of *DLR* institutes. With the launch of the incubator roughly around September 2001, these options to contact the *DLR* have changed completely. The number of new contacts to start-up teams established through partner organizations has increased rapidly to 80% of new project proposals, as this platform with its service offerings has become more known to the general public. Although incubator services are only known by selected and related providers, the scope of further contact has to be drawn very carefully to keep the number of business development requests and thus the workload for staff members within boundaries. Already existing contacts to service providers also serve as a good filter for promising business concepts, since they are highly familiar with *DLR*'s and *Sun*'s technical capabilities and cooperation needs.

Although in March 2002 no formal due diligence process exists for pre-seed projects, further formalization of screening and mentoring new venture teams are under development. In the earlier pre-seed phase, the iterative tasks of completing a business plan necessitate frequent adjustments of required services for *Sun*, *DLR* and service providers. At all times, the incubator *Sun BIC* and the coaches are considered as an

independent platform, which only represent the interest of their clients – new venture teams and start-up companies – and do not acquire financial stakes in them. On a case-by-case basis, coaches drawn on *Sun*'s and *DLR*'s contact network validate the business plan sections such as market potential and financial planning:

“To provide a customer survey for a business plan, one could [utilize the existing partner contact network of SUN and DLR] to receive high quality information. [For the future], one could also develop a systematic approach for this, at least for a specific industry, by identifying available people with excellent industry knowledge. That’s how I would envision effective support in the pre-seed phase.”

(Thorsten Rudolph)

On the operational level, as a replacement for the formal due diligence process, the *DLR* has outlined a rough ‘check-in’ process that summarizes the cooperation path between institutes and the new venture: After the receipt of the business plan or project proposal, *DLR* research personnel from related departments will be consulted to reach a decision on whether to invite the new venture for a formal presentation and further information gathering. At this early stage, the pre-seed or seed team is expected to respond to a set of evaluation criteria on state-of-the-art in the respective technology field, technological differentiation, market volume, benefits of product applications, the number of potentially created employees and skills of the entrepreneurial team. The *DLR* on its side has to reach an assessment on the novelty of innovation, relevance for current research programs, opportunity to embed the company in its local site environment and the availability of complementary *DLR* technology to jointly achieve product uniqueness. After a presentation of both concept and team, the *DLR* department ‘Innovation and Technology Marketing’ and involved departments decide on the possibility to coach or support.

In an assessment similar to the ‘check-in’ process outlined above, the research scope of the seed start-up company in particular needs to be consistent with *DLR* institutes’ initiatives. A decision on technological complementarity is reached in intranet collaboration with *DLR* technical experts, supported by technology databases and

informed by defined questionnaires. In the future, the *DLR* plans to expand the application of this intranet technical due diligence into the earlier pre-seed phase to improve idea generation, to assess already existing product applications, to screen partnering options and to accelerate the overall screening process.

After the decision to partner with either the pre-seed team or the seed start-up company, further cooperation and technical exchange is supported and defined on a case-by-case basis. *DLR*'s top management institutes broadly, formalizes and codifies a letter-of-intent on the intended research cooperation or licensing agreement.

“The DLR is focused on supporting new ventures by signing contracts on research projects and out-licensing patents to start-ups for subsequent commercialization. Patent property rights pertain to the DLR and these new venture spin-offs are driven by the people that have initially filed for the respective patent and now have the incentive to create their own business.”

(Thomas Groth)

In close contact with the new venture team and tailored to the start-up's developing capabilities, *DLR* as the client establishes and potentially extends the relationships to teams and start-up companies by subcontracting respective service agreements for the development projects.

“Within the scope of our responsibilities, we try to activate and practice ‘management by walking the talk.’ We know the managing directors personally and chat with them regularly. Especially in these conversations, we come up with new topics, which can result in new projects. But the communication flow between DLR institutes and companies runs almost automatically and the cooperation develops over time.”

(Thorsten Rudolph)

During this time period of approximately two years, the seed ventures may engage in additional joint product development with *DLR* institutes, service providers or firms within the *BIC* incubator. After initial development agreements, as an earlier *DLR* subcontractor the start-up can directly provide further development or maintenance services to *DLR*’s customers.

Technological complementarity within the defined boundaries is seen as a requirement to facilitate cooperation by all incubator project sponsors. At the time of the case study interview in March 2002, the concepts of cooperation between organizations and complementarity of offered support services remain under continuous development and review. Uncertain overlaps in the evolving technology scope and a limited number of already established start-up companies in the incubator network pose a challenge for achieving sufficient technological complementarity. Although there are some relationships between the fourteen new technology-based firms for sub-projects, differences in business objectives and products complicate the search for general and broad commonalities and partnership opportunities. Regarding the future objective, Thorsten Rudolph adds:

“But this has been the past of new venture incorporation. We intend to change that with our incubator project. We have already seen that an external company outside of Bavaria has been cooperating with a DLR start-up company on a project basis.”

In this process of selecting and integrating new venture projects, *DLR*'s functional departments for purchasing to review research contracts, site management to provide office space, infrastructure and telecommunication and legal services to frame cooperation agreements, and licensing and appropriate research departments are highly involved in the selection and partnership formation process. In the future development of the *BIC*, the involvement of marketing and public relations is expected to increase with the number of high profile partnerships. All decisions for the incorporation and development of new ventures require board review and approval within the *DLR*.

On the part of *Sun Microsystems*, the corporate business development and partially also marketing, public relations and legal departments are involved in the development of the incubator project. Human resources, purchasing and the R&D department are only remotely involved. Over the course of developing the alliance network, business units, marketing and the executive boards have become involved to a larger degree as driving forces behind the *BIC* project initiative.

Operational coordination:

Providing specialized technical and business perspectives

For the daily business development support of new venture teams, the assigned or selected coach develops a project plan for review of the *DLR*, which concludes the contract with the new technology-based firm. The project plan then represents an agreed upon proposal in written form, which commits the coach to execute the agreement with the pre-seed team. Coaches review the progress, integrate and coordinate service offerings to review financial plans, to facilitate product development, to select alliance partners and develop finance options. In case of the later incorporation of a company in the seed phase, *DLR* encourages the seed firm to establish operations and office facilities at its site in Oberpfaffenhofen.

As described above, the *DLR* provides technological know-how in the form of innovative patents, services of the Oberpfaffenhofen site infrastructure and conceptual support in new venture business development. To extend financial resources of its venture partners, the *DLR* also supports seed ventures in acquiring purchase orders from industry customers or obtaining additional public research grants for their development projects: After the launch of the *BIC* incubator platform, founding teams

also have the potential to obtain venture capital direct investments. The growing network of supporting project partners has also been extended to these external sources of financing with an interest in these specific technology areas.

“Through the growing network, we have contacts to VC Funds that regularly – maybe once a month – visit us to meet with two or three start-up teams. They rely on the DLR and that we have made the right choice [in selecting the team.] Therefore, more intensive contacts for seed capital are in the process of development.”

(Thorsten Rudolph)

In addition to the *BIC* services, *Sun* contributes valuable industry contacts, sheds light on its internal development projects and facilitates the business development process in providing insights into industry, market and technology trends. In addition to these benefits, alliance programs such as the Sun Developer Connection support all worldwide JAVA and Solaris developers which provide discounted hardware products and access to beta software technology.

Between *Sun* and the *DLR* as the two major project sponsors, great consensus exists on the overall network structure, expected benefits, target technology portfolio, future business development agenda and participating new venture companies. Based on previous long-term cooperation experience, both sponsoring organizations have developed high levels of trust and good understanding of capabilities and mutual expectations. Therefore, incubator project management does not require formal conflict resolution mechanisms:

“If we happen to run into severe conflicts, something is off track, we have not communicated enough, or we don’t have a sound business proposal. Until now we have always received the requested and required resources [due to good fit of the new venture with either Sun or the DLR].“

(Thomas Groth)

Also, potential conflict resolution between *DLR* institutes and new ventures is performed by the department of “Innovation and Technology Marketing” on a case-by-case basis with the involvement of a coach as interface for the *DLR*. As the *BIC* incubator is regarded as an open platform and extends invitations to the wide community of ventures with matching technology skills, magnitude and nature of financial and research contributions can be the source of some discussion between the start-up and *DLR*. However, *DLR* closely follows its policy of entering into cooperation agreements on the exchange of research and development services between new technology-based firms and *DLR* institutes. Experience has shown that this model requires communication and some effort on the side of the new venture team to comprehend. Besides achieving this general understanding on the model of exchanging contributions, more operational issues on technical know-how exchange, patent property rights, technical project scope and technical development can in most cases be resolved quickly during initial negotiations along with the discussion of financial contributions.

At the time of the interview, no formal mechanisms exist for the continuous exchange of jointly developed technological know-how. New ventures, however, are encouraged to establish an advisory board based on its current network to review technology and business strategy and to exchange know-how between related knowledge domains. In addition to experience exchange on a general level, project sponsor *Sun* intends to shield supported start-ups from any knowledge spillovers and to preserve their innovativeness.

Network objectives and performance: Targeting new venture incorporation

Sun and the *DLR* complement each other in their technical and managerial skills and, due to a joint history, have the experience of successful and flexible collaboration. Although the incubator is considered to be success story by *DLR* and *Sun* in March 2002, no formal quantitative controlling mechanisms exist to assess the current performance of the incubator project from both *Sun*'s and *DLR*'s perspectives. On a long-term, strategic level, *Sun*'s project business plan tracks the costs incurred and intends to reach profitability within a timeframe of five years. Future revenue for *Sun* are generated from consulting engagements to the liquidation of company stakes, although holding equity stakes in new ventures is not considered the standard model.

Despite missing financial controlling systems, quantification of project results is considered an important agenda item for the future development of the project. Since an incubator in public-private partnerships – according to the *DLR* perspective on the project results – represents an innovative and unprecedented model of cooperation, the joint project is not assessed by quantitative financial indicators such as license revenues, cost reductions or overall profits. However, the number of newly incorporated companies and staff employed is considered an important criterion to assess the impact for the regional economic environment. In quantitative terms, the incubator has set a target to carry out ten pre-seed projects per year.

From 1995 to March 2002, the *DLR* alone can look back on the foundation of 24 start-ups with staff of more than 200 employees in total. The establishment of the *BIC* incubator platform has added 8 external ventures to the total 14 companies supported by the cooperation with *Sun Microsystems*.

DLR's qualitative performance criteria such as quality and timeliness of product development, have been completely fulfilled in most cases of new venture cooperation. However, the timeliness of new product development certainly faces the obstacles of technological uncertainties associated with the development of new ventures. Since *Sun* also introduces its customers to new venture teams for their respective business development, quality and timeliness of delivered products leave room for development potential and represent a critical prerequisite for the access to its contact network. For *Sun*, facilitative factors such as development of contact networks and the level of inter-

firm communication received a moderate assessment in March 2002, with room for additional improvement potential.

Initial resource base and development

The earlier bluetooth project has initiated contact to *Sun Microsystems*, which has been leveraged to launch subsequent incubation services: As this technology project opened up new development and research areas, the *DLR* was able to attract additional scientific personnel and out-license developed patents. Development results have also been utilized for new product ideas, which result in the targeted incorporation of additional start-up companies for the incubator project. Innovations from this project represent the technological basis for external start-up companies with the objective of developing mobile services and the need for a testing environment. As an early project partner, *Sun* mediated the contacts to potential and promising co-sponsors, which opened up previously unavailable market potential and business contacts. In the context of earlier cooperation, earlier founded start-ups now act as partners for the incubator project, contributing product development and demonstrating showcase projects.

Both partners realized that the successful selection and development of new venture teams depend on ‘bridging the gap’ between technical applications and managerial aspects of business and market development. As both *Sun* and *DLR* have bridged this gap in their initial project, new venture projects supported by the *BIC* incubator face similar challenges.

“The case of market and business driven people with prior experience in founding a new company in cooperation with the DLR team of complementary, specialized experts represents a completely new model. The joint company is looking for unique value propositions driven by their complementary skills set. Insofar, we are currently learning how to build, moderate and support in this process.”

(Thorsten Rudolph)

In their self-assessment of the capability to form and develop multiple alliance relationships to entrepreneurial teams, *DLR* and *Sun* have clearly developed their capability in selecting the right pre-seed team and seed start-up companies with the experience of 2 to 3 years of cooperation. Similarly, the project partner *SUN* adds:

“Our strength is that we quickly identify the team’s ‘state-of-mind’ in conversations with the new venture team. To reevaluate the current position with its strengths and weaknesses and to build on current achievements represents a difficulty for many people. In our conversations, these issues will be quickly resolved and respective core competencies and gaps will be clearly identified.”

(Thomas Groth)

Regarding future development needs in this area, *DLR* seeks to select active supportive service providers with the knowledge on how to work with a research organization and to work on eliminating the technological uncertainties of new ventures. Further improvement potential can also be seen in selectively limiting or focusing the scope of potential new ventures and service providers that participate in the joint project to carefully commit personnel resources of both project partners.

“[The capability to limit the scope of searching for new companies] could be a weakness, since we have not gained enough experience in this area. At this stage, we have the objective of developing a larger office facility, which also requires modified operational models. At the moment, we act like we are targeting the quick achievement of partial success to prove our concept, idea and strategy of establishing new companies here on-site. In this case, it may well be possible that our staff is highly active in and busy processing new venture’s support requests, that are unable to give thought to the long-term strategy.”

(Thorsten Rudolph)

Along with supporting new technology-based firms, the *DLR* has also developed capabilities of how to establish relationships with an end customer of an applied development project: As successful practice, the *DLR* establishes direct contacts to another technical service provider that already has established an industry relationship and acts as mediator to the end customer. In the context of the *Business Innovation Center*, this mediator could be a new venture that performs product maintenance, covers customer service and communicates *DLR* research and development results.

“This relationship framework works particularly well with start-up companies that have developed complementarily out of DLR institutes, which speak the same language, know customers for years and can offer a different service portfolio which the DLR as a research institute just cannot provide. [...] This has been developing over time and previous concerns that employees virtually leave the DLR and cannot be replaced have been turned into the acknowledgement that these employees remain available and at the same time pursue their professional objectives.”

(Thorsten Rudolph)

In the process of cooperating with external ventures and industry partners, not only is scientific knowledge leveraged, but research institutes also gain insights into their alliance partners' entrepreneurial orientation.

“From our perspective as a research organization, we get used to the [high] level of scientific results. Embedded in international networks, researchers work on studies over several years and finally file the results. Therefore, it is very interesting and attractive for us, when a young entrepreneur approaches us and wants to utilize our research results to develop a technology application. This creates a completely new momentum! We have actually realized that colleagues who have

worked for an applied project for half a year do not want to return to their prior classical and basic research.”

(Thorsten Rudolph)

To some extent, the technological knowledge base has been developed through the cooperation with new technology-based firms. However, due to a high number of patents already at the disposal of *DLR*, the relative growth of technological know-how is only marginal. The same applies for project partner *Sun Microsystems*, which also has a large knowledge base at its disposal, but has had influence on the direction and utilization of some joint development projects. In the area of sales and marketing skills, some new venture contacts and showcase products have facilitated sales initiatives and establishment of pilot products with important Sun customers. On a limited case-by-case basis, joint development projects with start-up companies have been coordinated with and benefited from Sun's research and development projects.

2.2.4 *Within-case study analysis*

Although networks of relationships are utilized in both cases to develop new technology based firms, the alliance network of *Intel Capital* – due to its longer history and experience – shows more clearly defined structures. In contrast, the alliance network of *Sun* and *DLR* is characterized by project-based, emerging and highly flexible relationships.

Intel Capital Europe Middle East Africa (EMEA)

With the high frequency and number of equity investments, *Intel Capital* has developed unique minority equity relationships with technology-based ventures and valuable capabilities in selecting and developing NTBFs in cooperation with *Intel* business units.

Ventures in *Intel Capital's* equity portfolio are integrated in an 'hub-and-spoke' network with *Intel* at the center of multiple relationships. High specialization of technological know-how triggering different product and market development approaches results in rare cases of close cooperation between new ventures. Defined by the goals of *Intel's* corporate venture capital program, relationship intensity to new ventures is limited to minority equity co-investments. Although additional financial or technical commitment may be desired by the NTBF or theoretically feasible for *Intel*, developing technology-based firms in *Intel's* pursuit of long-term strategic goals does not seem to require an intensification of inter-firm relationships.

A sophisticated and well defined due diligence process as the 'gate keeper' for additional alliance formation ensures a well informed selection process, consultation with all involved parties, goal harmonization, and legal codification of the strategic investment case. Investment targets are identified with the support of the *Intel* technology roadmap, that forecasts technological development trends and current 'white spots' in capabilities. Missing capabilities are either complemented by internal research and development programs or by *Intel Capital's* investment programs. Business unit strategies also facilitate the identification of screening criteria for investment proposals: Non standard-compliant technology has to show highly superior performance to receive financial and technological contributions from *Intel Capital* and *Intel* business units. Ongoing new venture development processes provide

standardized services through an alliance program, cover continuous tracking of progress and – if necessary – support conflict resolution and performance-based compensation. Aiming for economies of scale, the standardized alliance program demonstrates a well-developed proficiency in tailoring services for NTBFs and availability of a critical mass of equity investments in the portfolio. Tracking of development progress is informed by the achievement of milestones and deliverables in the joint project. Although technological uncertainties impose major obstacles in predicting business progress, *Intel's* superior technological know-how and experience in setting up milestone agreements facilitate the codification jointly agreed upon in cooperation agreements. Experience both in the due diligence process and ongoing management creates a highly sophisticated alliance management capability.

High levels of experience in alliance management result in low levels of conflict between the new venture team and business unit management on mutually expected contributions. The due diligence process has already harmonized conflicting goals and clearly codified milestones in the equity investment agreement. As clearly defined incentives, future financial and technology contributions depend on achievement of previously defined goals in the product and technology development agenda. Prior legal codification of the strategic investment case, defined milestones for the future development agenda, and clearly defined incentives ensure a stabilization of the relationship to the new technology-based firm. Highly stable relationships cover predefined resource exchanges and limit unintended and explorative activities between two partners. Although understandable from an efficiency perspective, highly stable exchange relationships may limit technological exploration in addition to the already jointly identified innovation area.

Focused on developing an equity portfolio, *Intel Capital* has first and foremost developed alliance management capabilities as described above and has also gained a good understanding for dealing with dynamics in young technology-based firms. Maturing portfolios now require additional skills for the support of the less structured post-investment phase. In the area of other operational resources, *Intel* business units have experienced only marginal learning contributions in their technological skills. NTBF's diverse technological competencies and the clearly defined scope for joint development projects may be the cause for the limit in know-how generation. Limited

project and investment proposal scopes regulate the knowledge generated in addition to jointly defined development deliverables.

Sun Microsystems and DLR

Both *Sun* and *DLR* are in the unique technological and financial situation to facilitate the business development of new venture teams and young seed start-up companies. At the same time, leading in their industries and scientific areas, both of them complement unique and emerging skills set in their interest of sponsoring entrepreneurial activities.

After working informally on case-by-case and project basis, both sponsoring parties decided to institutionalize a business and technology incubator in September 2001. The *DLR*, in the tradition of a premier research organization, shares research results with its scientific community on a regular basis. Similarly, *Sun Microsystems* with its commitment to *JAVA*, shows openness in software standards and prominent alliance activities. Both major project partners seem to support this openness in sharing technological know-how and collaborating business practices. In two and a half years of emerging cooperation in joint projects, both firms and participating management have developed a sense of common values, objectives, trust and informality: A good joint understanding of the *BIC* projects results, consensus on the overall alliance network structure, expected benefits, future business development agenda and potential future entrepreneurial projects. Both partners intend to establish an open platform and to extend invitations to cooperate with broad groups of new ventures with matching technological skills.

Initiated by a project sponsored by ‘High-Tech-Offensive Bayern’, *Sun* and *DLR* supported 14 entrepreneurial projects – pre-seed, seed and spin-offs – in the areas of navigation, communication, geographical information and avionics. Attracted by *DLR*’s capabilities available at the site in Oberpfaffenhofen and *Sun*’s unique technological capabilities, young technology-based companies join the *Business Innovation Center* mainly from outside the state of Bavaria. The large number of unsolicited applications and direct contacts to the *DLR* department of ‘Innovation and Technology Marketing’ underlines the attractiveness of this bundled service offering. Contacts to start-up projects through third parties almost exclusively utilize the involved service providers, which are familiar with *BIC*’s objectives and technological

scope. As processing the number of cooperation requests clearly drives and challenges the feasible workload of both *Sun* and *DLR* staff members, this filtering function has clear advantages.

Diverse projects of different maturity result in an informal screening and supporting process within both major project sponsors. Although in the pre-seed phase frameworks for coaching and screening criteria exist as guidelines, codification of supporting research and development agreements, transition between new venture categories, resource contributions from the *DLR* and *Sun* are individually tailored to all parties' requirements: Various forms of licensing contracts, research consortiums and development agreements have to cover and balance resource contributions, monetary compensation and intellectual property protection. Also resource contributions from coaches and other related parties during the early pre-seed phase require frequent adaptation due to the unpredictable nature of defining a new venture business plan. Although later-stage seed start-ups are encouraged to set up operations in Oberpfaffenhofen, these more mature companies have the autonomy to freely obtain and tailor needed services for further growth, which adds to the complexity of the entire relationship set. Non-specific and successively defined contributions in the seed phase include highly intangible intellectual capital in the form of patents, insights into internal development projects or equally valuable personal contacts to industry experts that help in market assessment or project launch. Consequently, both seed start-up management and *DLR* management develop extensions of cooperation agreements opportunistically in a step-by-step process. Since multiple parameters in these cooperation agreements such as the nature of financial and research contributions represent open issues for negotiations, an agreement on the terms of the agreements requires disputing and mitigating a certain level of conflict between new ventures and the *DLR* institutes.

Although facilitated by a certain technological focus of *BIC*'s ventures, cooperation between all existing entrepreneurial activities is limited to very rare cases. Even though cooperation between start-ups could have a structure-reinforcing effect, the unpredictable technological scope of active projects poses challenges on the bilateral and joint support of ventures. However, the limited number of projects in the portfolio and shared project understanding between the two sponsoring organizations as described above make this case-by-case approach feasible, although both partners

acknowledge personnel resource constraints in performing their duties. As the foundation of the *Business Innovation Center* has led to completely new momentum in external project acquisition, further formalization and specialization of processes for screening and development of entrepreneurial projects would ensure comparability and generate economies of scales.

Restricted formalization in selecting and supporting entrepreneurs explains a missing financial and quantitative performance indicator system. Although costs are tracked in *Sun*'s business plan for the project, both the number of new ventures created and employees are the dominant performance indicator. As the *BIC* project represents a novel cooperation model in public-private partnership, measurement of the impact on regional economic environment and its prosperous development can be explained with the partially public funding. Based on conducting and establishing 14 entrepreneurial projects from 2000 until March 2002 at the time of the interviews, setting the target to 10 pre-seed projects alone in the entire year 2002, represents an indicator for an accelerating growth rate. The establishment of the *BIC* incubator platform also has added 8 external ventures to the total 14 companies supported by two project sponsors. Improved and increased performance can be linked to a broad collaboration experience between *Sun* and *DLR*, some formalization in both new venture selection and support as well as the development of valuable resources in operating incubation services.

The initial *DLR* research consortium with *Sun* has established an important nucleus of new venture creation and support: Development of applied technological knowledge, intensified contacts with industry partners in multi-party consortium and acquisitions of skilled personnel. Newly developed product ideas represent the inducement for additional start-up companies to set up operations and utilize an established testing environment.

Through their repeated activities, both partners have developed broad skills in selecting appropriate seed and pre-seed team. The extension of the service provider network with a good fit to *BIC*'s technological and business scope, the anticipation of technological uncertainties of new technology-based firms and good understanding of long-term direction remain as further growth areas for capabilities and skills. A sound long-term strategy on the technological and business scope suffers under the high

operational involvement of *DLR*'s staff to select a sufficient number of current entrepreneurial projects as an early proof-of-concept.

Along with alliance management skills on portfolio level, *DLR* has established supportive organizational arrangements with external industry partners and has built on the existing entrepreneurial orientation. In sponsoring entrepreneurial activities, *DLR* leverages the existing technological knowledge base to increase the motivation of its staff and to provide an enriching working environment for valuable employees. In pursuit of their entrepreneurial objectives, these employees continue to be available for the *DLR* and play a valuable facilitative role for establishing industry contacts. Due to very solid technological knowledge bases of both *DLR* and *Sun*, and the selected number of projects, improvements in technological capabilities are only marginal at this stage. Capability gains can be linked to the tailored and individual approach of supporting new venture projects. The flexible search for the most beneficial exchange of financial and technical resources helped to develop these skills. Trial-and-error approach in negotiations and flexible adaptations in the resource exchange according to shifting needs and capabilities foster awareness for start-up companies' capabilities and represent good learning opportunities for all parties.

2.3 Alliance networks for economies of scales in the fixed-line telecommunications industry

Liberalized fixed line telecommunications markets have opened up multiple entrepreneurial opportunities for new entrants into the market. Providing the home access to subscribers, so called city carriers offer an alternative to *Deutsche Telekom*'s fixed line services for the 'last mile'. However, drastically reduced telecommunications prices and increasing costs have changed the business cases of many new entrants, all integrated in an alliance network formed by *Elisa Kommunikation* and *Tropolys*.

2.3.1 Industry context

Across many European countries and also in Germany, telecommunications services have been controlled by the government for several decades: National telecommunications markets have traditionally been served by a limited number of equipment manufacturers and monopolistic incumbent network operators. With increasing deregulation of national telecommunications service markets, new entrants capture parts of the fixed-line telecommunications market and cover selected steps in previously defined value chain of equipment manufacturers and incumbent network operators. An industry value chain describes a combined sequence of activities to produce goods and services. Applied to the fixed-line telecommunications industry, the respective industry value chain can be structured as follows:

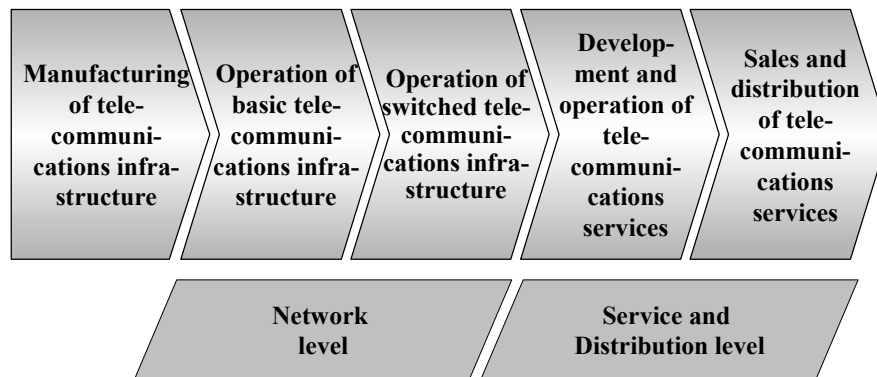


Exhibit 2-8 Value chain: Fixed-line telecommunications services

Manufacturing of telecommunications infrastructure covers development, production and distribution of products and systems that allow telecommunication ranging from telecommunications networks (basic and switched infrastructure) to terminals. The operation of basic telecommunication infrastructure includes the planning, construction and operation of land, deep-sea, radio and satellite lines for telecommunications purposes. The operation of switched telecommunications infrastructure includes the planning, construction and operation of switching centers, which are connected by basic telecommunication infrastructure to switches or terminals of telecommunications customers. The value chain step of telecommunications services defines communications services including technical specifications supported by software applications. Sales and distribution of telecommunications services covers the interface to the end-customer and customer acquisition activities.

Within the framework of this value chain, firms are not limited to only one step in the entire chain, but can also vertically integrate several steps. As example, the former monopoly and incumbent in the German telecommunications market, *Deutsche Telekom AG*, as an integrated firm covers four steps in the value chain from operation of basic telecommunications infrastructure to distribution of services.

Excluding the initial value chain step ‘manufacturing of telecommunications infrastructure’, the relevant industry value chain combines two major sequences of activities: A network as well as service and distribution level. The network level performs the transfer of information via a fixed-line telecommunications network as well as wholesale of information transfer services to other telecommunications carriers. A segmentation of network level services can be derived from a conceptualization of technical traffic routing within telecommunications networks.

Information exchange between telecommunications service subscribers can be transferred either within the local loop or will be relayed through switching centers to long-distance telecommunications networks. Long-distance telecommunications networks terminate the subscriber’s telephone call within the requested local loop, which connects to home access line of the other party. The information flow utilizes only the local loop or additionally long distance telecommunications networks in case of communication outside of the local call area of approximately 20 kilometers. Both separated network layers constitute the entire telecommunications network, which connects subscriber terminals and can be used to structure the network level of fixed-line telecommunications value chain.

(1) Local loop telecommunications networks provide connections to terminals of service subscribers and therefore forward or terminate communication traffic. Telecommunications markets cover both physical network access to the local loop through interconnection agreements and marketing of home access lines to fixed-line subscribers. In Germany, both market segments show only a limited degree of competitive activities by new entrants at this time. Only a limited number of alternative network operators has installed fixed-line communications networks to the end customers in addition to the already existing local loop access network of the incumbent *Deutsche Telekom AG*. At the end of 2000, 52 alternative carriers operate only 1,5% of the roughly 50 million home access lines in the German fixed-line networks (RegTP 2001). In October 2000, subscribers in 51% of all German cities over 50.000 inhabitant have the opportunity to choose from multiple providers for home access lines. Alternative local loop access providers in the majority of cases provide physical access to locally installed home access lines and market services of local telephone access. As a result, a separation of the value chain steps ‘network operation’ and ‘sales and distribution of service’ has not been achieved at this stage of

market liberalization in Germany: Local access providers install the fixed-lines, distribute and also charge for telecommunications service usage. Two thirds of all home access lines of alternative local loop access providers are physically provided by *Deutsche Telekom*'s telecommunications channels through interconnection agreements, which illustrate the strong dependence on the incumbent operator.

(2) Long-distance telecommunication networks with fixed lines between switching centers link up multiple local loop networks. Long-distance telecommunications services can be divided into two segments: Within the national markets, interconnection agreements provide access to and allow usage of long-distance communication networks. The rights to share networks are provided for fixed and minute-rate dependent access fee. In liberalized telecommunication networks, the incumbent fixed-line network operator is requested to provide unfettered access to its network under the supervision of governmental authorities. The *German Regulierungsbehörde für Telekommunikation und Post* (RegTP) has regulated interconnection rates per minute between alternative national fixed-line telecommunication networks and networks of incumbent *Deutsche Telekom AG*. At this stage, the rates for fixed-line interconnection cannot be negotiated on the basis of minimum contract duration or traffic volumes between parties involved. A second market segment for long-distance telecommunications services includes the sharing of specific telecommunications transfer volumes. Transfer capacities defined by time, distance and transfer bandwidth can be shared on distinct fixed-line network segments.

In the subsequent service and distribution level of the industry value chain, offered and distributed services range from basic services, value-added services to customer specific services. Basic services in area of long-distance telecommunications services includes the call-by-call selection, pre-selection or direct connection access to fixed-line communication services and billing for services. Valued-added services cover personalized billing, server-based mass fax communication, premium rate numbers, voice mailboxes and directory assistance. Value-added services are tailored to customer needs and backed by software investments in the switching centers of an intelligent fixed-line network. Customer specific services require individual investments in telephone terminals and support call center applications or videoconferencing.

The majority of new entrants in the German fixed-line telecommunications market cover the service and distribution level with offerings, based on largely externally provided fixed-line transmission capacity. Switched-based new entrants in the fixed-line telecommunications market not only access fixed-line communication networks through interconnection agreements but also operate a limited number of switching centers and a basic infrastructure of telecommunications lines. The *RegTP* considers an independently operated switching center and connections to three separate local loops an alternative public telecommunications network, that has the right of interconnection to the network infrastructure of the national telecommunications incumbent. According to legal requirements in Germany, alternative network operators with only one independently operated switching center for long-distance telecommunications traffic and without independently operated basic infrastructure fulfill the standards of alternative network operators. These switch-based resellers as one group of new entrants in the German fixed-line telecommunications market generally retail *Deutsche Telekom AG*'s telecommunications services and independently complement this portfolio with their value-added services and the deployment of switching centers.

Switch-based reseller receive transfer capacity from other network operators at competitive rates, enhance these services and market the complete offering under their brand name. As the interconnection to external transfer capacity represents a major cost component, switch-based reseller depend on the availability of transfer capacity at competitive rates. Therefore, this access is supervised by the German regulatory authorities at the interface between the network and service level of fixed-line industry value chain. Enacted in 1998, German law provides only switch-based carriers with favorable interconnection rates to *Deutsche Telekom*'s existing fixed-line network. To purchase information transfer capacity, establishing the status of a switch-based carrier with limited network investments in one switching center represents a low entry barrier easily fulfilled by the majority of alternative network operators. In July 2000, 45 switch-based und switchless resellers have established operations in Germany. After market liberalization, all alternative network operators have initiated drastic price reductions in the fixed-line telecommunications market. In 1998, the first year of liberalization in the fixed-line market, alternative carriers have offered price reductions of up to 30% compared to standard *Deutsche Telekom* rates. Although falling retail prices of 71% for fixed line communication services in 1998 (Heise 2000) have caused a strong traffic growth of 60 percent over all three years of market liberalization (Idate

2001; RegTP 2001), the prices leadership position could not be sustained. In 2000, only marginal price differences exist to the incumbent *Deutsche Telekom AG*, which makes changing the provider attractive only in selected cases. In first quarter of 2000, 22 percent of the entire information volume has been transferred on networks of alternative carriers, which accounts for a 25 percent revenue share in the German fixed-line telecommunications market. In the same period, the 45 percent of the transfer volume on alternative networks have used a call-by-call selection of the provider, which allows a case-by-case selection of the preferred network. The remaining information volume has utilized the default pre-selection (42 percent) or the direct connection to alternative carrier (13 percent), which also allow for a case-by-case choice of competitive carriers. The high flexibility of network operator usage allows a very low general level of customer loyalty, whose improvement is seen as an important priority among all operators of fixed-line telecommunications services.

2.3.2 *Elisa Kommunikation GmbH*

Following the consolidation cycle of the telecommunications industry, *Elisa Kommunikation* has initially developed a broad portfolio of city carriers, which have been later operationally integrated through majority stakes. Cost reductions and efficiency improvements require this intensification of relationships to consistently search and implement best practices across all equity holdings.

Business background

Coordinating providers for fixed-line telecommunication services

Elisa Kommunikation – the German subsidiary of the major Finnish telecom operator *Elisa Corporation* – develops and consolidates all regional operations and equity holdings in Germany. In its internationalization and expansion strategies, *Elisa Communications Corp.* based in Helsinki considers Germany a very promising European target market (Elisa Kommunikation 2002).

“Elisa with its 40 percent market share in Finland has only limited growth potential in very saturated markets. However, Elisa’s shareholders require continuing growth: Germany was selected as Europe’s largest telecom market with deregulation of Deutsche Telekom still in progress. Due to open market conditions, all additional players face tough competition. [...] Elisa Communications Corp. has invested substantially in Germany which has led to a conglomerate of equity stakes.”

(Pertti Laukkanen, Managing Director, Elisa Kommunikation)

Elisa Kommunikation in Germany provides local loop fixed-line access, retails mobile communication products and provides long distance communication services for third party operators. Fixed-line access is mainly targeted towards small and medium size enterprises, large enterprises operating in local markets, public authorities and independent business owners (Elisa Kommunikation 2002).

Elisa's activities in Germany have initially been launched with the incorporation of its consulting business Helsinki Telecom Deutschland (HTD) in 1995. HTD has provided advisory services to a variety of emerging city carriers including filing for an operator's license with the Regulatory Authority for Telecommunications and Posts (RegTP), negotiating interconnection fees with *Deutsche Telekom AG*, defining market entry strategies, implementing services and optimizing processes:

“The HTD consulting business has given us valuable initial insights into the German [carrier] market. [...] The team from HTD knew where and how to invest which enabled us quickly and in the matter of months to build up a portfolio of equity stakes.”

(Pertti Laukkanen)

After midyear 1998, *Elisa Kommunikation* extended its consulting services to the acquisition of minority equity stakes in local telecommunications companies. In the process of a deregulating German fixed-line communications market, municipal utility companies have founded regional city carriers as business development initiatives. Since the beginning of 2001, *Elisa Kommunikation* has launched a consolidation process and now assumes centralized corporate leadership for multiple city carriers in Germany. After February 2002, *Elisa's* operational sub-unit and legal entity *Tropolys* holds and integrates 13 mainly majority equity stakes.

After 1990 with the beginning of deregulation in the German telecommunications market, municipal utility providers and local state-owned banks founded the first local loop telecommunication providers. In particular, utility companies have started to install passive voice and data transmission infrastructure. Although market liberalization enabled early market entry, significant subsequent prices later eroded revenue potential to an unexpected extent.

“During liberalization of telecommunications markets, an unexpected price decrease has reduced margins substantially. At the same time, high investments in active communication technology made it very difficult for all city carriers to achieve reasonable profits. With very

rare exceptions, all city carriers have accumulated high losses without the ability for loss reductions and further business development.”

(Fritz Rademacher, Manager Strategic Planning, Tropolys)

Responding to market shifts, *Elisa Kommunikation*'s and *Tropolys*' network of city carriers seeks sustainable improvements in cost structure in a consolidating and increasingly competitive fixed-line telecom industry. Cost reduction potential can be achieved by the installation of jointly used communication platforms for network infrastructure, consolidated customer billing or shared administrative services. Supported by a consolidating and coordinated infrastructure backbone, local city carriers can then leverage their existing strengths of local market identity and presence required for sustainable customer acquisition (*Elisa Kommunikation 2001a*).

“In early stages of the market, one could realize that city carriers cannot survive due to their small scale. Drastically reduced telephone rates in terms of price per minute have rendered high investment volumes unprofitable. Previous historical business plans of city carriers were based on totally different assumptions. Cooperation and coordination were a clear requirement.”

(Pertti Laukkanen)

To establish and maintain coordination, *Elisa Kommunikation* has started to raise equity stakes in city carriers and to integrate operational processes within the network under its sub-unit *Tropolys*. In this process, equity stakes without a fit to the consolidation strategy or the option to hold majority stakes have been divested.

With the integration of 13 city carriers, *Tropolys* as the operational sub-unit represents the largest city carrier in Germany competing with *Deutsche Telekom*'s fixed-line business. Over 100,000 customers connect directly to network and a bundled service offering. Supported by the nationwide and long distance backbone network of *ElisaNet*, all local city carrier customers have access to high quality long distance calls at competitive internal rates.

Future expansion in additional city carrier operations has been centered on the highly populated areas in North Rhine-Westphalia, Rhine-Main/Saarland and East Germany. To prevent direct competition with integrated fixed-line operator Arcor in major German cities, further expansion builds on acquisitions of city carriers in small and medium sized cities with a strong industrial infrastructure (Elisa Kommunikation 2001a).

Network structure: Growth, development and selection of network participants

Following initial equity investments and continuing growth, *Elisa* has later sorted and integrated a portfolio of city carriers. With an initial nucleus of city carriers in North Rhine-Westphalia, cash flow shortages of many existing access providers and the entire telecommunications industry, the clear needs for consolidation propelled the growth of this operational network of local loop access providers. *Elisa's* alliance network development can be broken down into establishing the initial footprint, continuing growth, selective consolidation and operational integration.

Establishing the initial footprint: In 1998, *Elisa Kommunikation* developed the first footprint with an equity stake in Citykom, which was followed by minority stake investments in JelloCom, HTP and Nordcom in 1999. *Elisa* has complemented the emerging portfolio of city carriers with the incorporation of mobile retail chain Mäkitorppa with 100 outlets in Germany (Elisa Kommunikation 2002). Although facilitated by market insights of the consulting unit HTD, this first wave of acquisitions of city carriers in Germany lacked an overall coordination and focus:

“In the first phase of acquisitions, additional coordination and alignment of operations was lacking and clearly required.”

(Pertti Laukkanen)

Continuing growth: In July 2000, Apax Europe as a financial investor, municipal utility companies and *Elisa Kommunikation* have jointly founded *Tropolys* – a network of city carriers in North Rhine-Westphalia integrating direct stakes in CNE, TeleBel and the previously directly owned Citykom. At this early stage, *Elisa Kommunikation* has accepted a 29 percent minority stake in *Tropolys*.

In October 2000, *Elisa Kommunikation* completely acquired the majority stake in TIME start-up management which integrated 12 fixed-line network operators and city carriers through minority and majority stakes. Although also initially focused on consolidating local loop access providers, TIME, later renamed *Elisa Asset Management*, lacked the financial resources to independently implement its strategy. The foundation of *Tropolys* and the acquisition of TIME were complemented in 2001 by completely acquiring city carriers enco.tel and pulsaar as well as a national backbone later renamed *ElisaNet*.

“We completed the direct acquisition of enco.tel in Thuringia which was not integrated into one of the sub-holdings and has initially been kept as a direct stake of Elisa Kommunikation. The rationale behind this was our historical minority stake in Tropolys without the perspective of gaining the majority stakeholding later on.”

(Manuela Peris, Manager Corporate Communication, Elisa Kommunikation)

Tropolys independently acquired 100 percent in two additional city carriers, meocom and TeleLev without the dilution of the *Elisa* equity stake. *Elisa* discontinued consulting services and integrated personnel of HTD into *Elisa*. As a final investment in 2000, *Elisa* purchased a 51 percent majority stake in Internet access provider Webmatic.

Increasing growth momentum and establishing an even wider footprint in the German market have dominated the business year 2000. At this stage and at the end of 2000, *Elisa Kommunikation* held mainly (68 percent of all cases) minority shareholdings in its operations. *Elisa*'s management has then set a differing direction for the two consecutive years:

“The business year 2000 has been characterized by strong growth. Through numerous acquisitions we have established a position in the

German market. This and the following years will be dominated by consolidating the legal entities and operational integration.”

(Pekka Perttula in (Elisa Kommunikation 2001f))

For the consecutive *consolidation* phase starting in January 2001, the management of *Elisa Kommunikation* has set a clear target for its future portfolio development:

“Majority stake holdings have always been our clear target, continuously backed by ongoing negotiations on multiple levels.”

(Manuela Peris)

Under the umbrella of renamed *Elisa Asset Management*, majority holdings have been newly established in MAINZ-KOM, Mainova TK and HU Kom in addition to already existing majority stakes in DDKom, tnp, HansaCom and Time City Link. The extension of majority stakes has been facilitated by limited access to capital markets for other industry participants:

“Following autumn 2000, access to financial market has been closed. Multiple additional investment plans have been reduced and reviewed. The current market conditions have propelled the consolidation. In the event of cash surplus, no interest for consolidation exists and all industry players have full flexibility to grow.” (Pertti Laukkanen)

Elisa’s majority stake in JelloCom and the fully owned subsidiary enco.tel were merged into jetz! with an *Elisa* stake of 53 percent. The creation of jetz! in May 2001 complemented the total geographic coverage with the largest city carrier in Thuringia (*Elisa Kommunikation 2001g*). Due to missing fit with the consolidation strategy, *Elisa* sold its stakes in CNS, NordCom and HTP.

“Since Summer 2001, our main focus was centered around building a fully operational and consolidated group. There were some carriers with no understanding for our strategy: Some local public utility

companies – as stakeholder – had a different opinion on how the operations should be organized. In the case of htp in Hanover, we therefore divested our stake, because we did not want to utilize additional resources.[...] We have also divested NordCom, because obtaining the majority of the equity share appeared to be infeasible.”

(Pertti Laukkanen)

By August 2001, the consolidation strategy reached full momentum and later led to *Tropolys* as the hub and competence center for further consolidation activities. This concentration has been preceded by an agreement in May 2001, that *Elisa Kommunikation* and *Tropolys* combine parts of their technical platforms and respective business units supporting nationwide integration of local and regional city carriers (Elisa Kommunikation 2001e).

“Discussions with Tropolys management helped us to understand that we were building parallel and redundant structures. As a five carrier group, Tropolys has taken similar ideas into account and needed centralized personnel resources, billing and customer care. [...] And building up parallel resources raised our concerns.”

(Pertti Laukkanen)

Within its now five carrier group in 100 percent majority ownership, *Tropolys* has also already begun to detect and implement synergies. Early cooperation on technical platforms and first consolidation results made *Tropolys* appear the better choice as a hub for further operational coordination.

Between the two alternatives – discontinuation of Tropolys and integration in Elisa or further expansion we decided for the latter: Tropolys had a good management and a more stable organization [than Elisa]. [Tropolys] also had a German management – a long-term strategic objective for Elisa. After multiple reviews, all scenarios

illustrated that integrating all carriers into Tropolys will be the easiest and fastest way [to reach our objectives].”

(Pertti Laukkanen)

Based on this understanding, *Elisa*'s management has started negotiations with *Tropolys* shareholders about the integration of the majority of *Elisa*'s remaining carriers in August 2001. *Elisa*'s clear objective was to reach the majority ownership of *Tropolys* by adding other carriers to *Tropolys*' portfolio.

Operational integration: Streamlining *Elisa*'s portfolio in the second half of 2001, the merged FIT and *Elisa Net* national carriers have been integrated in the *Tropolys* Group, thus increasing *Elisa Kommunikation*'s stake to 34 percent (*Elisa Kommunikation* 2001c). This integration has been achieved through a legal agreement in the form of a subordination contract (“Betriebsführungsvertrag”) with *Tropolys* management.

In a final step in December 2001, *Tropolys* integrated *Elisa*'s direct holding ‘pulsar’ and some portfolio elements of *Elisa Asset Management* – mainly its majority holdings Mainz-Kom, Mainova TK, DDkom, tnp, HU-KOM and HLkomm. Along with this integration, the stake of *Elisa Kommunikation* in *Tropolys* was increased to a majority position of 63 percent. Regarding all other *Elisa Asset Management* holdings, only the majority stake in HANSACOM (90 percent stake) and the 50 percent stake in Time City Link as well as all other minority stakes KRM, RMN continue to be directly owned by *Elisa Kommunikation*. In October, *Elisa* has acquired a 25.3 percent stake in the city carrier ChemTel.

Consolidation closure: As a spin-off in 2002, *Elisa Kommunikation* sells its minority position in 3 T as non-strategic asset to its majority stakeholder Energieversorgung Offenbach. *Elisa* has exercised its preemption rights to increase its stake in ChemTel to 75 percent in January 2002. Within the first quarter of 2002, the majority stakes in city carriers – ChemTel and jetz! – are planned to be integrated in the *Tropolys* group as well (*Elisa Kommunikation* 2001a).

“In the case of a 53 percent stake in jetz!, Elisa could easily sell the 53 percent stake to Tropolys and ask [other stakeholders] – the public

utility company – if they would exercise their preemption right for the stake. We could take this risk, since the local utility companies have no money anyway. But this conduct would generate negative sentiments. The preferred way is to offer a waiver for the preemption rights prior to the transaction.”

(Pertti Laukkanen)

At this stage at the end of January 2002, *Tropolys* holds stakes in 13 city carriers in its operational portfolio. With the only exception of HLkomm, all city carriers are owned as majority stakes which allows for the implementation of consolidation initiatives and further cost reduction.

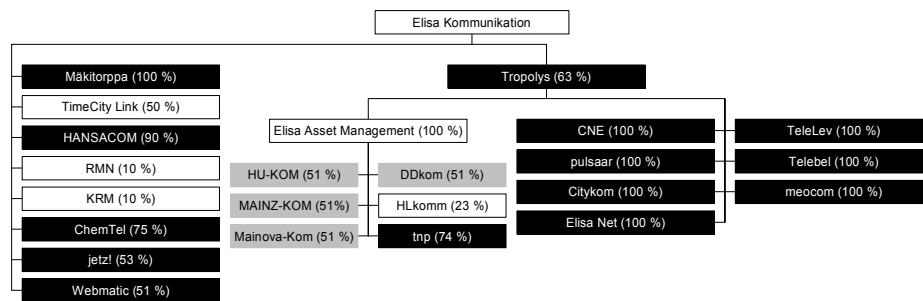


Exhibit 2-9 Elisa Kommunikation: Portfolio 31/01/2002

The integration of *Elisa Kommunikation*'s city carrier into *Tropolys* has proven a good option to achieve majority stakeholding without additional cash investments. According to *Elisa*'s management principles, limited financial resources should be only invested in the direct acquisition of city carriers and their operational integration.

Elisa Kommunikation	21.7.2000		1.12.2000		5.11.2001	
	Direct stake	Consolidated stake	Direct stake	Consolidated stake	Direct stake	Consolidated stake
Tropolys	29%		29%		34%	
<i>Citykom</i>	100%	29%	100%	29%	100%	34%
<i>CNE</i>	100%	29%	100%	29%	100%	34%
<i>Telebel</i>	100%	29%	100%	29%	100%	34%
<i>meocom</i>			100%	29%	100%	34%
<i>TeleLev</i>			100%	29%	100%	34%
<i>Elisa Net</i>					100%	34%
Pulsaar	100%	100%	100%	100%	100%	100%
enco.tel			100%	100%		
JelloCom	20%	20%	20%	20%		
HTP	50%	50%	50%	50%		
NordCom	25%	25%	25%	25%		
ChemTel					25%	25%
jetz!					53%	53%
Webmatic					51%	51%
Elisa Net	100%	100%	100%	100%		
FIT	50%	50%	50%	50%		
HTD	100%	100%				
Mäkitorppa	100%	100%	100%	100%	100%	100%
TIME, Elisa Asset Management	100%		100%		100%	
<i>3T</i>	10%	10%	10%	10%	10%	10%
<i>MAINZ-KOM</i>	20%	20%	20%	20%	51%	51%
<i>Mainova TK</i>	60%	60%	60%	60%	51%	51%
<i>DDkom</i>	51%	51%	51%	51%	51%	51%
<i>Time City Link</i>	50%	50%	50%	50%	50%	50%
<i>CNS</i>	40%	40%	40%	40%		0%
<i>tnp</i>	75%	75%	75%	75%	75%	75%
<i>KRM</i>	10%	10%	10%	10%	10%	10%
<i>RMN</i>	10%	10%	10%	10%	10%	10%
<i>HansaCom</i>	50%	50%	90%	90%	90%	90%
<i>HU-KOM</i>	10%	10%	10%	10%	51%	51%
<i>HLkomm</i>	23%		23%	23%	23%	23%
<i>Lkomm</i>	100%	23%				
<i>3H</i>	100%	23%				
<i>TelSA</i>	100%	23%				
Number of majority stakes [%, absolut]	28%	7	32%	8	43%	10
Number of minority stakes [%, absolut]	72%	18	68%	17	57%	13
Number of majority stakes [%, absolut]	22%	5	29%	7	38%	8
Number of minority stakes [%, absolut]	78%	18	71%	17	62%	13

Exhibit 2-10 Elisa Kommunikation: Equity stakes in percent from 07/2000 to 11/2001

Network adjustment

Market insight for equity stake acquisitions and subsequent integration

Elisa Kommunikation has used its market insights into the telecommunications market to develop minority relationships. Early investment decisions have been driven by an optimistic market outlook and opportunity of benefit sharing. Price decreases in the telecommunications markets and limited access to financial markets force carriers to consolidate and cooperate.

For the early equity investments, HTD's involvement with consulting services in the liberalizing German telecom market have enabled the first company assessments and facilitated the due diligence process for them. Support in business plan development has initiated early contacts with the city carriers prior to the equity holding. After longer and trustful partnerships, minority equity stakes in city carriers represented a logical consequence for *Elisa*. With growing momentum of equity acquisitions *Elisa Kommunikation* was already known in the marketplace as an investor with consolidation interests.

“Under the topic of consolidation, Elisa is known in the marketplace as a buyer and has realized after early decisions that other firms have approached Elisa for a potential interest in an equity stake in them.”

(Manuela Peris)

City carriers to be integrated in the *Tropolys* group in some cases have also had an established relationship with the group. In the case of ChemTel, the carrier has – prior to the integration – built up technical know-how and provided a joint technical platform in the form of shared switches for the relay of voice services (*Elisa Kommunikation 2001b*).

Therefore in the case of *Tropolys*, alliance network growth does not depend on referrals to the current network, since only a limited number of companies there operate local communication services and industry participants know all of the major operators. However, in some cases, the informal network of municipal utility companies can also be leveraged to promote *Tropolys*' strategy within the industry.

Prior to the integration, focus is on the management of local utility providers as major stakeholders, which in many cases openly appreciate the integration of city carriers in the *Tropolys* group:

“The agreed [integration of ChemTel] opens up additional and economically significant contacts to our company and the city of Chemnitz. At the same time, we increase our options in the interesting market for telecommunication services.”

(Karl Gerhard Degreif, Member of the board, local utility provider, Chemitz) in (Elisa Kommunikation 2001b)

Historically, most of the city carriers were founded as business development initiatives of local utility companies. For the duration of *Elisa*'s portfolio extensions, local utility companies in many cases have either held historical majority stakes or continue to hold minority stakes in city carriers. For in-depth cooperation with and integration of once locally developed and owned city carriers, aligned goals represent a critical prerequisite for the achievement of synergies.

Due to continuing relationships after *Elisa*'s initial investments, acquisition decisions are initiated and completed only in close cooperation with municipal utility companies as important stakeholders and local partners. City carriers across Germany are very much embedded in the development of regions and local communities:

“Not everything can be explained by numbers, there are a number of mental [and emotional] factors to be considered: [Elisa] wants to maintain that city carriers are locally very important. During my visit to ChemTel in Chemnitz, [I learned that] the people involved are very proud of everything they have built up and know that the municipal utility company is involved.

[Customers] very much trust ChemTel and want to use their local services instead of national telecom services.”

(Pertti Laukkanen)

This strong embeddedness of city carriers in regional economic relationships stems from majority state ownership, long lasting political ties to constituents, and deep involvement with city authorities for construction. Local utility company management feels a deep sense of ownership for its locally developed city carrier and considers it highly embedded in its local community.

Sense of ownership and embeddedness in some cases represents the motivation for the former stakeholder to continuously keep minority stakes in “their” city carriers even after the integration into *Tropolys*. In these specific cases, the offer to the municipal utility companies to receive a direct equity stake in *Tropolys* after integration has been rejected. As utility management with its local ties and responsibilities also has to consider interests of other municipal authorities, city councils and politicians, they prefer to maintain local, direct ownership.

Therefore, *Elisa* management has to take into account the interests of their partners and stakeholders. In the case of ‘pulsar’, prior majority stakeholders clearly expect from *Elisa Kommunikation*’s ownership to reach additional customer groups, to push new product development, to generate synergies in technical operations such as billing and to access a national communication backbone (*Elisa Kommunikation* 2000).

But, *Elisa* also wants to maintain regional links for future business development and marketing initiatives. Sales support and operations also remain an important area of continuing collaboration, since the regional partners and former majority stakeholders can most effectively target local businesses as an attractive customer segment. Both disincentives and benefits of strong local ties require active communication and coordination to maintain these valuable relationships:

“The advantage of having many local utility companies as local partners turns into a disadvantage due to all activities in supervisory boards. Almost half of my time is spent on discussions with

stakeholders. Particularly in this phase, one is required to communicate extensively to alleviate concerns.”

(Pertti Laukkanen)

In the process of future partner selection, *Elisa*'s due diligence process clearly follows predefined legal, technical and business review steps. *Elisa*'s technical experts assess the state of the technical equipment, further investment requirements and capacity utilization. Business reviews involve the evaluation of operational processes, marketing expenditures and market potentials. An established brand with close ties in the regional telecommunications market, established technical infrastructure, a location in small or medium-sized cities and satisfactory operating results demonstrated by potentially already positive EBITDA are mentioned as positive selection criteria for an integration into the *Elisa Kommunikation* and *Tropolys* group (Elisa Kommunikation 2001d). The general paradigm of *Elisa*'s majority holdings in city carriers imposes certain limits for further network growth:

“In the case of integrating an additional large city carrier without an Elisa stake, our equity holding in Tropolys would be diluted. This is an important aspect of integration, which we don't fully appreciate. We could reduce the momentum of this acquisition growth, but we do not see that as your objective. [...] Legal clauses prevent any dilution of Elisa's stake in the event of capital increase.”

(Pertti Laukkanen)

Although capital increase requires financial resources, *Elisa* corporation in Finland or *Elisa Kommunikation* in Germany would most likely be able to meet the requirements. Divestiture of minority equity stakes mainly to current majority equity holders has freed up cash flows for increasing equity stakes in consolidated sets of city carriers (Elisa Kommunikation 2001f). This ensures at any time *Elisa*'s majority stake in *Tropolys* as the dominating paradigm and very important management principle. The

early experience with these minority equity positions held by *Elisa* has developed and affirmed the validity of this management guideline.

“Our approach has been to learn from Elisa’s mistakes. According to our perspective, it has been a mistake to hold minority equity positions [...] because it is very difficult to locally determine the business direction. Elisa has then faced the result of decentralized units operating independently and the impossibility of aligning interest.”

„Elisa has then clearly changed its strategy: We – as Tropolys – only want to hold majority equity positions and the equity stakes that cannot be transformed into a majority holding will be sold. [...] Four years ago, it seemed impossible to buy majority holdings from self-confident municipal utility companies. [...] But today, if someone does not want to give up a majority stake, the company does not represent an interesting target for us.”

(Dr. Fritz Rademacher)

Operational coordination

Identifying and implementing consolidation potential within the carrier network

Elisa’s subsidiary *Tropolys* holds the portfolio of city carriers to be integrated operationally and coordinates processes to achieve synergies. Synergies can be achieved by cost efficient fixed network operation, more integrated shared services, marketing harmonization and streamlined sales operations.

Network operation and shared services: The transfer of *ElisaNet* in July 2001 from *Elisa Kommunikation* to *Tropolys* has enabled network operation improvements. The 24 points of interconnection (POI) to the network of *Deutsche Telekom* can be used as a communication platform for all regional carriers to reduce interconnection costs

(Elisa Kommunikation 2001d). Bundling national communication traffic allows for routing optimization. For active network equipment, purchasing frame agreements with equipment providers generate additional savings in the procurement of technical infrastructure. Increased purchasing volumes can be leveraged for volume-based price reductions. Shared services for governmental regulation, legal services, financial controlling, human resource administration and accounting are currently harmonized through common standards. Governmental regulation and legal services are performed by cooperating city carriers. Support for human resource administration, financial controlling and accounting depends on *Tropolys* and *Elisa* resources.

Marketing harmonization: Small and medium sized enterprises, regional companies and public authorities and high volume private customers require a standardized set of unified products such as ISDN, international calls, DSL and Internet products at comparable prices. Important customer ownership and loyalty, however, can mainly be achieved by offering multiple services through one provider. Although harmonization and standardization dominates *Tropolys'* carriers, *Elisa* Management does not expect product-based network effects for usage of telecommunications services. Only roughly 15 percent of all calls are made within the national network, although *Elisa* city carriers frequently serve public authorities and municipal utility companies with high internal communication requirements. Harmonization of products targets productivity improvements through unified billing and customer care, but is kept within defined boundaries constrained by the local sense of ownership:

“Many mixed sentiments and personal preferences among former equity stakeholders have to be considered. Labeling [and re-branding] the locally embedded entity would raise multiple eyebrows. [...] Marketing is currently being centralized, excluding the brands, however. Cost reductions are mainly achieved by harmonization for standard products such as unit alignment for communication services, which enables the synchronization of billing systems. [...]”

(Pertti Laukkanen)

Since constraints apply for marketing and advertising communication, local city carrier brands will remain unchanged to demonstrate local identity and to preserve the differentiating factor in comparison to the *Deutsche Telekom AG*.

“For communication services, the central marketing provides the basic layout, photos and visuals, which is then done only once and customized to the local city carrier to a limited extent.”

(Manuela Peris)

In addition to this product and marketing communication harmonization, pricing structures, regional customer care and billing centers within the three *Tropolys* focus regions Rhine-Main-Saar, North Rhine-Westphalia, New Laender will be harmonized as well.

Streamlining sales operations: As sales operations and direct distribution represent a major differentiating factor in the market and at the same time a weakness of many city carriers, activities in this area specifically require national alignment: The *Tropolys* group insists on group-wide harmonization of customer groups around a four column approach to fulfill their standards: Telecommunication carriers, municipal customers, small und medium-sized enterprises and residential customers.

Responsibility reallocation in marketing and sales faces the obstacle of a strong historical sense of ownership for local customers. Key accounts, however, with national communication service offerings and unified pricing call for a reallocation of responsibility to the holding level. Especially in the case of highly important customers, reallocation of responsibilities significantly raises the level of conflict. Therefore, marketing executives and their respective departments in the *Tropolys* group had to make the largest adjustments.

Although integration of city carriers into *Tropolys* yields significant efficiency improvements in the area described in this chapter, both determination and implementation of best practices required facilitation:

“[Tropolys] has set up workshops to determine strengths and weaknesses of carriers and mutual exchange opportunities. [...] The strong requirement for cost reduction is in many cases inconvenient for the local corporation that was once independent.” (Pertti Laukkanen)

Starting with the launch of *Tropolys*, the installation of functional boards realizes coordination and harmonization between city carriers: Besides managing directors, second level executives for sales, marketing, governmental regulation exchange best practices and know-how and decide within their functional responsibilities on a very regular basis. The vertical exchange of information motivates employees and serves as a decision committee for further integration and harmonization.

Boards have been set up to fill in for missing centralized holding level and *Tropolys* resources not to review but also to make decisions within their functional areas. *Tropolys* executives lead boards with full functional responsibility and a solid understanding of *Tropolys*' interests and objectives. At this stage of the larger 13-carrier group, the current structure of boards is under review: With the problem of too many committee members, *Tropolys* has decided to limit participation to fewer and more competent individuals.

Although “guided facilitation” aims at supporting the integration process, the external control of business process from marketing to network operation was not always welcome by previously independent companies and their senior management. On issues such as HR, communication to local management was clear and unambiguous:

“[Elisa] wants to exercise more control over your business unit [the city carrier]. And from now on you don't need a personnel department anymore, because we centralize that and so on.”

(Pertti Laukkanen)

Not all changes within the local network carriers have been met with full understanding. Local personnel in some cases has not been fully supportive in finding and implementing synergy potential: These adaptations across the network of city

carriers demanded changes in the leadership team in each of the city carriers, which has resulted in the loss of valuable human resources.

“Either this policy receives understanding and is welcome or one would have to replace the responsible managing director. This change process has demanded casualties: The local managing directors in many cases do not understand that their new duties have changed.”

(Pertti Laukkanen)

„In the first year of Tropolys’ five carrier group, we had to replace the managing director in almost every city carrier, not due to poor performance but due to a lack of understanding for our strategy.“

(Dr. Fritz Rademacher)

Particularly personnel decisions influenced by centralized personnel development often remain touchy subjects, as this frequently involves second level executives reporting to the local managing director. According to *Elisa*’s and *Tropolys*’ policies, local managing directors retain the authority to decide, but *Tropolys* leverages its influence if necessary and applicable.

Since the total city carrier alliance network around *Tropolys* has been very much focused only on detecting and implementing synergy potential, both *Tropolys* and regional local loop access providers lack the competency to innovate and develop new service offerings. In the current industry environment, innovations in value-added services and high-speed Internet access have been intentionally delayed and are not expected as collaboration from the carrier group.

Network objectives and performance

Expanding the revenue base and reducing cost base across the enlarged group

The consolidation under the leadership of *Tropolys* creates the largest network of 13 city carriers in Germany with targeted revenues of € 150 million. With more than

100,000 customers, the combined network represents the largest private telecommunications provider in Germany (Elisa Kommunikation 2001d). For 2002, the enlarged group predicts a 130 percent increase over last year's revenues. In 2001, *Tropolys* already generated a revenue increase of 50 percent with 55,000 customers. In contrast to telecom industry trends, *Tropolys* expects to break even in 2002 with an EBITDA (Earnings before income tax depreciation and amortization) of € 7.5 million. (Elisa Kommunikation 2001a)

On the daily operational level, sales operations as a major differentiator are controlled by the *Tropolys* holding on a daily, weekly and monthly basis: sales channel, type of customer, revenue projections. On a monthly basis, sales results are shared between all city carriers to evaluate it for internal benchmarking and internal ranking. This system allows for continuous tracking and involvement on a management by exception basis. To track efficiency improvements in network operations, performance indicators such as number of direct customer lines per technical employee, network costs per revenue, the investment volume per revenue or others are tracked on a quarterly basis. All these indicators demonstrate performance enhancements especially in the area of human resource capacity in charge of the network operation.

Initial resource base and development

Learning to subsequently grow and coordinate similar network members

From 1999 until 2001, *Elisa* and *Tropolys* developed capabilities to perform due diligence processes, to coordinate a network of city carriers through the exchange of best practices and to centrally perform selective functions.

Due diligence skills facilitate the selection of promising city carriers and the transfer into the *Tropolys* portfolio for further integration in the alliance network. Early consulting engagements and minority stakes have clearly helped to develop a good understanding of city carriers' operations. A broader understanding of the acquisition target represents very valuable input for the decision to invest in majority equity shares. The high level of continuous commitment to the city carrier requires an extensive due diligence process as described in chapter 0. According to the staged

network growth in number of holdings and intensity of the relationship, this capability has been built up in sequences.

With the integration of several city carriers, *Tropolys* has developed network coordination and cost focused consolidation capabilities:

„We are on track to achieve a homogeneous group of city carriers and an improved competitive position. The management of Tropolys has demonstrated their consolidation capabilities.“ (Laukkanen, Elisa Kommunikation in (Elisa Kommunikation 2001a))

Without alliance network management capabilities in the beginning, *Tropolys* had to learn how to initiate and maintain alliance networks during daily operations. In the case of not completely owned subsidiaries, important decisions are taken carefully, justified and communicated diligently. The capability of implementing decisions through consensus, discussion and direct instruction has developed slowly over time. Learning processes in this area have been initiated earlier by *Elisa* and then continued later with the incorporation of *Tropolys*.

“[Tropolys] has tackled [the integration] vigorously and forced the companies to implement something. [...] With today’s knowledge, it has been very beneficial to participate in this learning curve [of how to deal with decentralized units], but now as we do not only have decentralized units but also self-confident equity stakeholders we have to proceed more cautiously. We are in the middle of a learning process that hopefully progresses quickly to reduce the level of conflict. At the beginning, we paid little attention to the interests of other stakeholders, also due to the fact that we did not know them.

Now we know the [interests of our stakeholders], because they have clearly brought their objectives to our attention and we are considerate of their needs.”

(Dr. Fritz Rademacher)

Especially after adding new city carriers, streamlining marketing activities and harmonizing product variety, the level of conflict with new network firms increased: City carriers endeavor to keep their products with local customer acceptance and feel strong ownership of a larger product portfolio. Although management teams have accepted the overall revenue and profit goals, influences on operational practices have considered an independent area. Combination of pressure, lobbying for a mutual understanding and replacement of personnel facilitated integration implementation. With these learning effects, *Tropolys* now has a better understanding of city carriers' interests and of their strengths and weaknesses. In the process of managing the conflict, *Tropolys* has also learned to set up functional boards to detect, implement and control activities for consolidation and cost reduction.

Besides these facilitative skills, *Tropolys* has developed some centralized and functional business capabilities in accounting standards and systems: Former utility-based cost accounting systems – although detailed and precise – have proven to be too slow for controlling and reporting daily operations. *Tropolys* has developed accounting standards, policies and systems that mandate and enable full and compatible P&L cost accounting on the 9th of the consecutive month across the complete carrier group. Consolidated accounting policies result from *Elisa* Corporations financial accounting and shareholder information obligations of its public listing in Finland. Although technical difficulties for up-to-date accounting information initially appeared a major obstacle, the reduction of managerial resistance now makes rapid and unified cost and public accounting a reality for the whole group. After harmonizing accounting systems for historical numbers in 1.5 years, *Tropolys* is now working on developing appropriate group-wide forecasting tools.

2.3.3 *Within-case study analysis*

As *Elisa Kommunikation* regards the liberalizing German telecommunications market as an important growth opportunity, its partnership and investment history cover expansion, selection and intensification of partnerships. In its core business area, *Elisa* and *Tropolys* provide fixed-line voice and data transmission through a web of regional city carriers. Consulting services mainly for municipal utility providers established the initial footprint in the German market and a strong knowledge base of industry participants, their capabilities, cost structures and market conditions.

Strong knowledge base and well-developed consulting business contacts facilitated the establishment of relationships on the basis of minority equity relationships. Minority equity investments helped in the more detailed assessment of city carriers' capabilities. At this stage in November 2001, price decreases in the fixed-line telecommunications market have mandated the implementation of efficiency improvements in city carriers. After the assessment of potential efficiency improvements and fit to consolidation strategy, former mainly minority stakes in 24 city carriers have either been extended to majority shareholdings or divested to third party stakeholders. Some resistance to this concept of a consolidated group of thirteen city carriers can certainly be explained by a clear loss in entrepreneurial autonomy. However, drastic and unexpected price reductions as well as underestimated investments in telecommunication hardware as external industry factors provided the needed support to convince local management: Existing economics in the operation of local loop access providers make the independent operation of city carriers unprofitable.

Centered around the highly populated areas in North Rhine-Westphalia, Rhine-Main/Saarland and East Germany, the network of city carrier investments has evolved gradually from 1998. After a sequence of investments without a clear regional and conceptual focus, the foundation of *Tropolys* in July 2001 introduced the concept of an integrated network of city carriers. Only at this early stage, *Elisa* did accept a minority stake in the newly founded entity of three local loop access providers. The later acquisition of *TIME start-up management* in October 2000 has underlined the commitment to a network of fixed-line communication providers. All further acquisitions have not been integrated under the *Tropolys* group, because the long-term

objective of achieving majority ownership in this company could not be warranted at this early stage of network evolution.

Due to very limited access to the capital market as the dominating external industry factor, the consolidation of the earlier growth strategy achieved its full momentum in 2001. *Elisa*'s objective of obtaining and holding majority stakes has been facilitated by stakeholders with limited cash without many options for third party financing.

In August 2001, *Tropolys* – now a five carrier group through independent acquisitions – has been determined as the hub for all consolidation activities: Previously gained experience in defining and implementing the consolidation strategy as well as *Elisa*'s opportunity to achieve a majority stake in this company, made this company the new 'center of gravity' for the city carrier network. This decision has been preceded by operational integration of technical platforms and the observation that *Elisa* and *Tropolys* have developed redundant organizational structures. In December 2001, negotiations with all remaining city carrier stakeholders have resulted in the highly expanded network of twelve city carriers and one national backbone. This major consolidation step allowed for *Elisa*'s 63 percent majority ownership in *Tropolys*. As a final step, the merged city carriers of ChemTel and jetz! are to be integrated in the first quarter of 2002 to complement the group of thirteen carriers and one provider for national long distance communications services (see dark gray area in Exhibit 2-11). With the only exception of the minority stake in *HLkomm*, *Tropolys* owns all city carriers as direct majority stakes, which enables consolidation initiatives to be rolled out across the entire group.

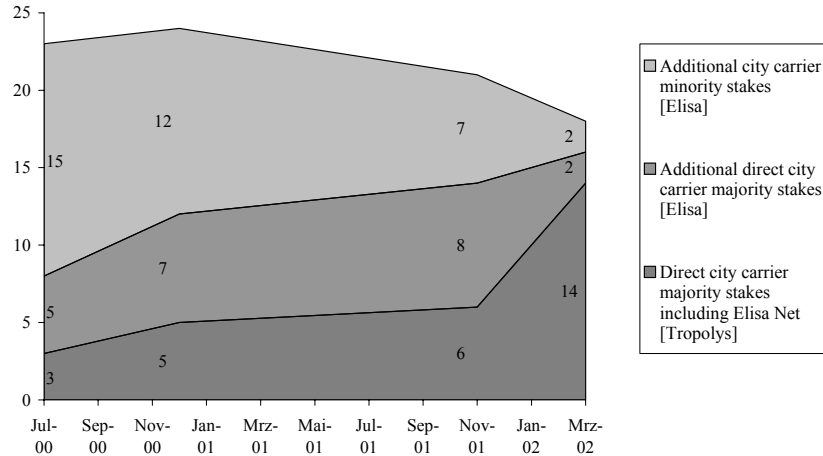


Exhibit 2-11 Elisa & Tropolys: Direct minority and majority holdings in telecommunications service providers

Over the course of network evolution from 1998 to 2002, *Elisa* has gained valuable information on the fixed-line telecommunications market and the capabilities of local loop access providers. Trustful consulting relationships have later been extended to minority equity shareholdings. Since the number of competitors with similar business models is fairly limited, *Elisa* was known quickly as an investor with consolidation objectives. Therefore, generating leads for new investment proposals does depend on referrals out of the current network and has not represented an obstacle for the further evolution of a network of service providers.

Due to experience gained through the number of transactions and importance of the decision to integrate an additional city carrier, the due diligence process prior to the investment decision covers extensive legal, technical and business perspectives. As an important component, clear and established evaluation criteria guide the assessment process. The overall strategic objective of consolidating operations as outlined above mandates majority ownership to ensure implementation of consolidation activities. Therefore, achieving and maintaining this majority ownership status throughout the entire evolution of the city carrier network is of paramount importance and may not be diluted by an increased acquisition growth rate.

Although generating leads for potential investment targets does not represent an obstacle, integrating new city carriers in the network of partners imposes significant

managerial challenges. Founded as sub-units of municipal utility companies, city carriers are highly embedded in the network of local authorities, state-owned enterprises and municipalities. Gradually removing city carriers out of these dependencies with possibly complex and conflicting objectives requires active change management by *Elisa's* and *Tropolys'* management. This transition process also requires internal adaptations to processes, organizational structures and personnel with awareness for the beneficial regional relationships that have clear benefits for customer acquisition. In all cases, this transition process needs to be induced by benefits for city carriers: Access to additional customer groups, development of new products and generation of synergies in clerical processes.

As described in the case study, the achievement of cost reduction potential depends on the consolidation of network operations and shared services, harmonization of marketing and streamlining of sales operations. Although all of these resources have a certain business impact, these 'commodities' do not represent the important differentiating factor for city carrier selection by end customers: The operation of a switched fixed-line communication network requires the application of cost-efficient routing through the network and selective sourcing of network components. Customer billing and service performs the economical processing of invoices according to communication service usage. Shared services in human resources, controlling and finance are mainly targeted towards internal customers and support other departments in providing customer services. Therefore, only 'commodity' and less valuable resources are consolidated to achieve economies of scale. Interestingly, other resources such as the proud identity of 'a locally run city carrier', brands or customer access have been kept at local city carrier level. Based on earlier experience and the anticipated high level of disagreement between headquarters and their subsidiaries, both *Elisa* and *Tropolys* concluded that the transfer of these more valuable resources as a clear indication for high degree of integration appeared infeasible at this stage.

Functional boards with the clear directive of *Tropolys'* management have facilitated the achievement of feasible efficiency improvements. With the launch of *Tropolys*, functional boards bear the responsibility of identifying improvement potential, determining appropriate measures and tracking the consolidation results. Although complex functional organizational structures, these functional boards establish alliance

structures between city carriers on the vertical level. Although the need for cooperation is clearly acknowledged, establishment of these functional boards through *Tropolys*' management seems a clear requirement for their formation. *Tropolys* as the coordinating entity seems to have the responsibility to coordinate the form of cooperation and alleviate the obstacles of know-how exchange. Although all city carriers through their distinct regions should not have any competitive relationships, they do, however, apply a very similar business model. Exchanging knowledge on how to improve city carrier operations faces obstacles: With a sense of pride for regional development, locally tailored solutions and entrepreneurial independence, local city carrier management has problems with taking outside advice on how to alleviate their operational problems. Therefore, *Tropolys* does not only need to facilitate cooperation, but also to enforce identification and implementation of consolidation potential. This enforcement is backed by majority ownership of any city carrier, which requires upfront investment in these stakes, but also provides the opportunity of settings objectives for senior city carrier management.

As *Tropolys* has finally grown into a larger thirteen-carrier group, the complexity of these functional boards has been reduced to include only the most knowledgeable representatives of city carrier line management.

Elisa and *Tropolys* at the center of this network of integrated city carriers have clearly established the resources of conducting a thorough due diligence process. In the area of operational integration, *Tropolys*' management as the entity responsible for coordinating the network has also gone through a learning process. A high level of conflict with city carriers' sales and marketing functions, loss of senior management and conflicting interests with still existing minority stakeholders have signaled the limits of influence in previously independent organizations. The consecutive learning process has outlined the barrier of *Tropolys*' external control, fostered awareness of stakeholders' objectives and underlined the value of facilitative coordination in the form of functional boards. All these components make up the specific alliance management capability of *Tropolys*. The 'commodity' resource shifts mentioned above in the context of operational coordination provide learning opportunities on the operational resources of city carriers. Besides these operational learning benefits,

Tropolys monitors the success of integration efforts through harmonized controlling and forecasting tools.

Although the revenue growth is largely driven by external acquisitions, the implementation of consolidation activities seems to have a first impact on EBITDA profits. In addition, closely tracked operational indicators illustrate performance enhancements in the targeted areas of marketing and network operation.

2.4 Alliance networks for providing online services

Both mobile and Internet communication networks provide the platform for innovative online services. Since many services developed and integrated from *MSN*, *E-plus*, *Lycos* and *Sonera Zed* go through their early stages of innovation and face uncertainty in customer preferences, respective alliance networks show rapid cycles of change.

2.4.1 Industry context

Telecommunications services covering fixed-line voice telephony, leased lines, switched data services and mobile telephony service account for € 218 billion or 33% of the telecommunications and information technology markets in Western Europe as described in chapter 2.2.1. In Germany, telecom service segments account for € 46.6 billion with a € 14 billion share of mobile telephony services.

In August 2001, 55.1 million analogue and digital mobile telephony subscribers in Germany pushed the penetration rate in Germany up to 67% of the total population. Based on the number of service subscribers, the market for mobile communication services is dominated by a strong duopoly represented by the incumbent mobile network *T-Mobile D1* with 40.5% and the close follower *Vodafone D2* with 39.7%, of the total market. Later entrants *E-plus* and *Viag Interkom* – later renamed *O2* – occupy the combined minority market share of 19.8%. Licenses for the third generation mobile standards UMTS (Universal Mobile Telecommunication Standard) have been allocated to all four current mobile operators and two new market entrants. UMTS operator licenses for the duration of 20 years have been allocated in an auctioning process in August 2000 raising € 50.5 billion in fees for the German government (Anonymous 2001a).

After a period of tremendous service subscriber growth in Western Europe, the number of mobile connections and subscribers will increase marginally from 330 million at the end of 2002 to nearly 350 million at the end of 2005. As subscriber growth rates will drop dramatically from 71% in 1999 to 1% in 2005, today's standard mobile voice communication services will turn into commodities and lose their currently highly profitable margins.

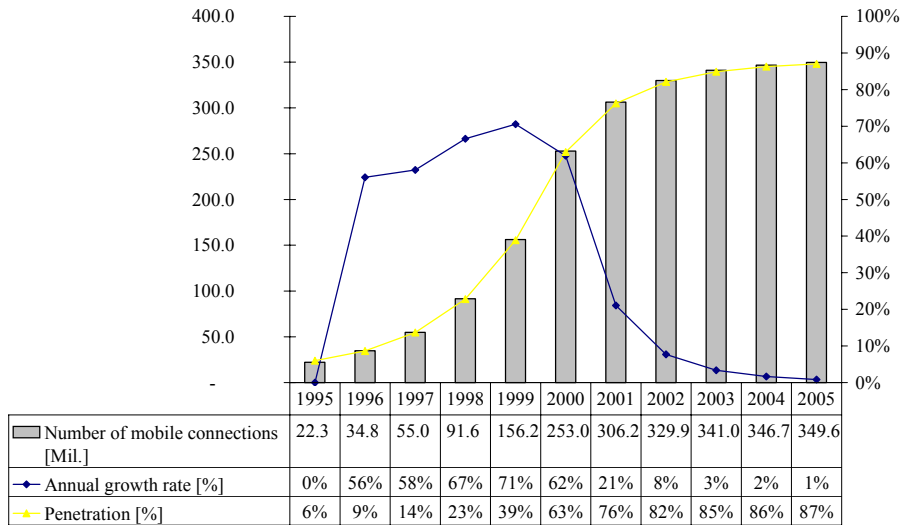


Exhibit 2-12 Subscribers: Mobile communication services in Europe at the end of the year (Durlacher Research 2001)

As clear support for the trend of commoditization, the average revenue per user (ARPU) has already dropped significantly, will bottom out in 2003 and then – with increasing revenues from new data services and mobile fixed-line substitution – rise up to current levels. Current decreases in ARPU are mainly driven by the addition of pre-paid subscribers with lower per capita revenue and the intense competition between mobile network operators (MNOs).

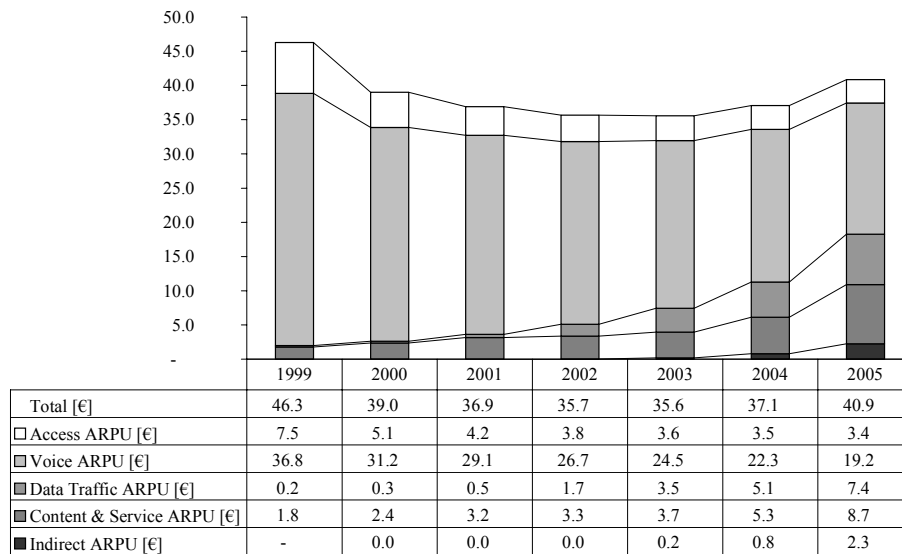


Exhibit 2-13 Revenues: Average per user in Europe (Durlacher Research 2001)

Decreasing ARPU until 2003 and increasing market saturation will reduce the revenue growth rates for mobile communication services to 5 % in 2003. Although the significance of voice traffic revenues will decrease, they will remain the largest revenue segments in the market. Saturation in mobile voice services is driving this decline, caused by increased retail price competition between mobile network operators. The overall increase in mobile telephony minute usage does not compensate for price pressures, leading to an absolute decline from 2003 onwards (Durlacher Research 2001). New mobile and mostly non-voice service offerings based on more advanced mobile communication standard are very much needed to drive the market volume expansion to 12 % in the year 2005. Therefore, mobile network operators are required to screen, select and bundle service offerings such as mobile commerce transactions, entertainment or business information and functions as the interface to the end consumer. Bundling new service offerings requires that mobile network operators select the volume of high quality content and applications through partnerships with experienced and trusted providers.

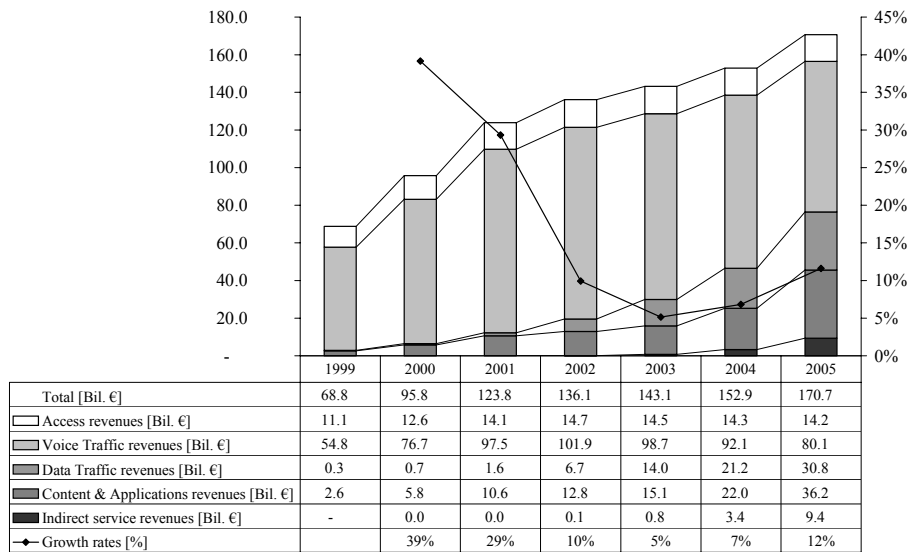


Exhibit 2-14 Revenues: Mobile communication services in Europe (Durlacher Research 2001)

Driving these changes in mobile communication service markets, underlying industry drivers can be broken down into digitalization, packetization, consolidation and technical convergence. With current mobile transmission standards, voice, data and video information is being created, transported, and received digitally. Digitalization also allows seamless technical convergence. Packetization of networks – the upgrade from circuit switching to packet switching – enables the transmission of larger volumes of data. Technical convergence facilitated by digitalization and packetization of telecommunications, information technology, media and entertainment services and products will serve as a major innovator and growth engine. Telecommunications service providers will now have the ability and increased incentives to cooperate with partners from related industries (Heise 2000). Integration of applications will be advanced by platform independent programming languages (e.g. JAVA) or device sensitive languages (e.g. XHTML) (Durlacher Research 2001). Facilitated by technical convergence, consolidation enables economies of scale, operational efficiencies, regional and global reach, stronger negotiation and purchasing power (Gulati 2001).

Only inadequately supporting the trends of digitalization and packetization, the currently operated digital mobile communication standard GSM (Global System for Mobile Communications) has been developed for standard voice communication only.

Reflecting its insufficiency, data transfers are technically limited to the short message service (SMS) and other short data transmissions. Full digitalization and packetization requires GSM extensions and upgrades – namely HSCSD or GPRS – or the next generation of mobile communication UMTS (Universal Mobile Telecommunication Standard).

Standard	HSCSD	GPRS	UMTS
Maximum transmission speed	56 Kbit/s	115 Kbit/s	2 Mbit/s
Services	Voice, Data, Images	Voice, Data, Images	Voice, Data, Images, Videos
Availability	2001	2002	End of 2003

Exhibit 2-15 Overview: Standards for mobile communication services

HSCSD (Highspeed Circuit Switched Data) solves the problem of small GSM bandwidths by bundling multiple GSM channels. In addition to GSM and HSCSD, GPRS (General Packet Radio Service) uses a package-based transmission technology that does not require a constant connection to the base station. The handset remains online continuously, and receives only the specifically dedicated data packages. Subscribers can therefore share multiple transmission channels and bandwidths can be adapted to transmission volumes. The subscriber will be charged for the data volume only and not for using multiple channels. Therefore, GPRS is well suited for the transfer of emails and Internet applications that require data transfer in packages and not in a continuous flow (Heise 2000).

Representing the next milestone, UMTS as the future mobile communication standard enables standard voice communication and also higher bandwidth data transmission: A wide variety of business and entertainment applications can be accessed from subscribers regardless of their current location or device. Besides standard Internet applications, email, online banking, video conferencing, and music transmission are also to be supported by UMTS networks. In addition to obtaining the license, UMTS requires mobile operators to invest high amounts in core network upgrades and a completely extended high-density antenna network. Due to the high number of

required antennas, UMTS networks will most likely only cover highly populated areas (Heise 2000). With the antenna network growing gradually, transmission rates for the network launch in 2003 will realistically reach only 40 kbps (Durlacher Research 2001). For a full-scale launch, availability of handsets with high capacity batteries and color displays will remain a bottleneck for the entire industry. UMTS network equipment vendors are expected to have difficulties rolling out 70 networks almost simultaneously in Europe over next three to four years. UMTS rollout will not be completed until the year 2005 and the geographic coverage will never be as good as that of current GSM networks. Greenfield UMTS network operators are expected to spend € 8 billion to deploy a UMTS network with 90% coverage of the German territory (Durlacher Research 2001).

For the transition of users to higher bandwidth networks, currently available GPRS data transfer rates will be sufficient for basic m-commerce applications and are expected to facilitate the launch of UMTS-based services two years later. GPRS is therefore considered among operators to be a very important driver for the development and deployment of mobile data services (Arthur D. Little 2000). Exploring early steps of digitalization and technical convergence, the launch of mobile Internet platforms and content, initial investments in the new technology have mainly been motivated by experimenting with novel mobile communication technology and exhibiting an innovative first mover approach (Exhibit 2-16).

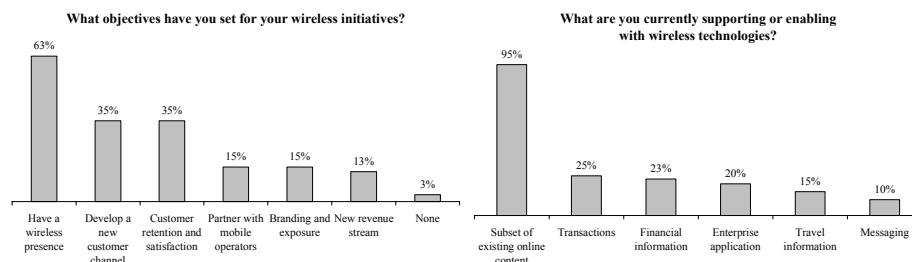


Exhibit 2-16 Overview: Objectives for wireless initiatives and applications supported by wireless technologies (McCarthy 2000)

Following this explorative approach, mainly a sub-set of the existing Internet content has been made available to establish an initial wireless presence, to develop a new channel for customer retention and to gain additional brand exposure. Underscoring

the explorative character of initial mobile investment, generating new revenue streams has only been given a minor priority (McCarthy 2000).

In many cases, alliance partners have implemented wireless technology and device support for mobile network operators, since the mere technical platform know-how is not regarded as a core competency and time-to-launch has been given major attention. Although partnering with companies along the value chain has been widely utilized for mobile development (Exhibit 2-17), mobile applications are generally hosted in-house to keep control over future data service development and to ensure a high quality service level.

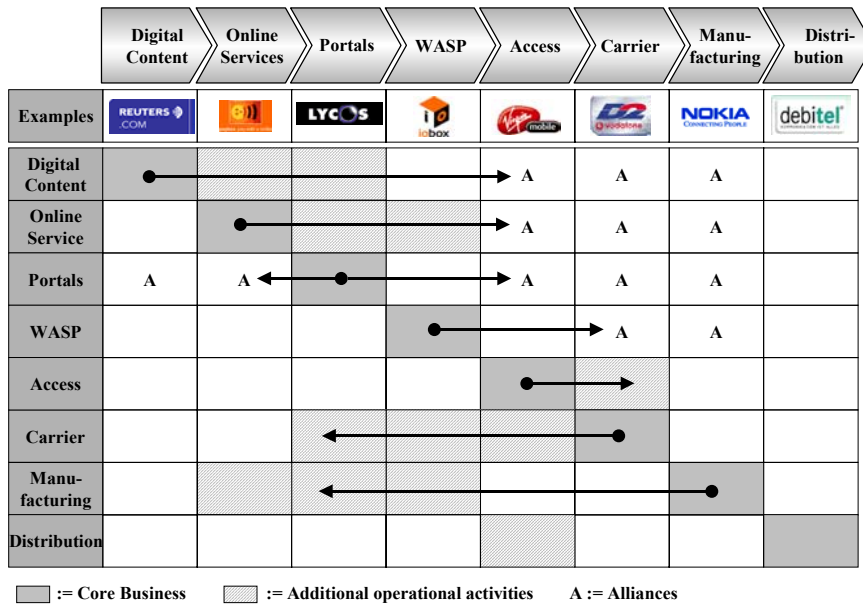


Exhibit 2-17 Value chain: Mobile industry and partnering

Although first steps in collaboratively developing data services have been taken, mobile network operators and their partners face significant technical uncertainty of multiple networks, protocols and devices. This lack of standards remains the barrier for further adoption and a larger customer base (McCarthy 2000). Challenged by current complex and heterogeneous technical systems however, end customers require seamless and compatible solutions in multi-network environments (Kviselius 2001). Multi-network environments based on Bluetooth, Wireless LAN, GPRS and UMTS

trigger the demand for multi-mode devices and development of unified software standards. Besides processing power and power supply, the various interfaces to mobile devices will act as principal restricting factors in the development of mobile data space. Bluetooth allows the synchronization of mobile devices with PC applications, data exchange and m-commerce application within a distance of 10 meters. As a widely accepted and supported technology, it will become the standard for short-range, peer-to-peer and home networking of devices manufactured by component and device manufacturers. Wireless local area networks (WLAN) are substituting cable-based LANs at transmission speeds of up to 10 Mbit/s. Similar to cellular systems, terminals communicate with base stations over an air interface on a certain frequency band. Mainly, WLAN infrastructure is used indoors for laptop equipment and provides increased mobility between cells.

Although mobile operators are generally in the position to define the basic platforms for network access and security, the variety of wireless application service providers (WASPs) needed for implementing satisfactory application functionality imposes complex coordination issues. Wireless application supplier or developers regard technology issues and building a customer base driven by good user experience as their top priorities. Not responding to these priorities (Exhibit 2-18), mobile network operators as important partners lack the capability of providing technical support and are only perceived as a distribution channel, bottleneck and mere infrastructure provider.

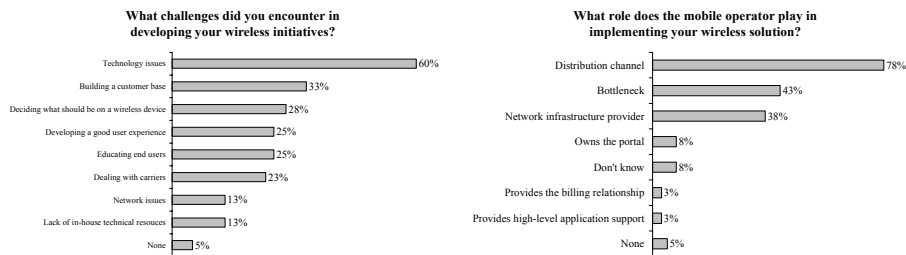


Exhibit 2-18 Overview: Challenges of deploying mobile data services & roles of mobile network operators (McCarthy 2000)

In the year 2001, WASP, service and content section of the value mobile chain currently consists of 3,500 companies in North America and Europe. Wireless

application development comprises data enablement players as the largest group, wireless enterprise application developers, wireless merchants and content players. Most of these young companies were founded 2 years ago and currently employ less than 40 people. At this stage, only a minority of 25% of wireless application development companies will be able to finance growth through sales revenues. Slow revenue increases and technical uncertainties due to launch delays of upgraded mobile networks leave young enterprises vulnerable and dependent upon venture capital or strategic investor financial support. Slow revenue increases are further complicated by underdeveloped end-user charging mechanisms: Monthly fees, transaction-based and time-based mechanisms are among the explored options (Booz Allen & Hamilton 2001).

All types of wireless application developers rely highly on partnerships with technology players such as HP, Ericsson and Nokia. As a requirement for further business development, both wireless application developers and mobile network operators will have to agree on some type of revenue sharing. Not surprisingly, acquiring customers and developing partnerships range among the most mentioned strategic priorities for application developers. Most wireless application developers select strategic alliances over supplier relationships and other cooperative agreements. Exclusivity agreements are generally rejected except with restricted time or limited geographical area constraints. Innovation and international expansion rank as the third and fourth most often mentioned priorities (Booz Allen & Hamilton 2001).

In order to harness the innovation power of application development, mobile network operators need to speed up their decision-making, to focus on clear segments, technologies and business models, to communicate the focus clearly and to structure the interaction with the wireless application development community. Single points of interaction, forums, communities and established corporate venturing facilitate interaction with the application community (Booz Allen & Hamilton 2001). In practice, however, mobile network operators are generally perceived as competitors and difficult to work with. Although they are beneficiaries of newly developed applications, wireless application developers perceive operators as slow in committing resources.

Generally following their traditional paradigms, mobile network operators have focused too much on acquiring financial resources for radio network expansion and choosing the right technologies. Satisfied by healthy voice revenue growth, MNOs have lacked the incentives to look beyond their current business model (Durlacher Research 2001). Currently triggered by both necessity and opportunity, mobile network operators shift away from offering mostly voice services and become a true integrator of various mobile application services, supported by already existing large number of users and billing relationships (Müller-Veerse 1999). Although a majority of mobile network operators constantly considers ownership of network infrastructure a competitive advantage, the same majority anticipates opening of networks to competitors and development of further alliances (Arthur D. Little 2000). These trends are shifting business focus for the network operation away from end-users to wholesale customers with large-scale communication usage (Durlacher Research 2001).

With more sophisticated applications and the utilization of the described packet-based networks, MNOs will increasingly generate revenues from digital content and data services, which turns them into content aggregators and an interface to the mobile phone subscriber. Innovative new services ranging from downloadable games, Java-based software applications, telematics to healthcare applications-based technologies enable service providers to create both rich and personalized wireless applications (McCarthy 2000). Fueling the use of advanced mobile data services will be the only way for mobile operators to recoup their investments in licenses and networks. Mobile operators need to act quickly to turn their operations around from network development, voice-centric and customer acquisition-focused organization to one which is essentially a platform business managing numerous relationships next to an independent cellular infrastructure operations business. As product lifecycles are expected to become increasingly shorter all the time, company survival in the mobile market will also depend on how quickly a business and all functional areas embrace new paradigms (Durlacher Research 2001):

Either through partnership or self-development, network operators will have to refine their service portfolio by upgrading security of transactions. Analytical tools are also needed for the effectiveness assessment of marketing and advertising. At this stage partnering capabilities for integrated business development require further

development within MNOs. As both license payments and network investments are financed with high interest payments, tight financial management will also develop into a future necessity. Since the auctioning of additional high-bandwidth licenses further has liberalized mobile markets, the management of transmission overcapacity represents an additional challenge for some industry players. Outside of peak usage of the network capacity, MNOs try to work with mobile portals or other service providers as wholesalers to fill up some of this capacity.

Due to the lack of information on subscriber preferences, network operators do not have the right skills set to develop data services with appeal to mobile subscribers. As MNOs have traditionally provided homogeneous products and services, they have also relied on only one single brand strategy. As customer preferences move towards a heterogeneous service environment, MNOs need to develop new brand values that represent the attributes of a deep and broad product portfolio.

In more general terms, skill requirements for large mobile industry players include speeding up decisions, accepting a non-linear process, communicating clear visions, facilitating cooperative working relationships, creating mechanisms to initiate alliances, defining cooperation agreements and providing market insights. *BT Expidas*, *Nokia Ventures* and *HP Mobile e-Services Bazaar* are frequently mentioned as best practice industry benchmarks (Booz Allen & Hamilton 2001). Alliances between applications, content and mobile communication providers should also be facilitated by governmental organizations, founded across several industries and supported by venture capital funds (Oertel, Steinmüller and Beyer 2001).

2.4.2 *Microsoft Network Germany*

MSN Germany applies an approach of organic growth to its alliance network. Partnerships follow an explorative roadmap without predefined outcomes and rigid separation of benefits. However, *MSN* has its focus on maintaining and extending *Microsoft's* technology standard usage in joint software development projects with its partners.

Business background

Providing Internet services as a subsidiary of a software company

Microsoft network (MSN) Germany – a sub-unit of *Microsoft GmbH* – provides Internet-based communication, information and entertainment services. *MSN* services are provided as an open portal to the total Internet community (Anonymous 1998). *MSN* originally started in 1995 as a proprietary online service, but failed to achieve the minimum number of users as critical mass and thus abandoned telephone access provision services. *MSN* signed an agreement with *Microsoft* to migrate its remaining customers to *T-Online* in September 1998.

According to *MSN's* view of Internet services, customer requirements have transformed from providing mere content to delivering interactive solutions and services. The provision of exclusive content therefore loses its importance, and web-based services utilizing interactivity of the Internet are expected to gain much more user loyalty. The highly desired interactivity of online communication services generates positive network effects through growing user groups. Due to low variable costs of added users, Internet service providers achieve strong economies of scale in both providing content and distributing interactive services. *MSN*, like many other industry participants, expects further consolidation of Internet portals and therefore regards integrating user bases a pivotal requirement for achieving significant market share, leveraging a strong negotiation position and generating scale benefits.

Network structure

Transforming alliance portfolio to commercialize MSN's user base

According to own press releases (Microsoft 2001b), between the beginning of the year 2000 and January 2002, *MSN* has formed 39 alliances in the areas of content provision, technology and advertising. Partnerships for content provision provides *MSN's* user base with information on fitness, automotive and job opportunities. Technology alliances upgrade *MSN's* online services with improved functionalities to allow for online banking or enhanced instant messaging. Contracts for advertising open up access to the *MSN* user base for the promotion of products and services.

Alliance category	Content	Technology	Advertising
Number of relationships	14	4	21
Business areas	<ul style="list-style-type: none"> ▪ Weather ▪ Lifestyle, Fitness ▪ Job opportunities ▪ Traffic routing ▪ Business and Company news ▪ Personal finance ▪ ... 	<ul style="list-style-type: none"> ▪ Account aggregation ▪ Instant messaging ▪ Financial transactions ▪ ... 	<ul style="list-style-type: none"> ▪ Online retailing ▪ Co-marketing of online content ▪ Online marketplaces ▪ ...
Examples of alliance partners	<ul style="list-style-type: none"> ▪ Meteomedia ▪ JobScout 24 ▪ FT Marketwatch ▪ ... 	<ul style="list-style-type: none"> ▪ Net to Phone ▪ Buhl data ▪ ... 	<ul style="list-style-type: none"> ▪ Unilever ▪ Kellogg's ▪ Otto ▪ Volkswagen ▪ D2 Vodafone ▪ ...

Exhibit 2-19 MSN Germany: Alliance portfolio by category

MSN has started to negotiate initial alliances in the areas of content and technology to test and refine its online services. Advertising relationships have been added in a second phase after the establishment of all previous relationships. Advertising relationships involve the complex exchange of product catalogs for online shopping or partner brands with access to a developing *MSN* user base. Generated fees for the access to the *MSN* user community represent an important revenue source for *MSN*.

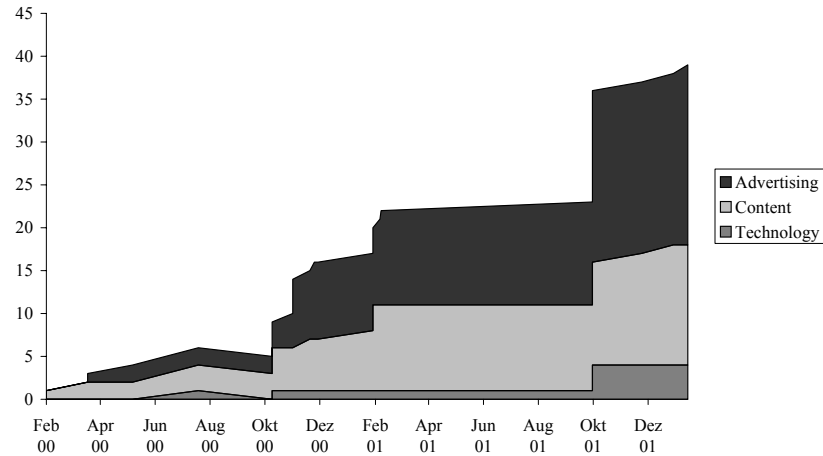


Exhibit 2-20 MSN Germany: Cumulated alliances by category from 02/2000 to 01/2002

Based on the partnership and alliance published in *MSN Germany's* press releases, so-called advertising alliances of the total alliance portfolio grew from 33% in April 2000 to 54% in January 2002. In the same period, content alliance decreased from a 67% high to 36% of all relationships.

Network adjustment

Project-based relationship with the potential of future extension

Reflecting *Microsoft's* constantly dominating industry position, two thirds of leads for alliance opportunities come from *MSN's* contact networks. Only the smaller remainder is brought to *MSN's* attention through current alliance partners. *MSN* applies an opportunistic and trial-and-error approach to the formation of alliances in its network without defined due diligence processes. Alliance formation is mainly driven by the exploratory formation of developing online solutions or products without clearly defined objectives at the start of the partnerships.

On the aggregated industry level, however, *MSN* – as a sub-unit of highly integrated *Microsoft* – is certainly framed by major industry coalitions which have to be taken into consideration on the lower alliance level.

“A telecommunications company – called Deutsche Telekom AG – owns a fixed-line network and maximizes profits. [MSN] provides the services and the technology itself to utilize and merge [the whole system.] All partners involved gain a fair share and complement each other. [...] On a vertical perspective [a firm like Microsoft] has multiple complementing relationships and on the horizontal perspective competitive relationships if [the firm] is integrated to some extent. The core characteristic of this industry is a partially complementary and competitive relationship.”

(Dr. Christian Göttlich, Head of Business Development & Product Management)

Vertically integrated companies in the software and telecommunications industry have to cope with multiple relationships and frequently face competition along their value chain. Competitive and complementary relationships on the corporate level both define and limit alliance formation and evolution on the operational *MSN* level.

In line with this argument, *Microsoft's* strategy to install software standards or to access customer groups therefore has an impact on *MSN's* screening of potential alliance partners: Technology usage for online identification (‘*MSN passport*’) and backbone systems raises issues of major importance to *MSN*. After fulfilling some of the necessary conditions, alliance partners on the operational level follow a more opportunistic approach.

“On the strategic level, technology issues such as usage of passport or Windows platforms or the strong access to customer groups are of major importance. When all customers sign up for passports to use services [...], this establishes the de-facto standard for online

registration. These strategic business alliances always raise technology issues and are based on almost religious beliefs.”

On the operational and tactical level, we approach topics very opportunistically. There is only a limited number of [alliances] one would need to forge. If the opportunity arises, one needs to act ... if nothing better is readily available. The decision to work with either publishing house X or Y is made absolutely opportunistically.”

(Dr. Christian Götsch)

Due to the exploratory nature of online services, no formal due diligence process or predefined criteria for commercial and technical screening of alliance opportunities exist in *MSN Germany*. Therefore, legal and finance functions of *Microsoft* are involved only to a very limited extent, and the marketing function is only selectively engaged in the alliance development process.

An informal personal communication process supports the ongoing alliance coordination. *MSN* seeks pragmatic operational progress in a partnership without being very conceptual in completely defining all the alliance goals. Due to their exploratory nature, most of the partnerships are defined by project-based boundaries with an exclusive tie only to *MSN*. Alliances for providing content and technology are mainly kept at arm's length: Contracts involving the exchange of some development and entertainment services provide the legal basis for project-based, jointly defined activities.

In only a limited number of six cases, earlier alliances developed into a more valuable and extensive technological implementation with an extended alliance scope. The implementation of the Volkswagen mobility – for example – requires an even more intense customer interaction with dynamic changes in scope and objective. Additional extensions of relationships require a higher intensity of resource exchange. In interacting in more complex co-marketing and advertising services, multiple resources such as the *MSN*'s user base, its technological skills and the partner's brand and

advertising campaign competencies have to be linked for an effective implementation of marketing measures. For example, the launch of ‘Car view’ gives users access to routing information, maps, traffic reports and clearly illustrates this combination of complementary skills:

“With MSN Car view, we add first-class information and services to the MSN portal. Renowned partners from the automotive industry guarantee the high quality of the service offering. MSN clearly considers itself as a partner of the automotive industry with the objective of providing innovative technologies and support for their digital marketing strategies.”

(Gregory Gordon, Director MSN Germany in (Microsoft 2001a))

After reaching a certain level of maturity in alliance network growth, MSN now acts more and more as mediator in integrating multiple interests across partnerships. As MSN is regarded as a focal player with technological and market expertise, enough credibility and information about partners’ objectives enable business development across the network for new joint service offerings. In one specific case, potential joint service offerings for senior citizens have been brought to MSN’s attention by diverse group of partners – banks, automotive companies, and many others:

“For the development of senior citizen service offerings, our industry has to come up with solutions. Together we can [generate synergies] and deal with distribution of pay-offs later. Provided that content and distribution services are available to us, we can directly target senior citizens [with a range of services]. [These initiatives] make sense, but only work when [MSN] can generate financial benefits from them.

Someone has to invest, someone has to recover costs and we have to achieve an equilibrium all of which has represented a strong challenge over the last few years [due to budgetary constraints].”

(Dr. Christian Götsch)

As the sustainability of internet business models in some cases remains to be proven, MSN selectively seeks redundancies in its alliance relationships. Further network growth and expansion is mainly limited by MSN's personnel resources. Additional in-depth and therefore valuable relationships require not only initiation but also ongoing maintenance as well as opportunities for subsequent extension.

Operational coordination

Exploratory projects and growing subsequent resource exchange

Across the majority of alliances, both the alliance partner and MSN initiate explorative alliances with unknown outcome due to technical and market uncertainties. Technical capabilities, corporate culture and flexibility remain open questions at alliance initiation and require mutual understanding of the alliance nature:

“[In the early phase of alliance development and under ideal circumstances], business developers in partnerships negotiate and explore the complementary perspective of a deal. We mutually develop [this technology] first and distribute benefits later – typical habits of people in fast growing industries.[...] In these new [business] areas, initial roles and responsibilities are highly unclear and new services are developed later.”

(Dr. Christian Götsch)

Therefore, alliance relationships are not standardized in areas of product development, transfer of intellectual capital, marketing and further business development. Technical

and industry dynamics do not allow for clearly assigned and predefined roles and responsibilities. As a result, operational decisions within the alliance network in most cases are made jointly with partners, but remain the responsibility of MSN and *Microsoft* in the case of the discussed technology standards. Although MSN is clearly the focal actor for bundling online products, it does not have the leverage of strong relationships or the power to clearly assign roles and responsibilities across the alliance network.

The majority of initial partnerships are defined by project activities for the co-marketing between MSN's Kellogg's, the mere integration of weather information from Meteomedia or the availability of traffic routing from Teleinfo. However, later in 2001 more intense alliances in financial services, for example, require the extensive combination of complementary resources and a more detailed interaction: Buhl data software enables customer handling and interfaces to banks on the MSN Money portal to users' consolidated bank accounts.

“[Buhl data] provides specialized financial software – a technical resource. MSN knows how to build and develop the existing money portal and its rich features. Buhl data also leverages the installed base of their former product users, MSN adds its user base and offers customer access for the distribution of financial software licenses.”

(Dr. Christian Götsch)

Both share complementary and complex resources and skills for additional business development. In limited cases as described above, initial project-based partnerships have grown into long-term relationships to automakers such as Volkswagen.

“Volkswagen represents a major marketing customer for us. [MSN] provides exclusive and high-quality marketing for large revenues and volumes in the automotive sector with the potential of key account management. [In the extension of the Volkswagen relationship], MSN

has supported the development and the operation of a VW branded portal offering weather reports, news feeds, SMS and routing.”

(Dr. Christian Göttisch)

As additional example for more extensive cooperation in advertising alliances, MSN Shopping, launched in November 2000 and enhanced in October 2001, bundles product offerings of mainly German retailers allowing for easier browsing, comparing and purchasing. Transactions with retailers require a tailored and customized approach with exchange of multiple product catalogs. Multiple catalogs are categorized according to product features. Retailers benefit from the access to MSN customers as a distribution service, although browsing through multiple catalogs makes buyers price sensitive. Due to intense interaction with exchange of product catalogs, some contacts to retailers have further distribution potential for MSN and can therefore develop into a key account for MSN. Although the exchange of product information constitutes continuous, long-term relationships, the inherent transparency and accountability of online retailing has clearly shifted the relationship:

“Originally, portals have taken no risks and [have sold non-exclusive content and access] for high sums of money. In the meantime, risk has shifted and we only receive [financial compensation] when we have a [sales impact].”

(Dr. Christian Göttisch)

On a selective basis, MSN facilitates knowledge exchange between alliance partners based on benchmarks generated from alliance experience. However, information exchange is done very cautiously and only between non-competing business partners. Apart from the knowledge transfer on business-related issues, MSN provides alliance partners with additional support, technology solutions or user identification such as passports. The knowledge exchange as described above remains informal, is very much tailored to the individual alliance partner and improved in the daily information exchange.

Network objectives and performance & its supporting resource base

Growing user base of the MSN portal

As MSN provides access to selected user groups, the number of page views and net ratings represents an important performance criterion. Having been on the 18th position in German net ratings in 1999, MSN attained the number 2 position in 2001. According to the study by Jupiter MMXI Europe in October 2001, MSN has maintained the second rank in circulation and distribution of Internet sites in Germany with a market share of 41.1% (Microsoft 2001b).

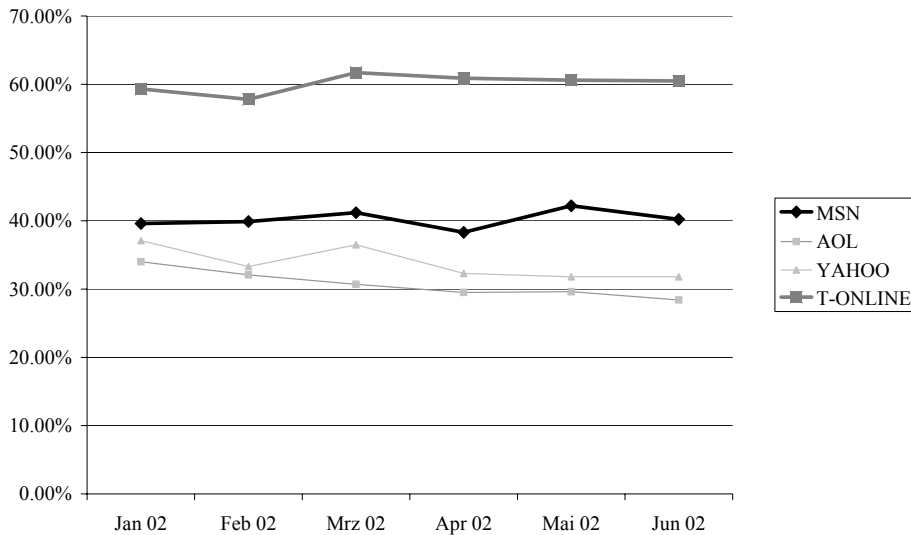


Exhibit 2-21 MSN Germany: Reach in %

Among the German ISPs, *MSN* follows the market leader T-Online with 60% reach in Germany. Internet reach or circulation is defined as the number of unique users divided by the size of the Internet population in Germany.

On an operational level, *MSN* uses simple and predefined parameters to assess partnership performance: Circulation, average minutes of use and revenues. Market share of partners and its changes represent an important indicator for changes in the competitive position. Other secondary performance indicators such as revenues per user and revenue per employee are used as benchmarks for internal comparison.

As technology follower on the online portal market in 1999 and 2000, *MSN* has mainly independently developed technical resources in its online product development in the first phase, and then set up partnerships and alliances to complement its online services in the second phase. *Microsoft* has a good understanding of its solid software development competency base and is not seeking to acquire resources outside of its traditional core competency base.

“We clearly have to say: We are a software company with compelling service offerings. We do not have any consumer business. We do not want to expand into full breadth of competencies and become a media house, telecommunications services or a bank.”

(Dr. Christian Götsch)

Partnerships mainly fill gaps in the content categories described in Exhibit 2-19 but also supplement online services and applications to reduce the time-to-market launch. Especially in content provision and online services, *MSN* only relies on tested and – to some extent – proven outside competencies:

“We have developed a financial portal and an automotive portal, three years after the first start-ups [had invented them.] We have done all this with very limited resources and have developed a competitive product. As I said, we have partners, we do not need an account aggregation and accomplish this with someone who has the capabilities.”

(Dr. Christian Götsch)

In 2001, after the Internet hype and extensive PR spending tapered off, *MSN*'s only modest advertising and marketing communications and interactive service offerings achieved additional market penetration, circulation and increasing customer loyalty. In a final and current stage at the end of 2002, *MSN* has developed the capability to commercialize the distribution power of its user base. Commercialization requires a

good understanding of user profiles with demographics, service usage pattern or purchasing behavior. This expertise in user profiles provides the necessary basis for customer value assessment for each of the alliance partners. Customer values represent an important resource in the exchange of financial compensation and other non-financial resources with individual partners. As a service offering to business customers, the online initiative ‘advantage *MSN*’ helps tailor online marketing campaigns according to business customers’ needs. Based on consumer demographics and behavior, marketing measures are bundled to reduce the overlap and to ensure complete coverage of communication measures.

2.4.3 *E-Plus Mobilfunk GmbH & Co. KG*

E-plus extends its traditional business model with launch of the mobile data portal i-mode. Under the objective of so called mass partnering, *E-plus* standardizes its collaboration approach with defined deliverables for all parties involved.

Business background

E-plus relies on innovativeness to alleviate the effect of low subscriber numbers

In 2001, mobile operator *E-plus*, as part of the KPN Group, serves 6.7 million mobile subscribers in Germany. In third place to the two market leaders *T-Mobile* and *D2 Vodafone*, *E-plus* seeks to develop an alliance network around its current competencies and business and to explore additional revenue opportunities in the establishment and distribution of mobile data services:

“Voice services are our core competency and exactly the area that will not grow that much any more – and that’s what we are seeing this year. [...] Consequently, we have to think about expanding into new business opportunities and generating additional revenue potential.”

(Peter Rohrmann, Manager Venturing & Partnering, E-plus)

As a promising and beneficial starting point, *E-plus* considers itself an innovator in the German mobile communications industry, demonstrated by the launch of multiple product innovations such as the prepaid charging mechanism, mobile data transmission and i-mode. To bundle mobile service offerings, *E-plus* has planned and implemented its mobile Internet portal i-mode as an aggregator of mobile data applications for communication, entertainment and information. After the announcement of the European i-mode launch in 2001, *E-plus* has formed 80 initial partnerships with providers for content, technology and marketing until the launch date March 16, 2002.

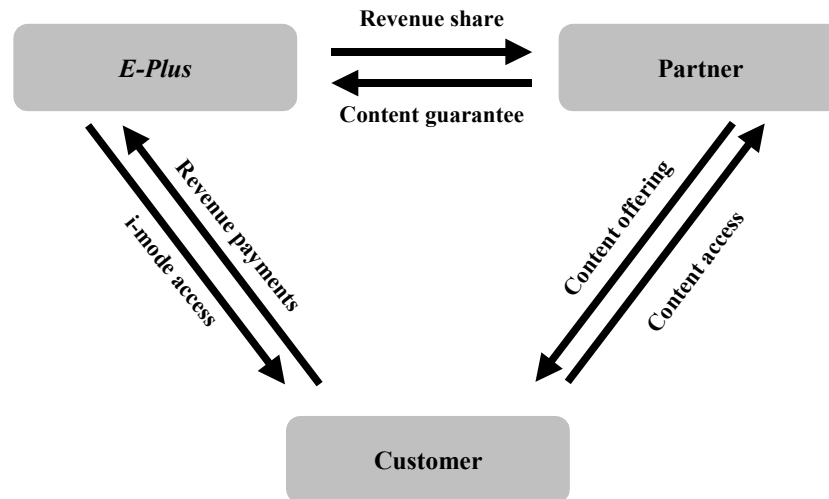


Exhibit 2-22 E-plus: i-mode business model

Embedded in a formalized partnership framework as outlined in Exhibit 2-22, *E-plus* partners deliver content to the i-mode portal and receive revenue share from *E-plus* when subscribers access the respective content. *E-plus* mobile subscribers receive a unique bundle of services charged by monthly subscription or the volume of data. Customers receive monthly bills for all services accessed within a certain period. *E-plus* acts as a mediator by bundling payment streams and selecting attractive content for end consumers. In contrast to the previously unsuccessful first WAP standards, this pricing mechanism allows for “always-on” capability of the handset and a more data driven usage. As both mobile operator and content provider share the revenues of mobile subscribers, *E-plus* seeks to balance the joint pay-offs of content offering to achieve a “win-win situation” (E-Plus 2002b). In addition to this revenue sharing agreement, the i-mode business model aims for a deeper involvement of content partners outside the mobile communications industry to draw on their respective customer contacts.

“With i-mode, E-plus moves away from mere voice communication to a new market, where mobile network operators are no longer only among

their peers and have to deal with new and established brands from other industries.”

(Uwe Bergheim, CEO, E-plus) in (E-Plus 2002a)

E-plus requires content offerings to be apparently useful “at first glance” (E-Plus 2002a) without the need for extensive explanations. Continuous availability of services for the daily usage such as cinema program information, news feeds, mass transportation schedules or mobile games represent the focus of the i-mode mobile portal.

Network structure

Replicating similar business models with partners and strong brands

The launch of i-mode and its predefined alliance structure represents an opportunity for companies outside the mobile communications industry to develop additional revenue potential. With the formation of the alliance network for i-mode, *E-plus* management seeks to facilitate innovation and economical application development including risk sharing with outside partners.

Until March 2002, *E-plus* has signed contracts with 80 partners, negotiations with another 250 content partners are either in progress or completed. *E-plus* aims at increasing the number of content offerings from 60 in March 2002 to 120 by the end of the year. Although the clear focus is on growth of service offerings, *E-plus* needs to maintain editorial integrity for the content:

“To be precise: Only useful content counts. Active content management ensures success in this market. E-plus is ahead of the competition here. It’s not only due to the well respected brand names of partners involved. Mobile multimedia is also a chance for small and new providers, which quickly and precisely determine user preferences.”

(Uwe Bergheim) in (E-Plus 2002a)

Business category	Content	Marketing	Technology
Estimated share based on interview results	85 %	10 %	5%
Number of relationships in March 2002 based on press releases and interview	60	~ 7	3 – 4

Exhibit 2-23 E-plus: Number of alliances by category

In spring 2001, *E-plus* started to develop and consequently build up this portfolio of partners with complementing skills in a top-down approach. As indicated in Exhibit 2-23, content partnerships represent a large majority of cooperation relationships, followed by marketing and technology agreements.

Individual alliance relationships for the contribution to i-mode content and technology are closely related to its Japanese model: Clear and transparent revenue sharing models with limited adaptations to the respective partner as well as open standards for the transfer of mobile content. These general guidelines certainly help to quickly negotiate and finalize contractual arrangements. However, predefined relationships apply one ‘clean role model’ to the complete portfolio, which limits resource contributions outside the defined scope, constant interaction, adaptations and feedback. *E-plus* has named this approach ‘mass partnering’ with direct contact to *E-plus* units for operational and technical support.

The majority of alliance partners directly interact with *E-plus* as the portal owner. In the minority of cases, *E-plus* has also integrated multiple partners from selected projects in business solutions. Deviations from the dominant and centralized i-mode model to multilateral exchanges have to overcome challenges of mutual buy-in into joint benefits:

“Especially with business solutions for business customers such as a company sales force, we get in touch with partners and integrate an IBM or HP to develop adequate technical solutions. We have these cases, in which we combine PDA manufacturers, programmers and

distribution channels. In cooperation with them, we can develop specific products and act as a mediator in between. [...] That's the minority [of relationships], because it's tremendously difficult to manage them. [...] It's a real challenge to integrate all these partners. One has to clearly demonstrate the benefits that each partner achieves in contributing his or her part to joint product development."

(Peter Rohrmann)

Network adjustment and operational coordination

Frameworks for facilitated partner selection and more complex operations

E-plus very much applies a top-down approach of complementing previously determined white spots in the partnering portfolio. With several years of business development experience, the responsible 'Venturing and Partnering' department leverages contact within the existing alliance network – mainly to large publishing and media companies – or additional alliance formation.

Clearly defined business models and pre-determined technical standards facilitate the selection of potential alliance partners. Both factors have a positive impact on alliance due diligence processes and criteria:

"We certainly have a clear concept on which partnerships we need, especially in the content area. We select the brands that represent a good match with our company and bring a strong customer base with them: Large publishing houses, media companies and television stations. We actively seek partnerships with a good fit to our strategy and to [content] areas we would like to cover."

(Peter Rohrmann)

Based on the business category – content, marketing or technology – of the alliance, a detailed and clear due diligence process outlines decision criteria, process guidelines, the estimate of business growth potential and the department to be involved in the review: A matching brand, considerable market penetration with a compelling customer base, fit with the content strategy, the fulfillment of quality standards and complementary technological skills in the case of providers of content and technology represent the most important criteria for a decision on the formation of alliances. In the majority of cases, both the legal and controlling department are very much involved in the alliance formation process, which underlines the adherence of relationships to contractual and business model standards. Marketing functions are only involved on a project basis and as far as co-marketing aspects with *E-plus* and the partner organization are assessed.

Upon the announcement of i-mode and the beginning of partner acquisition, *E-plus* has originally assumed that it required a majority in technology partnerships. During the course of developing alliance network relationships, however, the department Venturing and Partnering received feedback from ongoing negotiations and realized that technology infrastructure alone does not generate loyal customers. Attractive content utilizing the technical infrastructure seems to be much more of a requirement.

“We realized that purely technology partners do not do us any good, because we do not have the resources to support them and develop any respective application that might be of interest for our customers. For that purpose, you need content partners [...] and group them together with technology enablers and mobile communication.”

(Peter Rohrmann)

As a predefined i-mode policy, *E-plus* has full ownership of i-mode’s future direction and potential new participants in the alliance portfolio: As an open platform, i-mode does not guarantee the exclusivity of content offerings, the partner has to independently ensure the economic sustainability of its business in his or her own interest. Thus, the incorporation of additional partners and potential competition or redundancies in the entire alliance network have never been an issue or area of conflict

between *E-plus* and its partners. However, the ownership of intellectual property and exchange of technical innovations has raised the level of conflict between *E-plus* and alliance partners, mainly due to historical experience of clear purchasing relationships between network operators and technical suppliers. As a 'lesson learnt' from i-mode mass partnering, *E-plus* needs to be more actively involved in finding a compromise and balancing interests within all parties involved. At this stage of the i-mode launch in March 2002, conflict management has not been institutionalized and is handled on a case-by-case basis. Further learning with the launch of services and experience with potential conflicts may lead to a more formalized process and appropriate measures.

An important area for *E-plus*, know-how and innovation exchange is also not facilitated by formalized processes, and is handled on a case-by-case basis mainly in more intense technology alliances. Exchange in technology alliances is performed regularly by close daily operation in joint teams. Motivated by *E-plus*' interests, 'Venturing and Partnering' facilitates this process to gather information on technical specification or guide the development in the desired direction. However, the sharing of intellectual capital in content and applications or continuous tracking in the majority of partnerships happens only in rare occasions due to constraints in human resources.

Network objectives and performance

Relationship frameworks allow for detailed benefit assessment

With the alliance network close to its operational launch, *E-plus* is in the process of developing a system of key performance indicators for ongoing monitoring. Clear selection criteria in the due diligence process certainly help the ongoing performance monitoring of individual alliances and the complete network. At the end of March prior to the launch, *E-plus* has prepared and tested a key performance indicator system that in the long run can be aggregated for the entire alliance portfolio. Since content and technology offerings at the time of the interview have not become operational, performance results have not been documented.

Profit and loss impacts, market shares, revenues, resource commitments, costs for customer care and others represent a selection of future indicators to assess both an individual alliance and a complete portfolio. On a case-by-case basis, reductions in

capital expenditures and operational costs have already been tracked for individual alliances in its business. Soft factors such as the evolution of technical skills are not considered in alliance performance assessment.

Initial resource base and development

Confronting a stable organization with cross-industry partnerships

E-plus as a large organization with stable and defined processes faces challenges of adapting its resource profile. Traditionally, *E-plus* does not regard the development of mobile data applications or the cooperation with external alliance partners as a particular area of expertise. However, top management recognizes that *E-plus*' entry into the market of mobile applications requires an apparent transition in both strategy and organization:

“So far, business processes of mobile operators are largely targeted towards transferring information of their customers by voice and SMS. In the case of integrating third parties into the core business, one needs many and very flexible interfaces. With i-mode, E-plus has made this move.”

(Uwe Bergheim, CEO, E-plus) in (E-Plus 2002a)

With the foundation of ‘Venturing and Partnering’ in March 2001, *E-plus* has made a first move in founding and growing alliance initiation and management skills. Close cooperation with *E-plus* stakeholder NTT DoCoMo helps to develop these initial organizational competencies in alliance management (E-Plus 2002d): Providing a multitude of content offerings to mobile handsets requires the sign-up of a large number of alliances through so-called ‘mass partnering’. Mass partnering builds on the simple i-mode business model, an easy and transparent data volume-based charging mechanism (E-Plus 2002c) as well as fast and direct contact to *E-plus* for technical and organizational support in the development of mobile content. The access to external resources based on the clearly defined relationship frameworks allows the rapid growth of alliances in fulfillment of the described transparent selection criteria.

Utilizing and further developing this resource, the 'Venturing and Partnering' department determines the demand for partnering, selects the appropriate organization and conducts the due diligence process with the respective functional departments. After finalizing the negotiation, daily operations are completely taken over by functional departments without further operational involvement of Venturing and Partnering. Benefits and progress of alliances are monitored continuously, and conflicts are resolved on a case-by-case basis. Personnel resources represent the dominant constraint for further involvement in this process. Therefore, the selection of alliance opportunities aims at choosing partners that can independently drive an idea, product and application development.

As a learning effect in this process of alliance network evolution, alliance formation for i-mode content does not require a venturing component and the investment of financial capital and risks. Large corporations with well-known brands as preferred i-mode partners do not need additional external forms of financing. As another learning effect, standardized interfaces to the *E-plus* organization seem to limit the opportunity for interaction as well as trial-and-error, aggravated by the absence of knowledge sharing routines.

In a self-assessment of its alliance management capability, *E-plus* has successfully developed the skill of seeking innovations, matching potential partners and establishing joint business models. However, the operational implementation of business models after closing contracts due to missing joint learning opportunities of both partners faces significant hurdles:

“What the telecommunications industry [including E-plus] still needs to learn is the immediate implementation. The telecommunications industry relies on extensive back-up scenarios: Network operation requires hundred percent availability and multiple process validations. This mentality is shared within the whole telecommunications industry and does not fit with innovation and partnership models. They require a little bit more flexibility, which telecommunication companies obviously

do not possess. And that's the problem with the fast implementation of partnerships: [Operational] relationships to the interfaces, technology, billing and network operations act a little bit slowly."

(Peter Rohrmann)

Although the relevant business issues can be agreed upon quickly on management level, the time span from the formal decision to the implementation of the agreement could well take up to one year. Implementation tasks range from transferring content and instructing customer care to providing the billing infrastructure. As an example, *E-plus'* customer care processes have historically been tailored towards subscribers using voice services. With the integration of new partnerships into the operations, customer care needs to deal with new user requirements and shared responsibilities: The partner for content, and *E-plus* for billing and transfer.

2.4.4 *Lycos Europe GmbH: Mobile Channel*

Initially launched as an Internet service provider, *Lycos Europe* is now extending its online services into mobile communications. To complement *Lycos'* internal technical developments, partnerships for technical infrastructure are followed by more complex arrangements for cooperation in content and marketing.

Business background

Establishment and commercialization of mobile service offerings

Lycos Europe was founded in 1995 mainly as an Internet service portal with European footprint and 20 million users. The company has branched out into multiple information and communication channels from automotive to music, games to travel, carrier to sports. Between October and December 15, 2001, *Lycos* started to launch an additional information channel around mobile service offerings with five million European users in five countries. The service offering incorporates a community toolkit and an Internet presentation layer to integrate applications and services such as logo and ringtone composer, send/receive messaging for mobile short messages (SMS), information retrieval on the wireless access protocol (WAP), user database as well as other entertainment and information services for travel. *Lycos'* segmentation of services and applications targeted towards both consumer and business markets (refer to Exhibit 2-24), represent the developing structures of internal development and service provision of outside partners.

Business area	Content products	Advertising and sponsorship products	Operational infrastructure
Target group	Private households and consumers	Businesses and organizations	Internal
Services	<ul style="list-style-type: none"> ▪ Logos and ringtones ▪ Travel information ▪ Games ▪ ... 	<ul style="list-style-type: none"> ▪ Sponsorship sales ▪ Product illustration ▪ Advertising communication ▪ Targeting and profiling capabilities ▪ ... 	<ul style="list-style-type: none"> ▪ Interactive voice response (IVR) ▪ Premium rate number charging (PRN) ▪ Gateway for SMS ▪ Access to mobile networks ▪ Payment solutions such as paybox ▪ ...

Exhibit 2-24 Lycos Mobile: Business areas and services

Service offerings described above are associated with key operational units within *Lycos*: The operational infrastructure provides access and billing relationships to network operators based on revenue sharing agreements. In five countries with *Lycos* presence, premium rate number providers supply payment options to prepaid customers via their regular telephone bills. This charging mechanism requires voice-based instructions and feedback on how to order products which are offered by interactive voice response service providers. Alternate payment solution providers such as paybox complement payment alternatives. SMS (Short Message Service) based information exchange requires the support of SMS gateway providers which route data traffic at minimal costs from and in mobile networks.

Network structure

Growing towards commercialization of user base

All three business categories rely on external partners for the implementation of service offerings. As the operational infrastructure provides the framework and transaction platform, the formation of alliances in this category precedes partnerships for content products as well as advertising and sponsorship products.

Business area	Content products	Advertising and sponsorship products	Operational infrastructure
Number of partnerships in March 2002	<ul style="list-style-type: none"> ▪ 5 	<ul style="list-style-type: none"> ▪ 4 – 5 	<ul style="list-style-type: none"> ▪ Interactive voice response (IVR): 1 ▪ Premium rate numbers (PRN): 5 ▪ SMS gateway providers: 2 ▪ Revenue sharing with mobile operators: 20 ▪ Payment solution providers: 11
Sequence and prioritization of alliance formation	II.	III.	I.

Exhibit 2-25 Lycos Mobile: Business area and alliance portfolio

Content and proprietary *Lycos* products all utilize the basic operational infrastructure as a foundation and later develop the *Lycos* user base. Even commodity applications such as sending SMS can be leveraged for initial establishment of customer loyalty:

“What we found out: People come back to send a SMS. So we can start layering in more value-added services and high quality products later, we don’t have to have them right from the start. In terms of priority, services in this area followed the set-up of technical infrastructure in terms of priority: Infrastructure first, content second.”

(Matthew Hall, Director Lycos Mobile)

Communication with a customer base can be used to promote products and services of *Lycos*’ business customer at a later stage. The advertising and sponsorship category is directed towards the businesses and organization with demand for promoting products and services. As an example for this business category, *Lycos* has developed a relationship with handset manufacturer Nokia to promote the 7650 phones with multi-media messaging (MMS) capability. *Lycos* has implemented a composer for MMS communication to illustrate phone functionality and service usefulness on the Internet. Later, after launch of the handset, this application allows for MMS communication to

all compatible phones. For this alliance, Nokia is investing a part of its marketing budget and technological resources in this relationship with *Lycos Mobile*.

Network adjustment

From contractual and standardized arrangements to resource intensive partnerships

Increasing competition for mobile communication services and rapidly changing consumer demands make access to alliance partners a necessity. Alliances with outside partners are regarded as an entry option into new technology areas and later enable *Lycos'* mobile channel to build up competencies in-house, to license it or further integrate external services in the technology platform, if customer demands have stabilized and generated reliable cash flows.

The review of alliances in the time sequence demonstrates that *Lycos Mobile* has first established its operational infrastructure based on service for interactive voice response, premium rate numbers and SMS gateway and others to launch the product. Premium rate numbers are required for all countries with *Lycos* presence, which are routed into one interactive voice response provider to achieve synergies on European level. Relationships with infrastructure providers remain rather stable, since adaptations to technical systems and APIs (Application Program Interface), that have an impact on the data exchange, are limited to rare exceptions. *Lycos Mobile* management reviews these ties on a case-by-case basis, since these partners provide commodity service offerings. Redundant agreements to alternative suppliers back up the operational infrastructure to ensure high service levels.

Based on the earlier established operational structure, simple and later more sophisticated content services build up and maintain loyalty in the customer base. Services provided from outside partners include ringtones, SMS Games, WAP directory, entertainment with logos and ringtones, travel information and other information offerings. SMS Games and WAP directory are two-way technologies that require the development of specific features and other operational know-how. For *Lycos Mobile*, relying on outside partners – in the case of SMS games – enables the access to unavailable technological know-how, in the example of the WAP directory cost reductions or market tests of innovative technology. Although *Lycos'* corporate

culture generally advocates building up in-house technical capabilities, the majority of alliance formation decisions are driven by the access to much needed technological resources. Access to internally unavailable and differentiating technologies ensures acceptable time-to-market cycles in markets with rapidly shifting consumer demands. SMS, games, picture messaging and in the future JAVA applications – as examples – currently generate both attention and revenue for *Lycos Mobile*. As short user attention spans require quick responses to changing customer preferences, third parties also provide service hosting and billing without any significant integration into the *Lycos Mobile* platform. Low levels of integration ensure full flexibility to discontinue or redirect relationships to external providers.

The important market for logos and ringtones has become much more competitive with a clear differentiation in product quality, which calls for frequent discontinuation and redirection of partnerships: At any given time, *Lycos* needs to maintain editorial integrity with its product, which requires service offerings on *Lycos Mobile* sites and databases to be updated on a regular basis for constant availability. In this process and due to comparisons between content providers on a European basis, *Lycos* has selectively replaced agreements and also improved profit margins from 30% to 55% on these contractual agreements.

Besides replacing and rebalancing these relationships to logo and ringtone providers, three value chain steps – promoting the product, licensing content, and providing operational infrastructure for billing and distribution – represent options for further internalization. *Lycos Mobile* decides between these make-or-buy alternatives after the assessment of internal competencies, time-to-market cycles, financial consideration of revenues, gross margins and return on investments. Based on historical experience as an example, *Lycos* does not regard licensing branded content as a preferred option.

“If we don’t own the branded content, which is very rare and involves tremendous excitement, we have to license it. [...] We are not organized as a company to go out acquire and license content. We are set up to resell and distribute it.”

(Matthew Hall)

Greater negotiation leverage through increased competition, revenue stabilization in this service segment and the described internal assessment have motivated *Lycos* to internalize related capabilities. Consequently, relationships to these providers have been transformed from forwarding *Lycos*' customers for commission payments to independent *Lycos* service offerings with license payment to original copyright holders:

“Our relationship before rolling out the mobile channel: There was a link on our site to transfer to one of their pages [...], and you can buy a logo and ringtone [there], and [third parties] pass a revenue share back to Lycos. [...]”

(Matthew Hall)

With the launch of the mobile channel, *Lycos* has built up an independent platform and proprietary database, which contains, sells and delivers the content. After direct revenue generation with the service, *Lycos* now gives reduced revenue share back to the right holder. As access to a loyal customer base represents a valuable resource, *Lycos* does want to represent the only interface to the end customer without giving third parties valuable customer details.

The assessment of available revenue opportunities and availability of *Lycos* resources for commercialization has determined prioritization of alliance formation activities. Following this logic, establishment of the operational infrastructure and content products are at a later stage complemented by partnerships for product promotion and advertising. Since five million *Lycos Mobile* users represent an attractive exchange value in the very competitive Internet advertising market, setting up a content alliance with smaller companies, which only seek distribution for their products, takes little time and effort. In a competitive market environment, however, service providers like *Lycos Mobile* have to develop and offer something “really unique and really value-added” for larger shares of corporate marketing budgets:

“Now as things evolve, I am moving towards marketing and advertising types of relationships: More high-level strategic deals that now take advantage of the [online and mobile] product that we have built.”

(Matthew Hall)

The Nokia advertising alliance as an example for unique advertising and sponsorship agreement requires *Lycos*' established customer base, technical expertise, joint exchange of expectations and complex definition of deliverables. Typical for these partnerships, unclear ex-ante alliance benefits in terms of the number of page views, user traffic and online functionality require a continuous and more extensive negotiation process. For implementing the partnership and rolling out Nokia's advertising program, *Lycos Mobile*'s management faces the upfront make-or-buy decision for innovative MMS capabilities:

“We can talk to some of these cutting-edge venture-backed technology companies that are developing MMS composers and viewers or we can build our own. And, in conducting research on this more operational and commercial decision, we found that we could license a MMS composer and viewer. But then we would have to integrate it into our site. Although we would have to do 30% less work, developing MMS internally has turned out to be much faster.”

(Matthew Hall)

Another reason for independently designing MMS technology was motivated by its underlying technology standard SMIL, which is related to Open Source and LINUX. As Open Source allows for programming variations, *Lycos* has minimized technology and incompatibility risks by building up internal competencies. Internalized competencies also facilitate the exchange with *Lycos Mobile*'s related messaging and micropayment solutions. As a result, the marketing driven alliance with Nokia –

compared to market-based transaction by *Lycos Mobile* – has clearly enhanced *Lycos*' technological skills in MMS communication.

"With our latest product developments of trend-setting mobile features, we are well prepared for such technological innovations. The cooperation with Nokia is a great chance for us to act as one of the first movers in this field and to introduce this new generation of communication services to the millions of Lycos users."

(Dr. Jürgen Galler, Managing Director Lycos Mobile and Vice President Lycos Europe in (Lycos Mobile 2001))

Although the spending of Nokia's marketing budget bears similarity with market transactions, other aspects of the agreement require the deployment of non-financial resources such as collaboration in MMS design and functionality, exchange on capabilities of Nokia's handset and briefing on marketing strategy.

Other services in this business category provide direct marketing with profiling user behavior, which require a complex combination of capabilities: Since *Lycos* has not built up competencies in wireless advertising and has no detailed databases on the longitudinal history of advertising behavior, this service is provided by an external partner as well. This external partner not only contributes consumer relationships in addition to *Lycos Mobile*'s user base, but also a specialized sales force with a good understanding of wireless advertising solutions.

In the process of selecting a cooperation proposal within these three categories, *Lycos* does not use a formal due diligence process for screening alliance opportunities and contractual arrangements: Although regarded valuable for all alliance opportunities,

“In a way this company still operates somewhat entrepreneurially. Very reactive and moving very quickly and not in very formalized processes [...] But so far, we don’t have a long enough alliance history for setting that up.”

(Matthew Hall)

Although *Lycos* is actively promoting its current alliance network for additional business development, limited personnel resources remain the biggest constraint in assessing and negotiating potential deals. Missing internal resources for the administration of partnerships limits the potential and integration of existing agreements.

Operational coordination

Towards stabilization of operational processes

Influenced by resource availability, uncertainty and alliance opportunities, *Lycos Mobile* gradually develops its alliance network across five European countries. Due to the launch of operations, stabilizing operational processes with business partners is associated with a certain level of conflict and requires both channeling of communication and standardization of relationships.

Since the operation of *Lycos Mobile* based on industry-wide communication standards requires alliances with specific service providers for content and technical infrastructure, perspectives on the structure of the overall alliance network, decisions on the selection of future companies and staffing are widely shared among partnering firms. Other ongoing operational issues ranging from the appointment of alliance executives and staffing to setting the product development agenda and technology transfer policies are also viewed consistently among organizations in the alliance network. However, dissimilar partner views on overall alliance goals, product and market development agenda, annual budget levels and financial contribution are subject to the negotiation and reassessment process.

As a trigger for the level of conflict in the diverse *Lycos Mobile* alliance portfolio, different firm sizes cause differing expectations in the success of the partnerships and result in discussions between alliance partners. Within all partners, no formal processes for knowledge sharing and intellectual property transfer have been established. The same applies for conflict resolution if the partnership requires available but restricted resources:

“I think we are a small enough business unit, [considering] the number of people directly involved in Lycos Mobile on a European basis. Obviously, on the country level we have people that can also help to solve problems, but we are too small to have a formal process for those things.”

(Matthew Hall)

Due to the presence in five European countries and very decentralized organization, *Lycos Mobile* has faced communication challenges within its web of partners, which have become apparent during the launch phase with higher information exchange requirements and rapid business changes:

“Sometimes one or two people from each country are contacting that partner on a European basis. It makes good partners unhappy. They spend all of their time managing that relationship. But we are trying to get one partner manager to serve as the interface between the countries and the partner [to deal with this problem].”

(Matthew Hall)

In more straightforward technological areas, *Lycos* seeks to achieve service level agreements with operational infrastructure providers to achieve standardization and reliability of these relationships. Since service level agreements are uncommon in a changing technology environment of mobile communications, *Lycos* has only been

able to sign agreements for older and more stable technologies for premium rate numbers and interactive voice response.

Network objectives and performance and supporting resources

Leveraging earlier knowledge acquisition for valuable consecutive growth

In rating the overall performance on a qualitative scale, *Lycos Mobile* has been satisfied to some extent with absolute sales and sales increase. Full satisfaction has been reached in the capability to initiate alliance, although operational management and the quality of communication still leave room for improvement. As relationships are rarely reviewed on a regular basis, *Lycos* has no formal metrics to assess the performance of the individual alliance. Missing defined criteria and data on only the first months of full European operation make performance assessment very difficult. Across the majority of countries with *Lycos* presence, operations on the *Lycos Mobile* platform have been stabilized and relationships to some content providers have been renegotiated to improve margins.

Over the course of the alliance network development, *Lycos Mobile* and its resource requirements have determined its alliance formation activities, not vice versa. In general, not one alliance has developed into such a high value, moneymaking relationship that it could have changed the strategy or major resource configuration of *Lycos* as a company. Some effects, however, are visible on the lower level of *Lycos Mobile*:

“The alliance network has not effected [Lycos’] corporate strategy as a whole from my perspective in mobile, but it has, to some extent, done that at the lower level with the mobile strategy. If you had asked me in October last year: ‘Are you planning on building up MMS capability?’ I would have said: ‘No way.’ But then Nokia came on and said: ‘What if you develop an MMS capability and we sponsor it?’ Okay, that’s revenue and an interesting area and keeps us on the cutting-edge of our mobile technology development. [...] Other development priorities

have been shifted back and it will dramatically affect our business cycle. One of the questions that I ask and I know we will never have an answer to, is: With which one will we be better off?

(Matthew Hall)

Being one of the largest Internet portals, *Lycos* defines its traditional competencies as web-based like comparable competitors: Representing content on the Internet, person-to-person messaging capability and profiling users by database technology. These technology components enable mass communication on the Internet with further potential in mobile communications.

“I think of Lycos as a media company: Our key revenue sources are selling advertising, page views or sponsorship to a marketing buyer. [Mobile communication applications] are new business models for Lycos.”

(Matthew Hall)

Lycos' corporate culture is traditionally inclined towards building up capabilities in-house and this has remained unchanged. To maintain a position at the cutting-edge of technology in the example of MMS or protect value-added customer data for content services, *Lycos* has decided to expand own technical and operational capabilities with its implications for external partners.

As technical and content capabilities have been the first priority, *Lycos* has gained a better understanding of its business model in mobile communications, which apart from learning effects finally helps to establish the more strategic relationship to customers like Nokia.

“[We have built] an understanding of our own business [of mobile services]. So one of the great aspects about going through the classes of operational deal-making is that you have to have a grounding about

how your business works. Now that I have that, it is much easier to establish higher-level strategic sales activities.”

(Matthew Hall)

Over the course of operational deal-making, *Lycos* can now leverage the learning effects from operational infrastructure relationships to explore and explain its product capabilities to business customers, which utilize this technical infrastructure for promotional services.

With clear knowledge of the business model and the underlying operational infrastructure, other *Lycos* business units offering ‘commodity’ Internet e-mail and chat services might be merged in the near future into larger communication business units. All these business units offer communication-oriented products and a combination of their assets allows for economies of scale and better interoperability of services.

Although the competency to initiate alliances has developed to the satisfaction of *Lycos Mobile*, the ongoing management and controlling of relationships and its ongoing assessment still leaves room for improvement.

“We have various weaknesses in reporting. We get a new partnership in place for new products with people scrambling everywhere to get the product stabilized. Therefore, reporting gets shoved to the side. Reporting is required to maintain a successful relationship.”

(Matthew Hall)

Sales, revenues, the number of clicks and page views are important key performance indicators not reported on a regular basis to review both benefits and costs of the ongoing relationship. On the other hand, *Lycos*, as very entrepreneurial organization, is very responsive and moving very quickly, when a partner articulates certain requirements and issues regarding the established relationship.

2.4.5 *Sonera Zed Germany GmbH*

As a start-up with a clear focus on mobile online services, *Sonera Zed* has first handedly experienced the effect of uncertain and shifting customer preferences. Refocusing and concentrating on younger subscriber audiences has drastically shifted and reduced the partnership network. After the clear establishment of user community and preferences, early content and technology alliance have been followed by more complex marketing partnerships.

Business background

Innovating and refocusing mobile data applications

The Finnish telecom operator *Sonera* who integrates and supports all activities around mobile data applications has founded *Sonera Zed* in Germany along with other units in six countries. Known as an early innovation leader in mobile data applications, *Sonera* already started in 1998 in its home country to develop and market information-based services around telephone directory services and business information. *Sonera* still offers these mainly information-based services in the very mature Finnish market and benefits from its mobile savvy subscribers with data driven usage pattern.

Incorporated as *Sonera Zed* and first established in Finland in October 1999, the Finnish mobile operator has branched out with its mobile data services to country units in the United Kingdom, Italy, Germany, Malaysia and the Philippines. *Sonera Zed's* early data services have been mainly focused on the information segment, but have not found matching subscribed demand. Consequently, *Sonera Zed Germany* has quickly refocused and was relaunched in March 2001 as a service provider for entertainment demands of younger mobile subscribers under the age of 30.

“As first movers, we have started in Germany to refocus in the entertainment sector [...]. Which means, we have been in touch with our users and said: ‘What [services] do you really want?’”

(Michael Weiss, Commercial Director, Sonera Zed Germany)

Even the variety of roughly 100 refocused service offerings around sports, dining guides and entertainment have been reduced to twenty, since users older than twenty have unanimously questioned information value and usability of the offered mobile services. The great majority of remaining applications is clearly concentrated on entertainment and communication demands of an even younger audience. For this very tailored approach, *Zed Germany* has discontinued the majority of external content offerings specified by information categories and has replaced them to some extent with the development of internal and proprietary services for 2.3 million subscribers in March 2002. This transition is accompanied by shifting revenue segments: Standardized content service such as the offering of cell phone ringtones and logos has been reduced from 75% in June 2001 to 25% of the total *Zed Germany* revenue in March 2002, which underscores this shift in consumer demand and target groups. The evolution towards very focused service offerings has also required the *Sonera Zed* brand to be refocused.

Network structure

Growing relationships to corporate and business customers

Like comparable information portals in both the Internet and mobile arena, *Zed* relies on alliances and external partners (Exhibit 2-26) for providing the operational infrastructure, retailing its products to end consumers, complementing its internally developed products and capitalizing on its customer base. Shifting business priorities and partnering needs have impacted the number and type of alliances significantly from year 2001 to the year 2002.

Due to unavailable resources for the operational infrastructure or significant development costs, *Zed* has worked early on with service providers to send large volume SMS to mobile operators and to provide pre-paid payment options for its users. Defined by the standards in mobile communications, the number and intensity of relationships to infrastructure providers have remained relatively stable over time.

As outlined above, shifting user patterns have demanded a substitution of external commodity content offerings with more interactive internal software developments. *Zed's* internally developed entertainment services can be described by outlining the

concept of its “Virtual Lover” and “SMS Chat” products. The former entertains the user community by simulating a love relationship needing care and sensitiveness. A database tracks the user response and behavior and sends out the response. SMS chat allows anonymous exchange of SMS information with other mobile subscribers, which are both matched based on location, age and other factors. Both mobile service offerings need continuous adaptation and expansion of *Zed*’s internal application based on user requirements. From *Sonera Zed*’s perspective, preserving the uniqueness of the software development and personal information about user behavior mandate internal application development as the only option available.

Business category	Content	Advertising and Co-marketing	Retail	Operational infrastructure
Target group	Private households and consumers	Businesses	N/A	N/A
Services	<ul style="list-style-type: none"> ▪ Logos and ring tones ▪ Entertainment and news ▪ ... 	<ul style="list-style-type: none"> ▪ Product presentation ▪ Advertising communication ▪ Targeting and profiling capabilities 	<ul style="list-style-type: none"> ▪ Distribution of consumer products 	<ul style="list-style-type: none"> ▪ Interactive voice response and premium rate numbers (PRN) ▪ Credit-card-based payment system (EVS) ▪ SMS gateways ▪ Support services for capacity shortages
Number of partnerships in 2001	<ul style="list-style-type: none"> ▪ 30 – 40 	<ul style="list-style-type: none"> ▪ 2- 3 	<ul style="list-style-type: none"> ▪ 12 – 15 	<ul style="list-style-type: none"> ▪ PRN: 1 ▪ EVS: 0 ▪ SMS: 4 ▪ Support: 4
Number of partnerships in 2002	<ul style="list-style-type: none"> ▪ 5 – 8 	<ul style="list-style-type: none"> ▪ ~ 12 	<ul style="list-style-type: none"> ▪ 2 	<ul style="list-style-type: none"> ▪ PRN: 1 ▪ EVS: 1-4 ▪ SMS: 4 ▪ Support: 4
Company examples	<ul style="list-style-type: none"> ▪ Tomor-row Internet 	<ul style="list-style-type: none"> ▪ Fanta ▪ Kiss FM ▪ Wissen.de 	<ul style="list-style-type: none"> ▪ Karstadt ▪ Schaulandt 	

Exhibit 2-26 Sonera Zed: Alliances by business category

Despite growing proprietary applications, *Zed* still offers standardized services for handset logo and ring tones, which are provided by external suppliers. In this area, *Zed* has also accepted alliance partner redundancies to rapidly satisfy shifting consumer preferences. In the early pursuit of exclusive content, long-term contracts have also kept *Zed* in relationships with suppliers of invaluable or inappropriate content for its user group. Alliances to content suppliers are defined by standard contracts with only minor adaptations and variations to the revenue sharing agreements with partners. Similarly, partnerships with retail partners as well as infrastructure providers are also framed and structured by similar contractual arrangements.

Sonera Zed's subsequent growth area – alliances for advertising and co-marketing – do not follow clear patterns or standardized frameworks. With an established user base, *Zed* cooperates with business customers that have a demand for advertising communication to *Zed's* young customer group through mobile communications means. Requiring tailor-made cooperation agreements, provided services range from developing a mobile advertising concept to accessing *Zed's* customer base to co-promote products.

For future growth in another alliance category, *Zed* is planning to offer its services not only as prepaid but also as postpaid services, which requires cooperation and integration into the operations of mobile network operators. Many mobile network operators themselves also develop mobile applications and could potentially consider *Zed* as a possible competitor. However, *Zed's* clear and focused repositioning as a service provider for the younger user community leaves broader information portals of mobile operators enough flexibility to expand around *Zed's* core offerings. Therefore, *Sonera Zed* foresees additional important growth potential in establishing close and trustful relationships with mobile network operators.

Network adjustment

Alliance adaptation for efficiency improvement and revenue generation

In an assessment of the entire alliance portfolio, earlier alliances for operational infrastructure, retailing and content and later relationships for advertising and co-marketing take completely different paths in their evolution. Whereas the former

categories show signs of efficiency improvement, the later group exhibits high formation rate and extension of resource exchange.

With increasing technical transaction volume driven by a larger customer group, *Zed* has leveraged its stronger negotiation position with its technical infrastructure providers. Premium rate number providers share a large portion of their revenues with *Zed* and also feed back a richer set of customer usage data. The establishment of EVS Technology as another alternative payment solution based on credit card charging mechanisms illustrates the development cycle of these operational relationships:

“Both partners would have to see: What are your capabilities and what are my capabilities? What can we achieve together? Balancing the prices and services received in many cases is only a second step.”

(Michael Weiss)

Zed's refocusing of service offerings has reduced the portfolio of content alliance partners: The discontinuation of *Zed*'s earlier information and sport services which showed no fit with the requirements of the user community has significantly decreased the number of content providers. *Zed* has also discarded a number of global partners provided by *Sonera* headquarters, that have lacked the understanding for local user and market requirements. Although willing to adapt to changing customer preferences, the majority of earlier partners have not been flexible enough to fulfill *Zed*'s needs. Although intimate knowledge of the mobile subscribers and their usage patterns represent the most important decision criteria for alliance formation or discontinuation, these providers have severe difficulties to quickly understand and comprehend preferences of *Zed*'s young user group:

“We check out the requirements of our users and ask: ‘What do we need for you?’ And then we look at the decision on whether we need a partner or whether we can do it alone. What we have found out and what sounds strange in an extremely volatile and fast moving market, is: Although developing applications is very labor intensive, it is faster

to develop our own applications. Before I have even explained it to my partner, business is already over.”

(Michael Weiss)

Relationships to the remaining and now merely complementing content partners offering commodity content have changed dramatically over the course of the year. From “dictating prices for seemingly invaluable content” to “why don’t you deliver what our users are looking for and then we will talk about prices”. As the number of providers has decreased dramatically in just one year, relationships to them have also been intensified and the quality of provided content has clearly improved. As a clear requirement for continuing business, all remaining content providers share a good understanding for *Zed*’s user behavior and entertainment needs.

Following a good understanding of *Zed*’s users as an important prerequisite, advertising and co-marketing agreements represent the focus for alliance formation at the end of 2001 and the beginning of 2002. Co-marketing integrates communication and interaction with customer groups between *Zed* and its marketing alliance partner. In many cases of this complex resource exchange, *Zed* seeks access to the marketing and distribution power of the partner and offers contacts to its current customer base. Partners need to determine structure, intensity and monetary compensation of the arrangement. Marketing agencies help *Zed* to find potential and promising business partners, because they deeply understand both target groups, communicate appropriately and correctly analyze marketing campaign results. As an innovative way of communication, co-marketing projects are still exploratory in nature:

“High flexibility in an extremely short time period. There is virtually no preliminary lead-time to test the product. We go into the market and conduct market tests. [...] This may change in two or three years when things calm down a bit. But until then, you would have to try one or the other.”

(Michael Weiss)

Although very exploratory in nature, innovative marketing concepts due to high internal resource commitments have to undergo a diligent planning process to reduce all uncertainties to the lowest minimum possible.

“We need an accurate landing as far as revenues are concerned. [...]

Our funding has been focused and very much depends on in-depth consideration of what we should do.”

(Michael Weiss)

The formation of advertising and co-marketing alliances requires completion and approval of a detailed business case for the management team that defines the number of mobile subscribers involved, response rates, technical development requirements, and cost volumes by category. These quantitative factors are complemented by qualitative evaluation criteria such as the client’s industry or relatedness of user groups. Based on Zed’s experience, the relatedness of user bases is an important predictor for the impact of the co-marketing initiative and product acceptance. The due diligence process involves marketing, content and technology departments to provide multiple perspectives in the review process. The comparison of all qualitative, quantitative and financial indicators to the goal of profitable revenue growth is of major importance to top management.

Operational coordination with effects on network objectives and performance

Mutual contribution for joint benefits

As outlined above, access to and selection of a valuable alliance represents an important prerequisite for alliance performance. In the case of alliance formation, the business case in the due diligence process defines mutual contributions and quantifies joint benefits and therefore plays a significant role in reducing the potential level of conflict in the alliance. Especially for these very valuable relationships, smooth alliance implementation and quick day-to-day operations depend on mutual pay-offs for both alliance partners. In contrast to this agreed upon approach, all external and forced resource commitments lead to an increased level of conflict in the alliance network. As marketing budgets have to be kept within certain constraints, many

alliance partners including large consumer brands are unwilling to spend significant financial resources. This underscores the importance of a balanced mutual pay-off in this competitive environment. All other topics around technical solutions or intellectual property of software do not play an important role in the discussion with partners outside of the mobile industry. Besides the discussed mutually comparable contributions, the later ownership and usage of the MSISDN (Mobile Subscriber Integrated Services Digital Network) or subscriber telephone number after the marketing campaign represents an important negotiation issue. This observation underlines the importance of customer ownership and knowledge for further advertising and co-marketing campaigns.

Due to their value for *Zed* and its partners, alliances for content and joint marketing initiatives are tracked on a monthly basis and are compared with the original business case. Less complex content offerings receive a review of user acceptance and success. As outlined above, low performing services are optimized in the first step and, if no further improvement potential can be found, are abandoned quickly due to resource constraints.

On the company level, partnership reviews are mainly dominated by clear revenue and cost criteria. Qualitative criteria such as time-to-market or value of product development are only important with a clear identification of future or deferred revenue potential. The development of cutting-edge technology skills does not play a significant role, since *Zed's* initial learning experience showed the necessity of considerable financial and personnel resources to sustain technological leadership.

In a review of company performance in financial terms, *Zed* has seen 50% revenue growth on a monthly basis from January to February 2002. At the same time, the number of transactions is decreasing, mainly due to the expiration of free trial offers. After the establishment of clear brand recognition and a loyal user base, all *Zed* services are now provided on a revenue basis only and many former trial users seem to return as paying customers.

Initial resource base and development

Clear focus on understanding a growing and loyal customer basis

In the time following the launch date in March 2001, *Zed* has realized that business survival in the market of mobile communications depends on providing services on a clear revenue basis only. Since external financing through the capital market is unavailable at this time, only profitable and cash positive business models represent an option for further sustainable growth. Services with revenue potential require user acceptance, which in turn demands *Zed's* clear understanding of user behavior.

Although GPRS and WAP as mobile communication standards continuously expand possibilities for novel applications, *Zed* remains focused on the standard SMS data transfer, because this type of communication standard is widely accepted by its user group. Disregarding the variety of all technical options, *Zed* has made developing comprehensive understanding of its user base, brand equity and interactive mobile services a top priority.

“The user, who looks at the web of Zed services and brands, says that I believe in that and that’s also something I would definitely want to buy. The developed customer demand and the deep understanding of our user base are the two areas we needed to build a brand [as a solid basis with the flexibility to go anywhere].”

(Michael Weiss)

Technical skills and capabilities are merely regarded as underlying facilitators and *Zed* has accepted the position of not being able to set technical trends and standards. However, financial and personnel resources are sufficient for tailoring proven technical solutions to communication and entertainment needs of the younger user groups. Technical applications have been focused on the small number of propriety and interactive entertainment and communication solutions. An understanding of commodity database technology with a clear understanding of youth entertainment represents a valuable combination of skill sets. Other related technology expertise

covers detailed customer profiling based on service usage patterns. Complementary mobile phone technology skills such as JAVA-based handset or GPRS transmission technology are either purchased directly or in the future will most likely be accessed by technology alliances to experiment with these more costly infrastructure options. In recognition of scarce resources, additional technology infrastructure is implemented only on an as-needed basis and is driven by *Zed*'s user requirements.

The reduction of *Zed* personnel from 25 in 2001 to 14 employees in March 2002 makes an approach of cautious technology adoption appear all the more applicable. Therefore, alliance formation with additional resource commitments has to be backed by a detailed business outline of both revenue potential and committed *Zed* resources.

“All business cases are evaluated based on performance only. Some things such as the changes of certain infrastructure costs have not received full and due consideration. [...] Today we know much more about the aspects we need to pay attention to: Legal clauses that allow the exit, short duration of contracts, and flexibility in the event of market changes. We now have much better control of all these areas which I would call clear management guidelines.”

(Michael Weiss)

In addition to the development of evolution criteria outlined in the network adjustment section, experience in screening alliance opportunities has been built up over time and has led to further organizational changes: All business cases are now being centrally discussed, reviewed and decided on by the management team as the controlling entity. Identified as improvement area in alliance management, the top management team faces significant challenges in seeking additional co-marketing opportunities with significant revenue potential. The high value of the partnership and the industry of potential clients – consumer goods and media – can be identified as the cause of these challenges, which in part can be alleviated by enlisting marketing agencies as mediators as described above.

2.4.6 *Within-case study analysis*

All case study firms are faced with uncertain customer preferences and technological standards. Although all case studies apply different degrees of standardization in the development of alliance networks, all four case studies show a path towards increasingly complex and valuable partnership relationships. Whereas *MSN*, *Lycos Mobile* and *Sonera Zed* follow a more organic approach of alliance network growth, *E-plus* applies a more top-down approach of structured and predefined relationships.

Microsoft Network Germany

Driven by the vision of interactive online services and the expectation of further industry consolidation, *Microsoft Network Germany* provides online services aimed at developing a loyal user base through attractive service offerings. Loyal user bases limit their Internet access to only a small number of information portals, which provides companies contributing to information offerings with the opportunity of focused customer access. The value of a loyal user base can be justified with strong economies of scale in providing online services at low variable costs.

Since the parent company *Microsoft* is widely regarded as an industry leader, generating sufficient leads for additional partnerships does not represent a significant obstacle. For available alliance opportunities, *MSN* on the operational level applies a trial-and-error approach without a formalized due diligence process and evaluation criteria. Although on the corporate level certainly framed by *Microsoft's* cooperative agreements, *MSN* on the strategic level strongly promotes *Microsoft's* software standards for Internet identification and operating systems. In this regard, *Microsoft* utilizes *MSN* as an additional vehicle to sponsor its standard driven and compatibility focused business model. The establishment of standards can be linked to the objective of focusing on a loyal and stable customer base for *MSN's* online services.

The informality of *MSN's* approach to alliance formation is also reflected in the ongoing management and maintenance of partnerships in terms of defining their objectives. Project-based and exploratory partnerships leave room for innovation beyond broadly defined partnership scopes. Due to many unproven business models for online services, *MSN's* trial-and-error approach requires the utilization of

redundant partners in its portfolio. Across the majority of partnerships, *MSN* relies on the fact that partnership benefits gradually evolve with an open mind on complementary and mutual benefits from joint agreements. This open-minded cooperation anticipates ‘unknowns’ in technical capabilities, corporate culture or market conditions and refrains from any standardization of alliance relationships. Flexibility also has a positive impact on the magnitude of joint decision-making and the low level of conflict in the alliance relationships.

However, in cases of joint success and further business potential, the extension of weak partnerships – in a limited number of incidents – leads to increased resource exchange which involves a more intense utilization of both partners’ user bases, technological skills and brand equity: Embedded in a richer alliance portfolio of 39 alliances in March 2002, in selected cases *MSN* acts a mediator in the development and innovation of new service offerings.

Microsoft’s strong technological position through its core software business as well as deliberate Internet technological follower position reduces the overall need for external collaboration. However, in cases of needed outside support, a converging alliance portfolio from content and technology ties towards advertising alliances clearly illustrates the path to more valuable partnerships. This transition follows the evolution of *MSN* company resources. The development of content rich and interactive online products results in a loyal user base, which can later be commercialized in subsequent advertising partnerships. In this context after establishing a critical mass, a good understanding of user preferences provides a valuable feedback mechanism for the initial service development and deployment. Both these iterations and an open-minded approach to alliance evolution provide *MSN* and its highly skilled employees with ample learning opportunities from cooperative relationships. As the dominating performance indicator, net ratings of *MSN* in Germany seem to prove sustainable progress on this path.

E-Plus Mobilfunk GmbH & Co. KG

With the launch of mobile portal i-mode, *E-plus* conceptually extends its traditional business model with the support of external service providers for mobile data services.

The high alliance formation rate of 80 partnerships with a timeframe of one year between introduction and launch of i-mode can be associated with transparent alliance evaluation criteria, a detailed alliance due diligence process and highly standardized alliance relationships.

The highly standardized alliance relationships are adopted from the successful launch of i-mode in Japan and accelerate the alliance formation rate, because the basic structure of agreements and technical standards are known in advance – in most cases – can only be accepted as a take-it-or-leave-it option and have a limited number of open parameters to negotiate. However, this predefined and rigid interface to cooperation partners leaves little opportunity for adaptation, joint decision-making and conflict. Therefore, the learning potential for both partners is limited to involved and committed resources outlined in the i-mode framework. However, clear structures for alliance relationships have a positive impact on some ‘components’ of the alliance management capability: The restricted complexity of alliance structures simplifies the partnership selection and benefits the due diligence process. The clear definition of due diligence processes is underlined by the high involvement of legal and controlling departments. As another component of the alliance management capability, ongoing performance controlling of partnerships is also made straightforward through a set of qualitative and quantitative financial indicators.

As *E-plus* in its traditional mobile operator business model is composed of clear-cut managerial and technical resources, its capability of integrating and training additional resources such as online user patterns, consumer goods marketing strategies or technical development is limited. The rigidities of the i-mode partnership framework as outlined above present further obstacles for learning new capabilities. Limited knowledge acquisition can be demonstrated by multiple empirical observations in the *E-plus* case: The case-by-case switch from the dominant i-mode model to the multi-party alliance framework for some business applications seems to impose major obstacles for *E-plus*. The limited value of a complete focus on technical relationships and missing necessity of equity investments can be considered as insufficient feedback from one year of network evolution. Forced knowledge sharing in technical partnerships proves the missing capability of absorbing knowledge during daily operational processes. Consistent with this observation, the growth in technical

capabilities is also not included in the key performance indicator system for the ongoing monitoring of partnerships. And most important as a presumable result of limited learning, *E-plus* departments such as billing and network operation with their structured interfaces have difficulties in quickly implementing defined business agreements.

Lycos Europe GmbH

With the launch of the mobile channel in five countries, *Lycos* extends its current online service offerings to the area of mobile communication. The establishment of earlier operational alliances is the technical basis for business in mobile communications: Payment options, short message services, voice-based customer instructions represent fundamental 'exchange mechanisms' in the mobile arena. These services initiate the formation of a loyal customer base, which later can be extended through more sophisticated content-based software services. *Lycos Mobile* can then capitalize on enhanced customer loyalty and on a stable operational infrastructure by forming valuable partnerships for advertising and sponsoring.

Operational and content alliances as a replacement for missing internal competencies or entry options in new technology areas cannot be replicated at reasonable cost. In the cases of reduced uncertainty, *Lycos* may decide to internalize or discontinue the use of outside technology and content services to increase efficiency. Besides these structural changes to the alliance portfolio, after the initial setup of business processes specifically relationships to technology infrastructure providers show stability in the regular exchange of information and resources. Service level agreements and channeling of information further stabilizes these partnerships. Due to industry factors such as changes in customer preferences, content alliances are either discontinued or rebalanced by *Lycos Mobile*. Rebalancing content alliances leads to adaptations to the financial resource exchange and the level of backward integration of *Lycos Mobile*. With the increased revenue stability and certainty in technical standards, *Lycos Mobile* now stores, distributes and charges for content services ordered online. Later, more strategic advertising and sponsorship partnerships built on previously acquired competencies require long timeframes for negotiation to cover the breadth of involved resource exchanges. In the Nokia alliance example, mandated by a marketing

agreement, *Lycos Mobile* extends its technological knowledge to an unrelated area of MMS Communication. In contrast to previous content alliances, *Lycos Mobile* - for this project - disregards technological uncertainties and cost efficiency, internally develops this technology and acquires valuable technological know-how.

In expanding its traditional Internet business model to mobile communications, *Lycos* has developed a commodity operational infrastructure and knowledge of mobile communications. In a second step, a loyal customer base of 5 million users created more value alliance opportunities with the potential of technological leadership in MMS. Operational partnerships therefore represent a clear requirement of more strategic and valuable cooperation agreements. Low formalization and frequent adaptation in the area of content service agreements have facilitated *Lycos*' learning effects in this service segment, which provide valuable knowledge of mobile communication services' capabilities.

The high involvement in alliance formation explains a relative high proficiency in initiating, selecting and adapting partnerships. Due to missing stability of the entire portfolio, the skills for the ongoing performance assessment still leave room for further enhancement. In a general self-assessment, *Lycos Mobile* is not only satisfied with its capability to initiate cooperative relationships, but also with absolute revenue and its increase at this very early stage of business development. However, the operational management and quality communication with the alliance network reveal weaknesses, which may be alleviated with increasing stabilization of business and cooperative agreements.

Sonera Zed Germany GmbH

Driven by refocusing *Zed*'s business model from mid 2000 to March 2001, strategy, partnership structures and internal resources have undergone significant changes. A concentration on user demands and an unsuccessful experience with earlier external content offerings have generated unique understanding of customer preferences and user behavior. This knowledge has been used to inform internal software development for proprietary, interactive and more valuable internal software products and an evolution in *Zed*'s partnership structure. Whereas the majority of relationships to

commodity content providers has been discontinued, the relationships to a few and adaptive suppliers have been extended. Remaining and highly structured alliances have improved the content quality and face continuous efficiency and cost reviews. Quality content is very much customized to *Zed's* users, facilitated by enhanced and good understanding of user behavior and entertainment needs.

Interactive software applications have generated a loyal user base of 2.3 million in March 2002, which can be leveraged for the establishment of high value advertising and co-marketing arrangements. Based on the unique understanding of user preferences, this revenue growth area is driven by the demand of corporate customers to find novel options to communicate advertising messages to *Zed's* young user audience.

In contrast to earlier partnerships, these alliances are very much tailored to corporate client needs and their business cases have to meet a set of critical criteria. Extensive resource commitment for these exploratory alliances and custom-made service offerings require this more extensive review process on top management and functional level. The variety of resources committed to these exchanges range from marketing and distribution services, access to brand equity and sharing of customer contacts. Clearly defined business cases that describe the mutually expected resource contributions also ensure a low level of conflict in the operational implementation of relationships.

Clear profit and cash interests of mobile service providers like *Sonera Zed* have mandated the transition of business models and respective partnership structures. The growth path towards high value marketing relationships is enabled by the earlier development of products and a well-known user base. *Zed's* management has appropriately described brand, positioning and user base as the building block for further development and expansion. Proprietary software development also makes this building block very difficult for competitors to copy. Both subscriber and successful revenue growth clearly demonstrate the beneficial performance implications of this very focused business and partnership model for *Sonera Zed*.

2.5 Development of a model of tentative propositions for focal firm alliance networks and resources

In this section, analyses from within-case studies are integrated to detect common patterns of co-evolution between focal firm resources and alliance networks. In a step-wise approach, the section derives tentative propositions on the development of alliance management resources, focal company resource additions as well as their interactions with future alliance formation and transformation activities. In general empirical observations from all case studies firms contribute to development of all tentative propositions. However, only *Intel* and *Sun & DLR* show divergent patterns for the issues of future alliance formation and tie transformation.

As these two cases cover larger firm's business development support for new technology-based firms, these 'mentoring' partnerships follow defined firm or industry patterns and undergo only minimal future formation and transformations. As an example, *Intel Capital's* relationships to NTBFs by default involve minority equity investments and defined support activities from *Intel's* business units. In contrast these predefined frameworks, the experience gained from deep operational integration of *Elisa's* city carriers or partners of all four online service firms open up additional business challenges and opportunities over time. These challenges and opportunities in turn result in the transformation of existing and the formation of additional cooperative relationships.

Development of alliance management capabilities and stable alliance structures

Across all case studies presented, industry environment, business objectives and current resource base result in alliance network objectives whose implementation intends to fulfill firm objectives in the context of available resources. Firms in the center of these networks in this section are defined as focal firms. With exposure to alliance formation and management activities, focal firms develop specific skill sets or capabilities that influence both current and potential future partnerships.

Intel Capital as *Intel's* central business development function, has been assigned a pivotal role in exploring new technological fields and developing further market potential for its core silicon business. Also guided by overall network objectives,

Lycos, *MSN*, *Sonera Zed* and *E-plus* extend their partnerships in addition to internal resources to complement their online or mobile service portfolio, which allows direct or indirect future commercialization. Suggested by industry-wide consolidation, *Elisa*'s and *Tropolys*' profitability objectives for local loop fixed-line access require consolidation of a city carrier network.

The network objectives are to select and deploy internal and complementary external operational resources. Operational resources are defined as the set of human, technological, financial and organizational or other resources that support target processes industry specific to the individual business. With regard to alliance network evolution, alliance network objectives serve as a blueprint and guideline for alliance formation. With wide-ranging effects, the defined set of network objectives facilitates and assesses the alliance selection process, the deployment of resources and learning activities between companies.

In the case of *Intel Capital*, highly stable network objectives direct the selection and subsequent development of financially viable new technology-based firms that build up market potential for *Intel*'s core business. *Sun*'s and *DLR*'s *Business Innovation Center* aims at assembling entrepreneurial projects within the defined technological scope. More oriented towards operational integration, the alliance networks of *Lycos*, *MSN*, *E-plus* and *Zed* aim at initially setting up the infrastructure for online services and later selectively commercializing the growing user base. Dynamic in their nature, the alliance network objectives represent an alliance filter and therefore determine the selectiveness in screening partnership opportunities. As an example, *Intel*'s demanding expectations for the expected performance of potential investments result in a low rate of selected investment proposals. *Zed*'s early success in establishing a well-defined user base refocuses the target of potential alliance partners towards selected consumer goods and media companies. Across all online service case studies, higher quality standards for attractive content reduce the alliance formation rate with only a selected number of external providers.

Proposition # 1 *Determined by an assessment of a focal firm's operational resources, more selective alliance network objectives as guidelines in the alliance formation process have a negative effect on the alliance formation rate.*

Although companies in *Intel's* equity portfolio stem from a diverse set of industries, make use of uncertain high-technology applications and cooperate with *Intel's* business units that pursue dynamic strategies, *Intel's* extensive experience in corporate venture capital activities ensures relatively stable network objectives and – as a result – dependable alliance network relationships. Detailed due diligence processes for concise information gathering, transparent selection criteria for mutually agreed upon decisions, involvement of all relevant functional departments including business units for ongoing commitment, and milestone-based investment agreements for continuous dedication to jointly defined goals represent some essentials of *Intel's* well-developed capabilities in forming and developing alliance networks over time. Due to *Sun's* and *DLR's* fewer alliances to new venture teams and companies, their alliance management capability only includes selection criteria without clearly describing a due diligence process. More sophisticated alliance management resources with defined processes and criteria can also be found in *E-plus* case and the later evolution of *Zed's* alliance network. The increasing number of *Elisa's* equity investment cases with repetitively performed activities generates alliance management resources. Constant alliance network objectives, which provide the context of this capability, ensure stability and relevance of this resource value.

Proposition # 2 With an increasing number of accumulated alliance formation activities under constant alliance network objectives, the focal firm develops valuable alliance management resources of refined selection criteria and processes to successfully screen, form and advance alliances in its network.

Intel's alliance management resources to continuously advance alliance networks with benefits mentioned above minimize the failure of alliances and necessary adaptation in terms of intensity and functionality. Best practice approaches for setting milestones and controlling performance and replicated relationship frameworks to define the exchange contribute to partnership stability. Similar patterns can be found in *Zed's* later advertising and co-marketing partnerships, which undergo a detailed business case assessment to ensure mutual alliance benefit contributions and benefits during implementation. And even the *Lycos* case illustrates that channeling communication in alliances increases partners' satisfaction and – at the same time – the longevity of

alliance relationships. Along the same lines, *Elisa* and *Tropolys* set up structured functional boards and standardized controlling to stabilize majority equity ties to regional city carriers.

Across all these cases, alliance management resources are instrumental in harmonizing goals before partnership formation, determining milestones for the resource exchange, in providing performance metrics over the lifecycle of the partnership and assisting in conflict resolution. Distorting factors such as changing partner motivation, missing fulfillment of promised resources or unclear expectations are reduced, which has a beneficial effect on the partnership's stability.

Proposition # 3 *Better-developed alliance management resources contribute to higher stability in alliance relationships between the focal company and its alliance partners.*

Although high technology collaboration in all case studies is associated with inherent technological uncertainties and poses managerial challenges, alliance management resources can limit the required modifications in the functional dedication, intensity, and resource exchange of partnerships. As seen in *Intel's* case, a stable relationship reduces the need for 'trial-and-error' and the level of conflict. *Lycos Mobile's* channeling of the communication flow from its regional units to operational infrastructure providers facilitates a consolidation of interests, reduction of informational redundancies and conflicting needs, which contributes to the stability of relationship to the external partner. *E-plus'* very structured relationship framework for i-mode alliances clearly defines mutual contributions and financial benefits, which reduces conflicts in negotiating the contractual arrangements. The reduction of 'trial-and-error' processes, misled communication flows or disproportionate contributions also reduce the level of unintended resource exchanges beyond the scope of the alliance defined previously.

Proposition # 4 *More stable alliance relationships reduce the magnitude of unintended resource exchange and the level of conflict in partnerships.*

Focal company resource acquisition and learning

As focal firms cooperate to support business development, to consolidate fixed-line communication operations or to develop online service offerings, their interaction has effects on the exchange of operational resources. Propelled by the interaction based on alliance relationships and guided by their objectives, all case study firms exhibit an acquisition of resources either through learning or transfer. The magnitude and type of resource acquisition depends on alliance network and firm level factors.

Low levels of conflict in relationships to *Intel Capital* investments, restrictions in the enforcement of legal sanctions and milestone payments to ensure partnership compliance signal and convey a successful partnership model, support consensus driven decision-making and motivate the reliable achievement of defined stable partnership goals. In the *Sun* and *DLR* cases, variety of alliance partners, diversity of partnership frameworks and emerging alliance management functions result in multiple feedback loops in the coaching process and flexibility of venture development in the later seed stage. Both flexibility and feedback loops can be leveraged to explore product applications and business models, beyond the initial objectives of the alliances. In contrast, as relatively tight i-mode relationship frameworks regulate alliance partners and define mutual contributions, *E-plus* faces difficulties in implementing partnerships and even greater challenges in motivating innovativeness beyond initial alliance purposes. *Elisa's* and *Tropolys'* functional boards, group-wide controlling, standardized product offerings, and defined city carrier assessment criteria clearly limit innovativeness for fixed-line communication products. A reduced magnitude of unintended resource exchanges therefore decreases the number of opportunities for learning and creative and innovative resource combinations as the basis for potential future collaboration.

Proposition # 5 Lower magnitude of unintended resource exchanges reduces the focal firm's level of innovation and exploration beyond the originally defined alliance objectives.

A low level of unintended resource exchanges and conflict implies that partnerships closely follow their defined goals for the previous resource exchange. Limited changes

in alliance objectives, product development schedules, and marketing plans during the implementation of the partnership reduce the diverse interaction between functional departments of both alliance partners. Diversity of interaction can be regarded as a ‘trial-and-error’ approach, which supports awareness of the breadth of partner capabilities, explores new processes for resource transfer and benefits from unintended resource exchanges. Lacking the clear-cut and engineered interface for the alliance relationship, both partner companies invest in the mutual relationship by exploring the mutually beneficial balance of resource exchange. This search process facilitates mutual learning for innovation or future partnership projects beyond the current alliance objective.

The *Sun* and *DLR* case studies clearly demonstrate the diversity of cooperative relationships. Multiplicity of technical projects, case-by-case business development activities and tailored cooperation agreements create a rich learning environment for all alliance partners. In this environment, *DLR* has learned how to cooperate with industry clients and has developed stronger entrepreneurial orientation. This valuable learning experience depends on intense interaction between alliance partners for the reasons described above. *Elisa* and *Tropolys* in their objective to consolidate city carrier operations needed a conflict with minority stakeholders to raise the awareness of their objectives and to discover their value in acquiring new city carrier customers.

In contrast to these examples, i-mode cooperation models as defined by *E-plus* follows predefined selection criteria, offers a recurring revenue sharing framework and provides standardized operational interfaces with *E-plus*’ departments. This degree of standardization supports the high frequency of alliance formation in its “mass partnering” approach, but limits diverse exchange beyond defined alliance objectives. Reduced learning effects from i-mode alliance partners can clearly be associated with missing accounts of technical learning, problems in the implementation of partnerships and intentional knowledge acquisition procedures for technical alliances. The implementation of partnerships would clearly benefit from initial learning, which creates awareness of partner capabilities and facilitates in the anticipation of cooperation benefits.

Proposition #6 A higher level of conflict and unintended resource exchange in alliance relationships increases the learning potential for partners involved in the alliance.

If conflict and unintended resource exchanges generate learning potential, can it be utilized by the focal firm? As the first case indicates, *Intel Capital's* learning of technical resources beyond the previously mentioned alliance management capabilities is limited to rare exceptions. However, the magnitude of *Intel's* learning as a by-product of resource exchange increases with the technological relatedness to *Intel's* core microprocessor design and manufacturing technology base. In this case, *Intel* intentionally intensifies its relationship to the portfolio company to internalize learning from joint development projects.

Other cases exhibit similar patterns: With a clear understanding of city carrier operations through initial consulting assignments, both *Elisa* and *Tropolys* could better internalize and standardize resources of city carriers for network operation and shared service processes. Due to focus on the matching technological domains in navigation, communication, geographical information and avionics, corresponding *DLR* institutes enjoy a rich learning experience in cooperation with new venture projects and acquisition of valuable resources. In contrast to these examples, media, entertainment and consumer goods companies in i-mode's alliance network show a low degree of similarity with *E-plus*, which is focused on operation and administration of cellular networks. This difference in partners' resource bases reduces the magnitude of focal firm learning.

Comparing all these case examples, the similarity to the current focal company technology base seems to facilitate the accurate valuation of the external technology base, identification of own technology gaps and integration of innovations into the current know-how base. The integration of existing knowledge makes integrating new results and findings easier, because 'reference points' make interfaces to existing resources visible.

Proposition #7 Higher learning potential and closer resource base relatedness of alliance partners with the focal firm have a positive impact on focal firm learning.

Interaction effects of alliance network formation and focal firm resources

In the case of jointly coordinated operations across multiple partners, the presented case studies have shown clear patterns of co-evolution between focal firm resources and alliance networks. This pattern can be demonstrated in the online services case studies of *MSN*, *E-plus*, *Lycos* and *Sonera Zed*: Formerly less resource intensive partnerships – more comparable to market-based transactions – provide an operational infrastructure, which represents an ‘obvious industry specific necessity’ to transfer information and provide payment options. The subsequent development and deployment of more valuable resources – interactive services, loyal customer base, unique understanding of user behavior – open up a range of further, more advanced alliance formation opportunities for these companies. Also the case study of *Elisa* and *Tropolys* demonstrates a similar sequence: Earlier minority equity investments in a broad and diverse portfolio of city carriers have been used to clearly assess their capabilities and regional strategies. This more detailed understanding facilitated the decision on the viability of a consolidation strategy in general and commitment of further financial resources to later acquire majority stakes in particular. This section derives a set of propositions to describe this recurring and refining cycle of alliance formation that has an impact on focal firm’s alliance network structure.

As outlined above, *MSN*, *Lycos* and *Sonera* with their existing technology resource base have formed initial contractual and technical partnerships related to market transactions to complement their resource profile. Inter-firm cooperation with external providers mainly supply payment options, data transmission to mobile network operators or electronic content to complement internal information offerings. In a classical make-or-buy assessment, the obvious unavailability of internal resources or cost-based efficiency assessments have apparently mandated alliance formation for these basic technical services. The inevitable alliance network for the basic operational infrastructure provides commodity services and can therefore be easily replicated by competitors in the industry. The very narrow resource exchange of technical and financial resources follows a very defined scope and objectives, due to the nature of standardized services.

Proposition #8 Initial alliance formation for the support of technical processes across the alliance network aims only at the availability and narrow exchange of operational resources.

As described above, primary partnerships exhibit clear structural patterns of the defined exchange of services – payment, SMS transmission, electronic content – on a transactional or revenue-sharing basis. Although the extent of financial compensation dominates these service agreements, the focal firm also receives feedback on technical interfaces, sales volume or customer preferences as a non-financial and knowledge resource. Therefore, these cooperative relationships and their underlying contracts show some similarity but no identity to market-based transactions.

After initial learning effects, the acquisition of external resources and the independent development of focal company resources, additional partnership opportunities open up for the focal companies in the alliance network. Examples across all case studies clearly demonstrate this pattern: *MSN* has utilized earlier content alliances and internal applications development to bundle information channels into online products, which earn the loyalty of an increasing customer base. Similarly, with the help of an initial alliance for the operational infrastructure, *Lycos* has offered simple SMS sending functionality and *Zed* has distributed externally sourced content to establish a solid customer base. This customer base represents an attractive resource and therefore a motivation for business customers such as Volkswagen (*MSN*) or Nokia (*Lycos*) to intensify relationships and newly establish higher value relationships. Continuously returning and migrating customers from other online service providers gradually develop a user community. Database technology helps analyze online usage patterns and develop an understanding for customer profiles. With many feedback loops between service offerings and user preferences, these firm activities continuously develop a very valuable resource for all online information portals: A loyal and well-known customer base.

The case study of *Elisa* and *Tropolys* reveals similar patterns: The in-depth understanding of city carrier operations, consolidation potentials and city carrier capabilities represent a unique set of resources in the consolidation of the fixed-line telecommunications market. Although knowledge about running a city carrier has been replicated regionally on a number of occasions, the emergent resources of developing

and implementing a consolidation strategy made *Elisa* and *Tropolys* the unique and inimitable hub for a network of local-loop access providers. Newly acquired and developed resources can be used as a ‘stepping-stone’ for richer and more valuable partnership opportunities.

Proposition #9 The growing base of internally developed and externally acquired focal firm resources creates additional and more valuable alliance formation opportunities.

An establishing customer base has motivated business customers to collaborate with online service providers as an alternative option for advertising and marketing communication. If these more valuable alliance opportunities are turned into a cooperative relationship, how does their implementation affect the continuing resource exchange between partners?

In executing more valuable alliance opportunities, *MSN* has developed a mobility portal for Volkswagen with rich and interactive functionalities. For customers in the retailing industry, *MSN* has established a complex infrastructure for shopping channels enabling browsing within multiple product catalogs. Showing similar patterns, *Zed* has signed tailored co-marketing agreements with consumer goods companies that require complex customization of technical applications and retrieval of customer preferences. As *Lycos* promoted Nokia’s MMS handsets, *Lycos* has internally developed an MMS messaging capability tailored to the functionalities of the mobile phone. Along the same lines, *Tropolys* and *Elisa* thoroughly communicate on multiple channels – in this case functional boards – to identify, implement and track implementation potential. This intensification of inter-firm interaction has been established after the decision to include the city carrier in the consolidation network and to acquire the respective majority stake in the company.

In the case of all online service providers, all cooperation agreements involve the combined and complex deployment of technical development, customer profiling, external messaging or content services. The consolidation of city carriers requires the combined development and deployment of centralized controlling, standardized product offerings and shared administrative services. Due to the business relevance of these complex interactions, these more comprehensive alliances require very intense

relationships and the extensive exchange of multiple resources. Highly intense alliance relationships are associated with the frequent interaction to coordinate operational processes between alliance partners.

Wide-ranging resource commitments from the focal company call for a more sophisticated due diligence process with defined criteria embedded in a formatted business case. In the case of *Elisa* and *Tropolys*, the extension of city carrier relationships to majority equity stakes has been facilitated and verified by a detailed assessment process: *Elisa*'s very thorough due diligence covers technical, legal and business aspects complemented by the earlier experience of minority stake holdings. Similarly, *Sonera Zed*'s detailed business case based on input from diverse functional departments has to be approved by the entire top-management, which underlines the business relevance and significance of *Zed*'s resource commitments.

Proposition # 10 Emerging alliance management resources facilitate the selection of high-value alliance formation opportunities and their beneficial transformation into partnerships of higher resource exchange intensity.

Proposition # 11 Alliances of higher value and resource exchange intensity mandate a higher degree of customization and complexity in resource exchange.

The technical development of the Volkswagen mobility portal by *MSN*, consolidating fixed-line telecommunications services or the pioneering technical deployment of MMS messaging capabilities illustrate valuable resource exchanges of higher complexity and magnitude. Especially in these contexts, the development of alliance management resources represents a precondition for the assessment and negotiation of more complex partnerships. Extended timeframes for the negotiation of the Nokia MMS promotion or *Zed*'s co-marketing agreements serve as indicators for the value and relevance both parties attach to the cooperation. Similar patterns of steady but gradual growth can be detected in the yearly and continuous addition of partners to *MSN*'s shopping channel and specific utilization of marketing agencies to seek matching partners for *Zed*'s co-marketing alliances.

Challenges in selecting appropriate and beneficial high-value partnerships can be overcome after initially acquiring resources from partners in the alliance network. A good understanding of previously acquired operational resources from existing alliance network partners represents an important feedback mechanism for the capability to screen, form and advance alliance opportunities. Learning as the primary acquisition mechanism (Proposition # 7) contributes to changes and the refinement of alliance network objectives. In a second step, necessary adaptations provide a basis for clearer and more concise selection criteria.

Proposition #12 Focal firm learning through changed alliance network objectives represents a valuable feedback mechanism for refined selection criteria as a component in alliance management resources.

Empirical evidence for this proposition can be found in the more careful selection of *Zed's* content providers after its user profiles have been made available. Along the same lines, *Elisa* and *Tropolys* have determined clear criteria for the selection of promising city carriers with solid consolidation potential only after the earlier experience with a variety of local loop access providers. Out of the entire initial portfolio, some regional network operators revealed some financial, operational and managerial characteristics that have signaled no fit with the intended consolidation strategy.

Transformation and discontinuation of alliance network relationships

Environmental changes such as shifts in customer preferences and internally developed resources have an impact on the value of resources acquired from external partnerships. Changes in value obtained require a reassessment and redirection of earlier partnerships.

In studies of all four online service companies, resource exchanges with suppliers in initial relationships for technical processes (Proposition # 8) only complement internal resources. After full implementation of daily operations and initial learning effects, services and content provided go through a review process, which leads to a rebalanced exchange of resources. Options to rebalance the alliance relationship range

from internalization of services, renegotiations of existing contracts or discontinuation of the relationships.

Cost considerations and a focus on improved margins for *Lycos Mobile* have led to the internalization of activities for its content services: In mature stages of the adapted relationships to content providers, *Lycos* now independently hosts the database, provides payment options and therefore gives a reduced share back to the copyright holder. In addition to operational changes, both *Lycos Mobile* and *Zed* have reviewed and renegotiated agreements with premium rate number providers and now receive larger revenue shares from its service providers. In addition to rebalancing the resource exchange, *Lycos* and *Zed* have also discontinued content partnership as a reaction to unmet consumer demand. The emergence of a customer base with more defined profile leads to the obsolescence of earlier partnerships at the end of their lifecycle. Along these lines, *Elisa* has also divested multiple minority interests in city carriers after assessing their competencies and fit with a consolidation strategy. Comparable efficiency considerations mandate the divestment of equity stakes to free up financial resources for the acquisition of majority stakes.

Proposition # 13 Initial and less resource intensive alliance relationships face value reviews in their comparison to internally developed and externally available focal firm resources.

Proposition # 14 Value reviews may lead to the internalization of resources, rebalancing of resource exchange or the discontinuation of the relationship based on efficiency considerations.

This decision not only reflects the underlying strategic rationale, but also economically driven assessment to free up much needed financial resources in exchange for minority stakes. As a common understanding in the *Elisa* and *Tropolys* case study, intensified relationships are the precondition for the transfer of resources between network companies to achieve economies of scale in administrative service, customer care and billing within the network. Only majority stake holdings offer the necessary authority not only to plan but also to forcefully implement operational consolidation. The magnitude and speed of resource shifts in the consolidating city carrier network cannot only be based on the learning of other firms' capabilities. Forced and directed transfer

of resources orchestrated by the integrating entities *Elisa* and *Tropolys* seems to be required as well.

Proposition # 15 An increase in the relationship intensity over a certain threshold allows for the transfer in addition to learning about network company resources.

With the addition of resource intensive and the discontinuation of initial technical partnerships alliance networks around focal firms converge to fulfill and further specify their ‘business purpose’: Across a number of cases in this study, a certain transition from broad and diversified portfolios to a focused and selected set of partnerships can be observed in conjunction with focused alliance network objectives:

In the *Elisa* and *Tropolys* case, the need for a consolidation strategy has been developed earlier based on the information received from its initial portfolio companies. Changes in the industry environment have led to both, sharp price decreases and intensified competition. Stand-alone city carriers with the current resource base of marketing, network operation and customer care have very limited competitive advantages over rival carriers and *Deutsche Telekom AG*. With profitability and the time to break even being very uncertain, consolidation of operational resources with current knowledge represents the only remaining option to achieve profitability within certain timeframes. The need for consolidation and the design of the appropriate strategy has been developed in the phase of minority stakeholdings of *Elisa Kommunikation* in city carriers. Earlier knowledge resources generated by providing initial consulting services and holding minority stakes have presented a diverse set of information to *Elisa Kommunikation* as the focal organization in this alliance network: Performance metrics, best practice benchmarks, customer profile. The wealth and diversity of information has underlined both the feasibility and the necessity of a consolidation strategy.

With the integration in the operational network under *Elisa*’s sub-unit *Tropolys*, city carriers have been embedded in the web of functional boards to exchange best practices and to track their implementation across multiple operational areas. Previously defined consolidation potentials now await their implementation, which requires resource intensive exchanges on detailed best practices and coordination

among multiple partners for consistent and harmonized internal processes. This adaptation in resource exchange is facilitated by alliance network transition from *Elisa*'s hub-and-spoke 'hierarchy' to *Tropolys*' very dense network with multiple interconnected network firms. The initial exploration of roughly identified consolidation potential now awaits its exploitation in the actual implementation of efficiency improvement measures.

Proposition # 16 Motivated by a transformation from exploration to exploitation in alliance network objectives, an adaptation to the resource exchange between the focal firm and other network firms requires more intensive alliance network relationships to the focal firms and between network firms.

MSN Germany reveals a similar tendency in its mediating role between alliance partners and their interest to jointly develop information services for a user community of senior citizens. Network companies having shared their business initiatives and ideas, *MSN* can now exploit commonalities, foster further integration of alliance partners and direct the joint resource deployment of network companies. In a similar account after the exploration of user preferences in a trial-and-error approach, *Sonera Zed* has reduced the number of relationships to content providers and intensified ties to the remaining suppliers of online content. In exploiting the proven capabilities of remaining suppliers, *Sonera Zed* now constantly feeds back user preferences based on more intensified cooperative agreements.

Overview

In an overview of all derived propositions, Exhibit 2-27 integrates the multitude of presented relationships into a consolidated system. Both growing focal company resources and alliance networks are influenced by partnership reviews, interorganizational learning and changing alliance network objectives.

Based on the described sequence of tentative propositions, operational resources or the lack thereof represent the starting point for the co-evolution of alliance networks and focal firm resources. Resource gaps motivate the firm for external partnering, which is guided by specific alliance network objectives. Any learning effect – or resource

addition – in the top right corner of the chart leads adaptations in alliance network objectives. Alliance network objectives represent selection criteria, which have the described effect on the partnership formation rate. The process aspects of alliance management resources are built by cumulative and repetitive partnership formation activities. Developed alliance management resources – consisting both of appropriate selection criteria and sophisticated processes – have a positive impact on the stability of the individual alliance relationship and the network as a whole. Stability reduces the level of conflict and unintended resource exchanges, which both limit focal firm's learning potential. The similarity of resources between focal and network firms turns the available learning potential into operational resource addition or actual learning. The nature of operational resources depending on industry, firm size or relevant business context can be assessed along financial, technological, physical, managerial, human, organizational dimensions. Growing operational resources increase the value of externally presented alliance opportunities, which – facilitated by appropriate alliance management resources – leads to more intense partnerships in the event of actual alliance formation.

The entire model of alliance formation and focal firm resources reveals interesting converging patterns: Based on initial alliance formation activities, interorganizational learning through increased conflict and unintended resource exchanges provides feedback for a more selective screening of further high-value alliance formation opportunities. In this respect, the complete alliance network – exploiting earlier developed resources – is converging towards a more defined set of alliance network objectives and relationships. These converging relationships show signs of increasing intensity, higher complexity and customization of exchanged resources. The focal company can therefore start with a set of relatively unspecific alliance network objectives, which result in broad screening criteria and a multitude of unstable alliance relationships. These initial relationships provide ample opportunity for focal firm learning, which results in a more selective set of alliance network objectives for the screening of increasingly valuable alliance formation opportunities. Facilitated by growing alliance management resources, these more stable partnerships deploy an increasingly complex and customized set of resources.

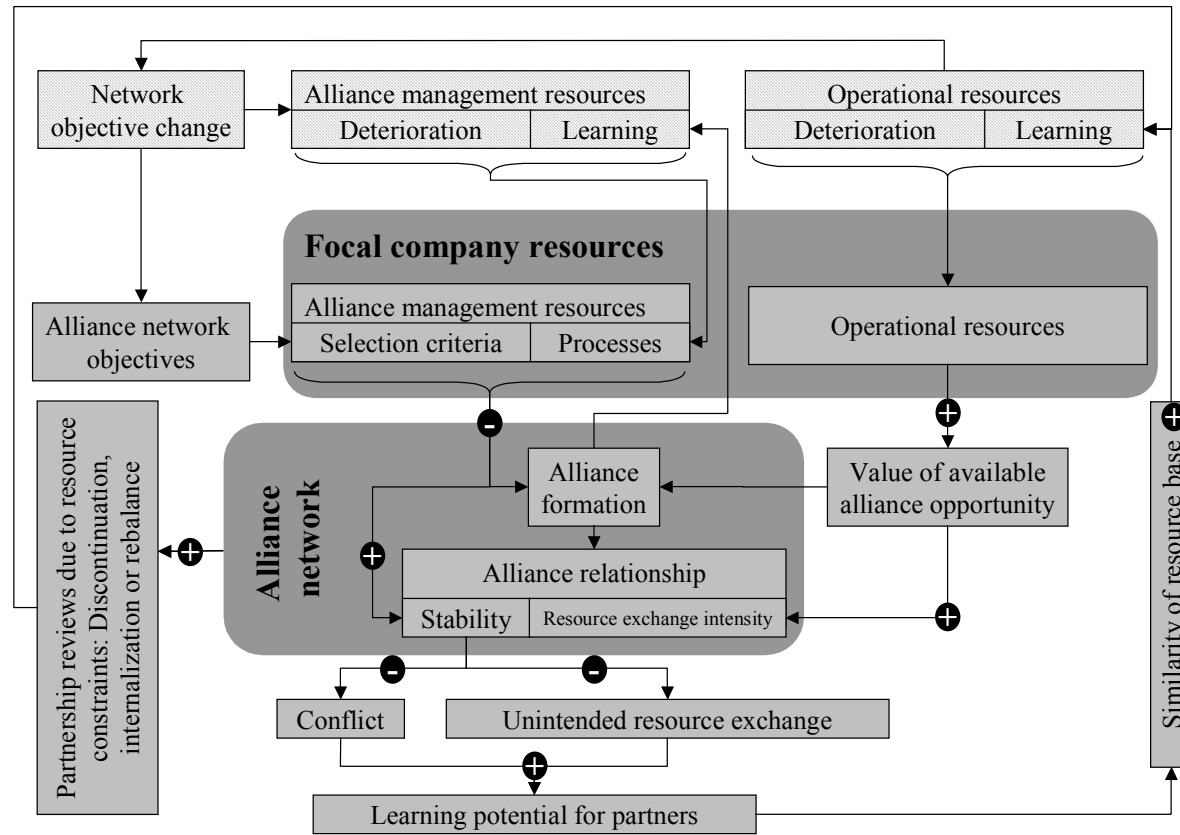


Exhibit 2-27 Overview: Framework of tentative propositions

Proposition	Definition
Proposition # 1	Determined by an assessment of a focal firm's operational resources, more selective alliance network objectives as guidelines in the alliance formation process have a negative effect on the alliance formation rate.
Proposition # 2	With an increasing number of accumulated alliance formation activities under constant alliance network objectives, the focal firm develops valuable alliance management resources of refined selection criteria and processes to successfully screen, form and advance alliances in its network.
Proposition # 3	Better-developed alliance management resources contribute to higher stability in alliance relationships between the focal company and its alliance partners.
Proposition # 4	More stable alliance relationships reduce the magnitude of unintended resource exchange and the level of conflict in partnerships.
Proposition # 5	Lower magnitude of unintended resource exchanges reduces the focal firm's level of innovation and exploration beyond the originally defined alliance objectives.
Proposition # 6	A higher level of conflict and unintended resource exchange in alliance relationships increases the learning potential for partners involved in the alliance.
Proposition # 7	Higher learning potential and closer resource base relatedness of alliance partners with the focal firm have a positive impact on focal firm learning.
Proposition # 8	Initial alliance formation for the support of technical processes across the alliance network aims only at the availability and narrow exchange of operational resources.

Proposition # 9	The growing base of internally developed and externally acquired focal firm resources creates additional and more valuable alliance formation opportunities.
Proposition # 10	Emerging alliance management resources facilitate the selection of high-value alliance formation opportunities and their beneficial transformation into partnerships of higher resource exchange intensity.
Proposition # 11	Alliances of higher value and resource exchange intensity mandate a higher degree of customization and complexity in resource exchange.
Proposition # 12	Focal firm learning through changed alliance network objectives represents a valuable feedback mechanism for refined selection criteria as a component in alliance management resources.
Proposition # 13	Initial and less resource intensive alliance relationships face value reviews in their comparison to internally developed and externally available focal firm resources.
Proposition # 14	Value reviews may lead to the internalization of resources, rebalancing of resource exchange or the discontinuation of the relationship based on efficiency considerations.
Proposition # 15	An increase in the relationship intensity over a certain threshold allows for the transfer in addition to learning about network company resources.
Proposition # 16	Motivated by a transformation from exploration to exploitation in alliance network objectives, an adaptation to the resource exchange between the focal firm and other network firms requires more intensive alliance network relationships to the focal firms and between network firms.

3 Theoretical perspectives of focal company resource and network evolutions – towards a dynamic model

After concluding case study descriptions and analyses, the tentative propositions are to be compared with relevant and appropriate theoretical frameworks: A combination of two emerging theoretical concepts – the resource-based view of the firm and strategic network theory – both informs tentative propositions and also requires conceptual extensions through theory building. Although many scholars have already acknowledged the relevance of company resources and strategic networks, especially new theoretical models for dynamic resource and network evolution require additional conceptual extensions.

The longitudinal case studies of the previous chapter and the derived tentative propositions shed light on emerging theoretical concepts for resource and network evolution. The following sections describe the basic theoretical frameworks, establish relationships between company resources and networks, elaborate on implications of network structures for their further evolution and explore learning across network structures. In a final stage, all theoretical perspectives are combined in one unified longitudinal model of focal company resource and network evolution, which is later compared with the set of tentative propositions.

3.1 Overview of selected and applicable theoretical frameworks

The combination of the resource-based view of the firm and the strategic network theory provides an insightful theoretical underpinning. However, both theoretical frameworks have to be integrated using the theoretical concept of network resources.

Resource-based view of the firm and its derivatives

The **resource-based view** (RBV) of the firm regards strategic capabilities as a bundle of internal resources important for the foundation of competitive advantage (Penrose 1959; Wernerfelt 1984; Barney 1991; Amit and Schoemaker 1993). The accumulation and deployment of valuable, rare and inimitable resources generate synergies and rents (Wernerfelt 1984; Barney 1986; Dierickx, Cool and Barney 1989; Barney 1991; Mahoney and Pandian 1992; Peteraf 1993; Barney 2001). Resources as tangible or intangible assets are generated over time by complex interactions and are guided by

information exchange through the firm's human resources (Amit and Schoemaker 1993).

Researchers have identified three characteristics that build up the barriers of inimitability as a major source for the sustainability of competitive advantages: Tacitness, complexity, and specificity (Reed and DeFillippi 1990). Tacitness characterizes skills and organizational routines whose re-creation and replication require learning by repeatedly executing the task. In contrast, explicitness describes knowledge and information that can easily be codified and transferred (Penrose 1959; Polanyi 1967). Complexity occurs when many different and interrelated skills or organizational activities exist within a firm (Nelson and Winter 1982) or across organizational boundaries (Gulati and Singh 1998). Specificity refers to the nature of some resources being specialized to the requirements of specific transactions either within a firm or across organizational boundaries (Williamson 1985).

As an important resource example for high-technology firms in this study (Tushman and Anderson 1986; Henderson and Clark 1990), technological capabilities comprising patents, development knowledge, and production skills define the roots of a firm's sustainable competitive advantage. Technological intellectual property protected by patent law allows for the subsequent value creation in the commercialization of new product development efforts, development of market opportunities and differentiation from incumbents. Not all technological capabilities can be safeguarded by patent laws and are therefore vulnerable to imitation and replication, which weakens the firm appropriability regime to capture respective rents from these capabilities (Teece 1986). However, technical organizational skills are hard to copy, because they remain largely embedded in the tacit routines and practices of the firm (Kogut and Zander 1996). Since tacit skills can be backed by enjoying a tight appropriability regime, innovators can be assured to translate innovation into market value for a certain time period.

Resource-based strategy research is traditionally concentrated on explaining sustained performance differences between firms. In its application to alliance formation, resource heterogeneity plays a significant role in explaining strategic change and actions. As a consequence, in numerous empirical and theoretical descriptions of alliance formation, the dominant focus has been on exploring the resource-based

motivations supporting alliance formation (Berg, Duncan et al. 1982; Hagedoorn 1993).

Consequently, scholars have identified collaborative practices across firm sizes and industry sectors as a practical method of knowledge resource creation and transfer (Hamel 1991; Nonaka 1994; Powell, Koput et al. 1996). In addition to the mentioned specificity and complexity, strategic alliances also have the potential to create competitive advantages through idiosyncratic complementary resource combination between partnering firms (Kogut 1991). The idiosyncratic character of resource combination and the embeddedness of the focal firm establish barriers to imitation (Hansen, Hoskission, Lorenzoni and Ring 1997).

Since the RBV is traditionally limited to the single firm only, it fails to explore the process by which multiple firms work collaboratively and develop individual and common capabilities. Therefore, both concepts of knowledge transfer and resource combination between partnering firms are not reflected in the resource-based view of the firm. In order to explore relational firm capabilities, the assumption of inimitable and therefore immobile resources that dominates the RBV (Barney 1991) has to be abandoned. Scholars have criticized the assumption of immobile capabilities (Hannan and Freeman 1989) and have released this notion by introducing different types of imperfect immobility that are not disadvantageous for the firms (Peteraf 1993) and by identifying certain resources that are selectively tradable through a network of firms (Hansen, Hoskission et al. 1997) in a process approach.

The related theoretical concept of **dynamic capabilities** builds on the resource-based view of the firm and provides a better insight into the basis of competitive advantage. By emphasizing strategic processes, the dynamic capabilities approach explores the mechanisms by which firms gather and distribute new skills and capabilities in order to quickly adapt to changes in the environment despite path dependencies and technological or organizational core rigidities (Lado and Wilson 1994; Teece and Pisano 1994; Teece, Pisano and Shuen 1997). Dynamic capabilities enable strategic firm behavior in the deployment of high response capabilities, reduced time-to-market cycles and innovative capabilities (Lorenzoni and Lipparini 1999).

In another related approach, the **knowledge-based theory** (KBT) emphasizes not only the ability to appropriate value (RBV) or to innovate (dynamic capabilities) but also

the very strategic capability to integrate the complementary resources of multiple firms (Hamel, Doz et al. 1989; Grant 1991; Nonaka 1994; Grant and Baden-Fuller 1995; Conner and Prahalad 1996; Grant 1996a, b). The knowledge-based theory regards a firm as a repository of knowledge and competencies (Conner 1991; Kogut and Zander 1996). According to this perspective, the organizational advantage of firms over markets is derived from their superior capability in creating and transferring knowledge.

Knowledge creation and innovation depend on new combinations of knowledge and other resources (Cohen and Levinthal 1990; Kogut and Zander 1992). The accumulation of knowledge through learning constitutes a driving force in the development and growth of young technology-based firms (Penrose 1959), because knowledge acquisition results in new productive opportunities. Inter-firm networks may be an effective option to facilitate the capability transfer or access in dynamically competitive environments and under conditions of dispersed or specialized knowledge.

Recent studies on organizational learning have proposed that inter-organizational relationships create opportunities for knowledge acquisition and exploitation (Dyer and Singh 1998; Lane and Lubatkin 1998; Larsson, Bengtsson, Henriksson and Sparks 1998). Through interaction with others, firms gain access to external knowledge, and relationships create a context within which newly created knowledge can be exploited and applied. Studies consider alliances more as a specific type of relationship to learn new skills that reside within other organizations (Hamel 1991; Hagedoorn 1993; Hagedoorn and Schakenraad 1994; Powell, Kogut et al. 1996). Attention to inter-organizational cooperation as a mechanism to acquire know-how is raised by the concentration of alliance activity in particular sectors of the economy: As discussed in chapter 1, high-technology industries are the areas in which partnership activities have been predominant in the recent past.

As a recently developed conceptual extension of the resource-based view of firm, the **relational view of firm** explores resource exchange between alliance partners as a source of competitive advantage. While the resource-based view of the firm is based on firm resource properties to explain competitive advantage, the relational view of the firm argues that the network of relationships represents an additional source of competitive advantage (Dyer and Singh 1998; Gulati 2000). The relational view of the

firm (Dyer and Singh 1998) extends the RBV beyond firm boundaries and argues that unique resource combinations of multiple firms beyond boundaries yield an advantage and a relational rent over competing firms. With the inter-firm network of partners as the dominant unit of analysis, key research issues are centered around the existence, the performance of the firm's network of relationships, and the effects of network positioning on relational rent distribution. The achievement of relational rents and competitive advantage depends on the network position strength.

Dyer and Singh (1998) defined four potential sources of inter-organizational competitive advantage: Relation-specific assets, knowledge sharing routines, complementary resources and capabilities, and effective governance. As empirical evidence, researchers have found that relation-specific investments between Japanese automakers (Dyer 1996) or tacit know-how sharing instead of explicit information sharing (Dyer and Singh 1998) can be the source of competitive advantage. Informal safeguards in the form of trust and reputation have an advantage over formal financial or legal penalties because they reduce transaction costs and allow alliance partners to invest in specialized resources or share tacit resources without any concerns about opportunistic behavior.

The described theoretical frameworks focus attention on the skills and capabilities for the transformation of inputs into outputs, whereas the firm's network of external relationships is relevant for the availability of external resources, disposing outputs and finding more rewarding opportunities (Burt 1992).

Strategic network theory

Firms are embedded in a social context with structural, cognitive, institutional, and cultural elements. Although all components are important for firm behavior, only the structural component highlights implications of social networks and their economic actors. A social network can be defined as a set of actors representing persons or organizations linked by a set of social relationships of a specified type (Laumann, Galaskiewicz and Marsden 1978).

Following the social network perspective, all economic actions are influenced by the social context and depend on the position of actors. Firms can be embedded through a

variety of social relationships constituting multiple social networks. These networks range from supplier relationships, trade association memberships to interlocking directorates and relationships among individual employees. Because embeddedness in a network of strategic alliances leads to asymmetric access to resources across the industry, it can significantly support or obstruct a firm's behavior or performance (Granovetter 1985; Burt 1992; Nohria and Eccles 1992). The concept of embeddedness refers to ...

“... the fact that exchanges and discussions within a group typically have a history, and this history results in the routinization and stabilization of linkages among members. As elements of ongoing social structures, actors do not respond solely to individualistically determined interests ... a structure of relations affects the actions taken by the individual actors composing it. It does so by constraining the set of actions available to the individual actors and by changing the dispositions of those actors toward the actions they may take.”

(Marsden 1981 p. 1210).

The varying significance of social networks is determined by the nature, purpose and content of information that flows through it (Stinchcombe 1990). Scholars have developed two general analytical approaches for exploring the influence of social networks: On the one hand, social networks permit differential informational advantages (Burt 1992). On the other hand, an advantageous position in a social network can be leveraged for control benefits.

Applied to the context of inter-organizational cooperation, information advantages from a social network can facilitate new alliance formation in three separate ways: access, timing and referrals: Access provides information on the capabilities and trustworthiness of current and potential network partners. The availability of recent information can also determine the structural choice of formalizing the alliance or evolutionary processes in its longitudinal development. Timing refers to having informational benefits about potential partners at the right time. Referrals depend on

the recommendations of future alliance partners by existing partners, which plays a significant role in the formation of alliance networks.

Informational advantages are generated by relational and structural embeddedness of organizations. In the search for an optimal network configuration, (Gulati 1998 p. 296) illustrates the two types of network embeddedness relevant for addressing this question:

“Relational embeddedness or cohesion perspectives on networks stress the role of direct cohesive ties as a mechanism for gaining fine-grained information . . . Structural embeddedness or positional perspectives on networks go beyond the immediate ties of firms and emphasize the informational value of the structural position these partners occupy in the network.”

Relational embeddedness refers to direct and cohesive relationships for accessing detailed common information and knowledge. The development of a common understanding in strong, socializing relations directs future actions and conveys information that may reduce uncertainty, foster trust between network participants and improve knowledge about partners' capabilities (Granovetter 1973; Podolny 1994; Burt and Knez 1995; Gulati 1995a).

Structural embeddedness also has implications for informational benefits. According to this concept, information access not only depends on the intensity of ties but also on the network structure and firm's position (Granovetter 1992). Structural embeddedness expands the perspective from dyadic relationships to a complete network. The relational pattern of all interactions determines the network position, which is associated with a certain status (Podolny 1993, 1994). Status is determined through clear and evident characteristics associated with certain positions in a social network that in turn require a very defined conduct toward other actors. Due to the importance of interaction patterns, secondary affiliations with the status of exchange partners also influence the status of focal actors as the central entity in the network.

Control benefits – as another benefit of social network participation – are generated by actors or companies located between other network actors: In these cases, two actors would like to attain the same relationship with a focal actor or have conflicting demands in separate relationships with the focal actor. In either case, the firms in the central role can create benefits for themselves by playing one off against the other and utilizing the tension between other network participants.

For partnering firms, performance outcomes of these benefits can be valued as information access and control benefits of their respective ‘social capital’ that facilitates increased competitive advantage (Burt 1997). Consequently, the concept of social capital also described as network resources has been expanded from individuals and interpersonal networks to firms and their inter-organizational networks. Embedded in alliance networks, firms with higher social capital have access to information from a higher number of alliances, receive more partnership opportunities, attract more reliable partners, access stronger capabilities and can negotiate superior contract terms due to information and control benefits.

Transaction cost theory

Combining and pooling resources through multiple alliances can also be considered an alternative to the traditional make-or-buy decision largely based on **transaction cost economics** (TCE) (Hennart 1991; Williamson 1991). As a fundamental principle of organizational design, organization research states that firms react to uncertainties and dependencies in their environment by internalizing transactions from markets and placing them in more hierarchical structures (Williamson 1975; Ouchi 1980). Although widely applied around the issues of alliance formation and governance, the dominant TCE approach has received attention and criticism in a number of studies and therefore remains out of the specific focus of this thesis:

(1) Researchers have begun to question the general TCE principle by demonstrating the increase of inter-firm market transactions with the rise in market uncertainty (Podolny 1994). Market uncertainty does not always lead to internalization of uncertainty within firm boundaries but rather to growing dependence on known and trusted external partners (Baker 1992).

(2) The TCE approach in its comparative analysis makes unspecific normative assumptions only within the boundaries of markets and hierarchies (Zajac and Olsen 1993). Transaction cost economics with its focus on tangible assets do not reflect the dynamic rent seeking behavior that utilizes distinctive capabilities and intangible assets such as learning and reputation (Barney and Hansen 1994). Alliances as a distinct form of governance are deeply embedded in multiple relationships and therefore do not fall in between the various market and hierarchy alternatives (Powell 1990).

(3) The static TCE approach treats each alliance as an independent and unrelated event. However, empirical evidence in many cases suggests that firms have extensive experience with each other by working side-by-side in multiple strategic alliances. The focus on one single transaction disregards the embeddedness in alliance networks and emerging processes from prior interactions (Ring and Van de Ven 1992; Gulati 1995a).

(4) Since the transaction cost theory focuses on structural forms of governance, significant process implications of ongoing exchanges and adjustments are neglected (Zajac and Olsen 1993). The focus on appropriation concerns due to contacting hazards and behavioral uncertainty leaves the issues of coordination costs unanswered. Empirical evidence suggests, however, that the choice of the alliance structure at the time of formation is very much determined by considerations around coordination costs incurred by the continuing harmonization of tasks between multiple partners (Gulati and Singh 1998).

Due to limited focus and concentration on short-term dyadic ties, the TCE approach seems to be inappropriate for explaining the transformation of networks and extensive dependence on inter-firm cooperation in this study. A cost focused approach overlooks the opportunities of intensive relationships and therefore fails to describe changes in the structure of inter-firm alliance networks. The complex reality of rapidly developing technological fields, in which knowledge is both sophisticated and widely distributed, exceeds the simple make-or-buy consideration. However, breakthroughs in technology, product or market development require the variety of intellectual and scientific skills of multiple organizations.

Based on this short review, combining strategic network theory with the emerging theoretical frameworks of the resource-based view of the firm will be more suitable to

thoroughly explore the sources of competitive advantages generated from the integration of competencies and the combination of knowledge across inter-organizational alliance networks (Lorenzoni and Lipparini 1999).

Bridging the gap: The concept of network resources

According to the described resource-based view of the firm, competitive advantage of firms is generated from the utilization of valuable, rare inimitable firm resources. Since the set of derived tentative propositions describes possible interaction effects of alliance networks with firm resources, conceptual frameworks used in this thesis extend the traditional perspective of the RBV to available network resources that are developed by a firm's participation in alliance networks.

Although studies of the resource-based view have highlighted the relevance of social factors and unique firms history (Barney 1991), the process by which firms actually create value-generating resources and the resources developing from firms' participation in inter-firm alliance networks have received limited attention. Therefore, exploring the source of value-creating resources and capabilities represents an important extension of the RBV and answers an important question regarding the origin of resources (Gulati 1999; McEvily and Zaheer 1999; Ahuja 2000b). A conceptual extension and subsequent definition of network resources uncovers additional and missing sources of value for sustainable competitive advantage.

Since network resources are determined by network structures, memberships and tie modalities, their inimitability has the potential to contribute to a firm's internal resources. Consequently, both the firm's network and the resources they allow to be accessed can generate sustainable competitive advantage.

Unlike traditional firm resources, network resources are not accumulated within firms but in inter-organizational networks in which firms are embedded. Due to their foundation on inter-firm networks, these resources do not reside securely within firm boundaries. The value of network resources depends on information access and control benefits of participating firms in inter-firm networks. Variations in these benefits can be linked to differing alliance network structures. Both the relevant industry context with implications on the resource value and the inimitability of the entire alliance

network have an impact on the sustainability and magnitude of the competitive advantage that can be generated from these benefits.

The importance of network resources ranges from facilitative to substantive depending on the industry context. In its facilitative role, network resources provide information on alliance formation opportunities and signal reliability to other partners on the merits of their historic collaborative behavior (Gulati 1995b, 1999). As an example of a more substitutive contribution of networks, coordinated dominant technical standards can facilitate the product justification of focal firms. Therefore, established alliances with appropriate firms can be a necessary precondition for the successful development and commercialization of technology (Kogut, Shan and Walker 1993; Galaskiewicz and Zaheer 1999). In industries with strong network externalities and competing standards, network resources have a higher potential for significant impact on company performance. In this study, the industry environment of information technology and telecommunications is very much dominated by network externalities and competing standards. *Intel Capital* and Microsoft make predominating technical standards a clear requirement for the selection of alliance opportunities. Growing customer bases in online service case studies require the adherence to standards for large volume mobile communication and meaningful customer profiling. Network effects can be achieved through interaction between growing online users, which benefit from the addition of members as potential communication partners.

Inimitability of alliance network resources can be traced back to its ambiguous, path-dependent and idiosyncratic nature. Causal ambiguity, very related to the described concept of complexity and specificity, is regarded as an important mechanism in the link between resources and superior firm performance (Lippman and Rumelt 1982). In a recent study of the chemical industry, (Ahuja 2000b) has shown that prior accumulated network resources do not influence performance directly, but determine the strategic options in the form of available alliance opportunities, which might enable increased performance. According to his study, differences in the opportunity sets defined as partnership options might be another alternative for establishing this causal ambiguity.

As network structures are developed and transformed through historical and evolutionary alliance formation patterns with multi-level effects on the frequency of

relationships, identity of partner firms and specific firm location in the alliance network, network resources are developed in path-dependent processes (Levinthal and Fichman 1988; Gulati 1995b; Walker, Kogut and Shan 1997; Gulati 1999), which describe the complete route towards an entire alliance network. The path-dependency also contributes to the complexity of network resources.

Referring to the specificity of firm and industry context, inter-firm coordination in alliance networks also follows defined organizational principles that can be idiosyncratic to alliance relationships and difficult to imitate as well. These partnerships define particular capabilities to speed up product development or minimize inventories (Kogut 2000). Therefore, competitive advantage does not only depend on the firm or alliance network structure, but also on organizational principles by which cooperation is coordinated and supported in the network. These principles outline how products are supplied or the process by which innovations are produced and shared. In Kogut's extension of the network resources, the network itself represents knowledge not in the sense of allowing access to distributed resources but in codifying coordination guided by continuing principles of the organization.

All case studies presented support this understanding of network resources: Over the course of network evolution, the principle of causal ambiguity is supported by varying alliance opportunities (Proposition # 9). Path-dependencies can be identified across all case studies of online service companies. The discontinuation of relationships (Proposition # 14) to content providers can be clearly linked to previous experience of unfulfilled user preferences. Particularly high-value alliance relationships such as minority equity stakes in city carriers (Proposition # 11) require an intensified customization of relationship in the form of functional boards, which represent the distinct idiosyncratic characteristic of this alliance network.

Inimitable and substantive network resources determined by network memberships, tie modalities and structures have the potential to generate sustainable competitive advantage and superior firm performance.

When relationship formation with one actor binds the focal firm in its ability to develop ties with other actors, lock-in and lockout effects have implications for network membership and performance. These constraints result from limited resources spent only on selected partnerships or expectations of loyalty to the alliance

consortiums demanding membership exclusivity. In particular, firms with superior bargaining power refuse to sign exclusive alliance agreements and forge multiple partnerships regarded merely as strategic options (Gulati 2000). Suggesting the value of specific network memberships, a resource-endowed partner has the potential to provide the focal firm with complementary capabilities: Afuah (2000)'s findings suggest that suppliers' capabilities significantly impact the performance of the focal firm. Depending on which network you are locked-in and out of, firm returns may also vary due to the fact that it is neither costless nor easy to shift across network groups. Since any single actor alone does not control the evolution of network structure, the early decisions by actors in the development of alliance network determines differences in benefits over time.

The modality of an alliance network, whether cooperative or opportunistic, strong or weak, multiplex or single, has clear implications for a firm's strategic behavior and performance. Network relationships as a resource provide valuable information and a competitive advantage by enabling action quicker than rivals in high-technology industries. Zaheer and Zaheer (1997) describe firm capabilities of alertness and responsiveness in the environment of information networks. Firms are highly alert when they create and leverage far-ranging responsive information networks with a majority of weak ties, high centrality and wide geographic scope.

Regarding the performance implications of network structures, Powell, Koput et al. (1996) find that companies which form a higher number of alliances experience increased growth rates. (Hagedoorn and Schakenraad 1994) also suggest improved innovation rates with entry into technology alliances.

In the industry contest of information technology, the alliance networks of all case study companies can represent a valuable source of sustainable competitive advantage and increased performance. The inimitability of alliance network resources is generated from its ambiguous, path-dependent and idiosyncratic nature, which can be found in the mature stage of collaborative networks.

3.2 Relationships of focal firm resources and alliance networks

Establishing an initial framework, the following chapter introduces relationships between focal firm resources and the ‘surrounding’ alliance network structures. Resulting from empirical observations, firms have the clear need for deliberate configuration of partner resources in their alliance network. Current focal firm resource profiles act as both important inducements and enablers for future alliance formation through multiple feedback loops. In this evolutionary process, alliance management capabilities and partner characteristics have implications for the formation of the entire partnership network.

Need for deliberate configuration of resources in the network

In response to high technology industry challenges of dispersed resources, high specialization and extraordinary variety described in chapter 1, several firms have to be integrated through specialization, dynamic learning and exploration (Kogut 2000). Researchers have recognized that a firm’s competitive advantage depends on tacit, inimitable collaborative relationships and the success of suppliers, customers, and all alliance partners with whom it must collaborate and compete (Singh and Mitchell 1996). Relationships to external parties are critical sources of innovations (Hagedoorn and Schakenraad 1994), organizational learning (Kogut 1988b) and capabilities (Kogut 1988b; Dyer 1996; Gulati 1998; Khanna 1998; Dyer and Nobeoka 2000). By pooling resources and capabilities with partners, firms can initiate projects with greater success and higher performance (Harrigan 1985; Burgers, Hill et al. 1993). But unlike firms, alliance networks without authoritative relationships cannot enforce their organizational structures on its members.

According to Kogut’s view, a supportive network structure follows operating principles that are derived from the inherent characteristics of popular industry technologies, social norms and institutional factors. As an example, biotech industries based on scientific technology tend towards rules that promote cooperation between research centers. These rules generate the structure of the network, which subsequently influences firm behavior and identity. Also certain differentiated capabilities or resource requirements result in industry rules that generate distinctive patterns in the structuring of a cooperative network. During the process of network formation, relationships develop informational properties and ‘signals’ that facilitate a matching

process between participating firms. During the process of network formation, knowledge is encoded in persisting structures that influence subsequent behavior in two different ways: A channel of information and the basis of coordinated action. Therefore, network structure is not only formed by exogenous factors, but also by the codification of competing and evolving rules that guide firm behavior.

As described in Proposition # 8, all four online service providers follow the rules of their industries in establishing the initial operational infrastructure. In the case of *Lycos Mobile*, channeling information that flows to these providers also encodes the developed experience of previously inefficient and complex coordination processes. But the knowledge embedded in these earlier cooperation structures does not automatically lead to higher value and resource intensive alliance relationships (Proposition # 9; Proposition # 10).

In the case studies of online service providers or *Elisa*, desired resources not only reside in the network structure, but also in focal organization itself (Powell, Koput et al. 1996). As a 'strategic center', *Tropolys* with developed alliance management resources can focus on the core internal and idiosyncratic activities, access specialized third party knowledge, coordinate external capabilities and potentially regulate trade between network partners (Lorenzoni and Baden-Fuller 1995). In this context, managerial decisions in strategic centers are clearly guided by internal alliance network objectives (Proposition # 1), which have an impact on the subsequent partnership network structure (Nohria and Eccles 1992; Madhavan, Koka et al. 1998).

Therefore, deliberately configuring internal resources and the subsequent external network, and not only Kogut's emerging operating principles in the telecommunications industry transforms a network of companies into specialists with dedicated roles. Facilitated by the deliberate search for and development of new internally created resources of the focal firms, these alliance network transformations involve intra-firm operational resources and alliance management resources, which lead to more aligned and converged relationships.

Development of focal firm resources: Inducements and enablers

Across all case studies, the motivation for alliance formation can be associated with the demand for resources. Through inter-organizational partnerships, firms can obtain access to resources that create value, are not available for purchase in factor markets and need significant time to be developed. Since the shared resources can be accessed through alliances without being separated from the firm, the inherent obstacle of tradability can be bypassed.

Since the value of internal resources depends on the nature and existence of network resources, firms utilize their relationships to mobilize complementary external firm resources that correspond to their internal capabilities. Organizations with broader network relationships receive higher returns on their internal capabilities, because they are in a position to identify and develop more rewarding opportunities (Burt 1992), to acquire complementary resources (Teece 1986) and to sell their production with better terms.

Since prior studies have only separately explored the performance impact of internal capabilities (Grant 1991) on network relationships (Hansen 1995; Uzzi 1996), the interaction effects between both factors have not been fully identified in an integrated approach. In line with prior studies, Lee, Lee and Pennings's (2001) study of Korean technology start-ups showed some positive correlation between the performance measured by sales growth and firm-level factors: entrepreneurial orientation, technological capabilities and financial resources. Regarding the issue of firm network relationships, from all the partnership-based linkages with other firms, venture capital companies, universities and research institutes, only the ties with venture capital companies have a positive and significant impact on firm performance. Interestingly, linkages to other enterprises do not have any effects on company performance. Classified as not performance relevant network relationships, sponsorship-related ties to financial institutions or government agencies also do not have a statistically significant effect on company performance.

As an important contribution, their study revealed interesting interaction effects between internal capabilities and two types of network relationships. Linkages to venture capital companies and universities have interaction effects with internal

resources in their impact on company performance. Since the relationships to universities have no main effects on new venture performance, the results suggest that due to the lack of internal capabilities these ties do not contribute to company performance. Only firms with existing internal capabilities can effectively absorb knowledge and technologies that are developed in alliances with university and research institutes (Cohen and Levinthal 1990).

In another study of innovation in the biotechnology industry, scholars showed that the firm's number of collaborative relationships and network position is positively related to its innovation performance as an indicator for technical capabilities (Shan, Walker et al. 1994). Broken down by alliance types, especially the number of commercial ties is positively correlated with the number of biopharmaceutical patents. Illustrating similar patterns, Dutta and Weiss' findings (1997) suggest that the level of technological innovativeness impacts the number of marketing and licensing agreements.

This observation is very much in accordance with case studies of all four online service providers. These companies initially build up their technical infrastructures and develop software applications to define the functionalities of their online services. Only after establishing technical capabilities and corresponding customer bases, these companies develop options to commercialize and market access to these customers, *Sonera Zed*, *Lycos Mobile* and *MSN* are highly involved with corporate customers to design and implement co-marketing campaigns.

The described research results contribute to the set of tentative propositions in two dimensions: Not all network relationships contribute to performance of young technology-based firms. Interaction effects between network relationships and internal capabilities have to be considered carefully regarding their effects on company performance. Growing alliance management resources (Proposition # 10) facilitate the appropriate selection of increasingly valuable alliance opportunities, which complement internal capabilities. The growth of these alliance management resources depends on learning from current partnerships (Proposition # 12).

The drawback in findings from Lee, Lee et al.'s and Shan, Walker et al.'s studies is the static approach of collecting measures for relationships, internal capabilities and performance only in a certain, defined timeframe. Since firm growth changes the type and extent of resource exchange as suggested in the tentative propositions, the

contributions of their studies have limitations. Alliance network formation for increased performance requires the growing availability and selection of appealing partnership opportunities.

Alliance formation opportunities depend on the possession of resources, which determine the firm's attractiveness to other firms (Proposition # 9). The attractiveness of potential partners is related to their ability to provide access to previously unavailable resources. Combining both theoretical perspectives on alliance opportunities and incentives, firms with a low level of integration in partnerships with a desire to form new alliances face the challenge of limited attractiveness and reduced alliance opportunities. Highly embedded and resource endowed firms have many partnership opportunities at their disposal, but the marginal contribution of additional ties diminishes. As a consequence, firms in the middle are expected to be the most active in the alliance formation process.

In a longitudinal empirical study of technical collaborative linkages in the global chemicals industry, Ahuja (2000b) has shown a positive correlation with the yearly number of linkages formed by firm and the level of internally available technical or commercial resources. However, the interaction of both commercial and technical resources has a negative impact on the number of relationships formed by a firm, which may suggest that the combined availability of multiple resources reduces the inducements of accessing partner capabilities.

These findings on diminishing returns of accessing external resources are in contrast to Proposition # 9 and Proposition # 10, which suggest constant growth in the resource exchange based on cooperative relationships. Previously acquired and internally developed resources are leveraged as a stepping-stone for an extended cooperative relationship, which again – after learning and internalizing resources – expand the 'option space'. The continuous expansion without a saturation effect might be due to the high-technology industry environment and constant product and business model innovation. Online service providers constantly launch additional product applications, and the city carrier group around *Elisa* and *Tropolys* pioneers a novel business model of consolidating local loop access providers.

Exploring a more related high-technology industry context, a study of emerging networks in the biotechnology industry underlines two key observations that support

the notion of the expanding ‘option space’ in network formation (Powell, Koput et al. 1996): (1) Inter-organizational partnerships are not only an option to compensate for the lack of internal resources (2) nor should they be regarded as a sequence of discrete transactions. A firm’s value and ability as a partner is related to its growing internal assets, but – at the same time – alliances enhance and continuously expand those internal resources. Learning from collaboration makes a firm realize the need to access innovations and information from a variety of external actors – for example – to exploit research findings in a commercial context. Both skills and experience are needed to develop the resources to benefit from interdependencies across diverse partnerships and to balance a portfolio of partnerships.

In a longitudinal approach, thier findings suggest that the formation of R&D and non-R&D alliances provide an exploration starting point for developing the capability to manage partnerships. R&D alliances directly or through increased experience provide access to more diverse sources of collaboration through subsequent commercial alliances. The development of experience in managing partnerships enables the firm to become more central, which has two separate effects. Centrally located firms have access to information and resource flows for subsequent firm growth. Furthermore, centrally located firms pursue the initiation and continuation of additional R&D alliances. Powell, Koput et al. also show that standard organizational measures such as age or size appear to be secondary in accounting for patterns of collaboration: Neither growth nor maturity reduce the likelihood of engaging in alliance formation.

Their findings underline empirical observations in all case studies: Focal companies continuously grow their operational and alliance management resources. Neither a clear-cut or discrete phase in the development of technical or marketing resources nor fundamental adaptations in the direction of network formation behavior can be detected. Furthermore, growing internal resources expand the option space and allow for additional alliances of diversity functionalities. The transition from technical alliances to commercial alliances capitalizing on initial development results has been suggested by (Powell, Koput et al. 1996). This pattern can also be demonstrated in all case studies of online service providers, which might justify additional research in the development sequence of internal resources.

In Ahuja's study, alliance formation activities seem to increase with the size of the firm's alliance network. However, a curvilinear relationship between previous alliance network size and current alliance formation rate, which suggests diminishing benefits, has not been identified. Diminishing returns and a downward sloping effect in the alliance formation rate have been justified with the theoretical assumption of increasing saturation in an over-embedded alliance network, which lacks informational diversity for the focal firm.

The theoretical perspective on over-embeddedness into dense alliance networks ignores that according to important empirical observation in this study (Proposition # 9; Proposition # 11) consecutive and close partnerships give access to an even broader range of resources. The broad range of resources facilitates extended focal firm learning and acquisition of external resources, which allows for diversity in information and resource access. In a ranking of all three types of focal firm resources, the availability of commercial capital, technical and alliance network resources in descending order has a positive impact on alliance formation.

Ahuja's study determined alliance network resources as a good predictor of joint venture formation, but not of technology agreement formation. As a reasonable explanation, the more selective search process for research and development agreements is not facilitated at all by generally unspecialized and unfocused network resources. In contrast to specific research agreements, broader joint ventures involve a higher level of operating flexibility and generally greater interdependence, which raises the potential facilitation of alliance network resources. The results in Ahuja's study underscore missing support of network resources in the selection process of highly specific and valuable partnerships.

In *Lycos'* and *Sonera Zed's* search process for co-marketing agreements, previous relationships to technical and content partners cannot be leveraged for additional high value alliance formation. Marketing agencies – in touch with corporate advertising customers – establish the desired initial contact. For specific and tailored agreements, alliance network resources show diminishing informational benefits in the search process for highly specific and tailored partnerships. As described in tentative propositions, previously developed internal operational and alliance management

resources (Proposition # 9; Proposition # 10) are also needed to attract, select and advance high-value partnership opportunities.

Development of facilitative alliance management capabilities

Since alliances can be viewed as incomplete contracts between firms without full specification of resource exchanges between partners, theoretical literature suggests that cooperative relationships tend to be difficult to manage. One reason might originate in inter-firm knowledge transfers, an important component of many alliances. The studies on knowledge transfer in alliances recognize the conflict between competition and cooperation (Hamel 1991; Gulati, Khanna et al. 1994; Khanna 1998). Related research has developed a classification of alliance learning strategies (Larsson, Bengtsson et al. 1998) informed by case studies on how learning unfolds in an alliance (Doz 1996; Arino and De La Torre 1998) in these environments.

Consistent with the relational view and in recognition of the described challenges, Lane and Lubatkin (1998) consider the capabilities to manage external relationships very important in competitive environments. A growing alliance network, internal knowledge and resource acquisition support the focal firm in developing alliance management resources and in coping with challenges of inter-firm cooperation (Proposition # 2; Proposition # 10; Proposition # 12). Due to the outlined challenges, the concept of learning can be defined as improvements in the ability to anticipate and respond to contingencies that cannot be specified in formal contracts (Anand and Khanna 2000).

Although so far scholars have primarily used resource-based arguments for the explanation of performance differences, observed resource variations and evolution can also represent the foundation of differences in firm behavior (Kraatz and Zajac 2001). Since the management of alliances is not a very defined process, various differences across firms exist in the capability or resources to manage these partnerships. Firms possess routines and capabilities when they have managed to perform a certain function that is distinct from a comparable group (Nelson and Winter 1982). Such knowledge is often described as tacit, which makes it inaccessible to other firms.

By repeatedly participating in alliance formation and development activities, firms can develop capabilities as a result of historical learning processes (Dierickx, Cool et al. 1989; Barney 1991). Firms can build up refined organizational capabilities from repeated experience and exploit existing capabilities (Levinthal and March 1992). Organizational theory argues that firms are driven by routines, repeatedly engage and gradually improve a comparable set of activities (Nelson and Winter 1982; Amburgey, Kelly and Barnett 1993). Therefore, organizational procedures and activities of alliance management can be set up, developed and established within the firm's regular routines (Westney 1988). Especially with an increase in the number of alliance relationships (Proposition # 2), all focal firms seem to show comparable patterns of developing alliance management capabilities.

Evolving firm behavior illustrates a growing sophistication in alliance formation activities and management activities. With availability and the selection of more resource intensive alliance opportunities, alliance management resources are instrumental in assessing resource transfer implications on multiple levels, in balancing resource contributions, in drafting complex contractual arrangements and in tracking their implementation. On the operational level during the implementation of the agreement, alliance management resources support the early sharing of critical information, the continuous day-to-day exchange of technical feedback and the mutual understanding of alliance benefits (Lorenzoni and Lipparini 1999). In this respect, the sophistication of alliance management resources has to keep up with level and quality of alliance opportunities induced by growing operational resources (Proposition # 10).

Especially high value partnerships are based on complex organizational agreements, demand extended efforts to identify partners, require sufficient authorization from many organizational levels, complex contract negotiations and a certain level of management attention to maintain the relationship (Gulati, Khanna et al. 1994; Ring and Van de Ven 1994; Doz 1996; Kale, Singh and Perlmutter 2000). Building up and maintaining an alliance network require the selection of appropriate governance mechanisms, the development of inter-firm knowledge sharing routines, relationship-specific investments and initiatives for necessary changes to partnerships during their evolution (Dyer and Singh 1998).

As evidence from previous research on strategic alliances (Lyles 1988; Amburgey, Dacin and Singh 1996; Dyer and Singh 1998; Anand and Khanna 2000), research results suggest that benefits of experience can be transformed into dedicated alliance management resources. In building up dedicated alliance management capabilities, firms develop standardized procedures facilitating the creation of new alliances and they establish organizational units supporting the creation and management of strategic alliances. Standardized procedures clarify decision-making authority, set guidelines for projects considered appropriate for the alliance, specify the company-wide legal framework for alliances and create a checklist of issues to be considered for the future management of alliances (Gulati 1999). Dedicated organizational units provide information in legal and managerial templates to respective departments considering alliance formation. They also serve as an interface to the legal department and provide guidelines in selecting a partner. In some cases, these units also distribute information about alliances as a strategy to department management and scan the market for new alliance opportunities. As senior management becomes more familiar with the systems and structures to simplify alliance formation, they can more openly accept these ties as strategically valuable.

All case studies in this thesis show similar patterns of developing standardized procedures and establishing dedicated organizational units with an increasing number of alliance formation activities (Proposition # 2). The majority of prior studies have focused on the process of learning within a particular partnership. Anand and Khanna (2000) extend this scope to the entire portfolio of alliances and focus the capability of managing a multitude of dense, repeated and extended inter-firm linkages.

Based on stock market reactions and firm valuations, their results suggest that firms forging a greater number of alliances seem to obtain more of the benefits created relative to their partners. In a related study, Gulati (1999) has found that more centrally located firms with a longer alliance history have developed much broader alliance experience. Utilizing this experience for inter-firm collaboration, these firms are more likely to form additional partnerships. Although past experience has a significant impact, the diversity in terms of partner country and governance forms had no significant impact on alliance formation rates. No impact of alliance diversity could support the assumption that managing a diverse set of alliances and partners is not as important for firms as the experience of a larger number of such partnerships.

However, based on empirical accounts of case study firms, Proposition # 2 and Proposition # 12 suggest that the development of alliance management resources depend on both the frequency of formation activities **and** learning from the increasing diversity of partnerships. Especially the value of partnerships with increasing diversity and intensity of deployed resources (Proposition # 11) mandates and develops a growing set of alliance management resources. Therefore, the mere frequency of historic alliance formation behavior illustrates only a limited aspect of firm behavior. Evolving capabilities in managing partnership networks are also required to prevent inertia in alliance formation behavior: Two firms usually develop specific routines to manage their relationship (Gulati 1995a), they are inclined to exclusively focus on these routines and may ignore alliance formation opportunities with new firms.

Prospective partner capabilities: Complementarity as an inducement for alliance formation

In the environment of high innovation and change, relationships to external parties are relevant for focal company performance (Afuah 2000). Although firm's network ties with suppliers and customers can be utilized the source of competitive advantage in exploiting existing technologies, but it can also become burdensome in an environment marked by rapid technological change. Especially in high growth industries (Teece 1986), firms form partnerships to access complementary capabilities, to ensure timely product introduction and to command a wide scope of capabilities across many different firms. Across the entire partnership portfolio, the capabilities of partner firms are therefore expected to have profound effect on alliance network formation and performance.

Also according to the theoretical network perspective on strategic alliance, research results suggest that partner firms' attributes are likely to interact with the characteristics of the alliance partners and subsequent performance: Mitchell and Singh's (1996) findings indicate that organizational mortality as a firm performance variable decreases when its strategic partner ceases operations or establishes a new partnership with another firm. Stuart's (2000) findings from the partnerships in the semiconductor industry suggest that firm performance not only depends on the number of alliances, but also on the detailed characteristics of the partner: Since alliance relationships are regarded as access and reputation relationships, size and

innovativeness of the partner firm have a positive impact on focal firm performance in terms of innovation and revenue growth rates. Despite the risks of opportunistic behavior, the study findings also suggest that alliances can be significant benefits even when they fail to reach their objectives that led to their formation. The reason for this is that a focal company's reputation may be upgraded by passing the due diligence process of a prominent partner, particularly if the focal actor is a young or small organization.

The increasing reputation of later stage external partners of *Zed*, *Lycos* and *MSN* underlines the enhanced value: Fast-moving consumer goods companies, technology firms and media houses turn to these start-ups for more resource exchange-intensive co-marketing and advertising alliances. In this process, a broad set of resources such as product specifications and brand equity is exchanged based on these cooperative arrangements (Proposition # 9; Proposition # 11).

The prospects of increasing performance with partners of selected capabilities have their impact on preceding alliance formation activities: The current resource base of the partner firms, conceptualized as strategic relatedness and resource complementarity (Tsai 2000), represent important factors for the likelihood of partnership formation: Strategic relatedness describes the extent to which two organizational units are strategically similar and determines an opportunity for sharing strategic resources between the two units (Rumelt 1974; Teece, Rumelt, Dosi and Winter 1994). Two strategically related units have common interests and are motivated to exchange information and resources in a beneficial way. The results of Tsai's (2000) study suggest that inter-organizational units with a high degree of network centrality and strategic relatedness are more prone to create a new inter-unit linkage. In addition to prior network centrality, trustworthiness strongly impacts the rate of new linkage formation between two strategically related units.

As a second factor, scholars have also emphasized resource complementarity between firms as a driver for alliance formation with additional benefits from pooling resources (Nohria and Garcia-Pont 1991). Although some studies suggest positive monotonic relationships between the number of prior relationships and the likelihood of forming repeated partnerships for the same complementary capabilities, there are arguments and supporting evidence for different relationships in the context of resource access:

Gulati (1995b) argues for a U-shaped relationship between prior ties and alliance formation due to potentially diminishing returns from a growing number of ties. As the number of interactions between two firms increases, additional exchange provides less information about the partner and consequently there is a reduced opportunity for additional partnership formation.

In contrast to this perspective, Baker (1990) and Uzzi (1997b) suggest that the optimal strategy for firms in building up ties with other firms requires the utilization of both arms-length ties and strong or embedded ties. This strategy mandates an inverted U-shape relationship between the number of prior ties and the likelihood of future alliance formation: Firms that rely on a few partners are limited in the number of partners with whom they can exchange information and form alliances in the future. These firms forego the advantages of arms-length relationships such as accessing diverse information (Uzzi 1997b) and negotiating competitive prices, which both result from competition between partners (Baker 1990). Therefore, dependence on a few partners reduces the capability to adapt to future uncertainties and decreases firm performance. However, frequently replacing alliance partners may also not be an optimal strategy. A firm adopting this strategy decreases dependence on some alliance partners and takes advantage of competition, but it cannot build up long-term, trustful relationships with other firms, because these firms will have no incentives to contribute their resources. Long-term, trustful relationships could be used to gain critical information and to create new economic opportunities.

As a compromise, firms guided by the balanced strategy will extend more opportunities to their long-term alliance partners until a certain level of dependence has been reached. As a result, this strategy will result in inverted U-shaped relationships between the number of prior ties and the likelihood of forming new alliances.

As empirical evidence this relationship, Baker (1990) shows that large industrial firms interact exclusively with neither a few nor as many banks as possible. A recent study of the U.S. investment banking industry in managing public offerings (Chung, Singh et al. 2000) shows that both resource complementarity and the developed alliance network resources have an effect on the likelihood of future alliance formation. In line with theoretical predictions, the role of alliance network resources in alliance formation intensifies as market uncertainty increases. But alliance partners are also

more likely to form partnerships with firms that complement their weaknesses (Gulati 1995b; Chung, Singh et al. 2000) and therefore increase the possibility of generating synergies. Prior ties prove to be valuable predictors of probability of firms to form partnerships (Chung, Singh et al. 2000): Direct and indirect ties have an inverted U-shape relationship with the likelihood of further alliance formation.

Resource complementarity and a balance between weak ties and strong ties generates the alliance portfolios identified across all online service providers in this study: At the more mature stage of their development, weak relationships to infrastructure and content providers as well as strong ties to co-marketing, advertising and development partners characterize the portfolio.

3.3 Implications of alliance network resources for partnership formation and evolution

Missing and developing focal firm resources motivate and enable alliance formation and subsequent development into an entire network, as described in chapter 3.2. The growing and emerging network as a feedback mechanism has implications for further alliance formation, evolution and collaboration between partners. The first section of this chapter elaborates on the effect of the mere alliance network structure on future alliance formation. The subsequent section sheds light on the trade-off between densely interconnected and structural hole rich networks. As any focal actor with influence on its network structure has to compare benefits and costs of these alternative network structures, the effects of environmental interdependencies and intended degree of exploration – explained in the remaining two sections – have to be considered as important factors.

Implications of current structures for future partnership formation

Since alliance networks shape the flow of information (Granovetter 1985; Baker 1990; Mizuchi 1992, 1996), the benefits of cooperative networks reduce certain challenges in the selection of partnership opportunities and formation of alliances. These challenges originate from the difficulty to obtain information about competencies, needs and reliability of potential partners (Stinchcombe 1990). Inadequate information about potential partners increases the search costs and the risks of exposure to opportunistic behavior (Gulati and Gargiulo 1999). Over the course of network evolution, embedded relationships are accumulated in a growing, trusted and rich repository of information on the availability, competencies and reliability of prospective partners (Powell 1990; Gulati 1995a; Powell, Koput et al. 1996). An iterative process of information internalization motivates firms to rely on the network for information about potential partners for future partnership decisions. Newly embedded alliances increase the informational value of the network, enlarging its impact on further alliance formation.

Consequently, embeddedness in inter-organizational networks (Baker 1990; Podolny 1993; Powell, Koput et al. 1996; Gulati and Gargiulo 1999) influences the number and quality of additional alliance opportunities, which has subsequent implications for both

firm behavior and performance. Embeddedness in alliance networks has a positive impact on partnership formation opportunities by utilizing three mechanisms.

First, highly embedded firms can gather information about alliance opportunities from their partners (Gulati 1995b). Firms searching for partnerships can discuss their needs with their partners. These partners can forward this information to others within their alliance portfolio. Over time, embedded relationships develop informational properties that enable firms to gather information about alliance formation opportunities (Kogut, Shan et al. 1992; Gulati 1995b; Powell, Koput et al. 1996). In the process of selecting alliances, firms need to minimize risks of moral hazards by first being aware of needs and requirements of potential partners and second by obtaining information about the reliability of these partners (Balakrishnan and Koza 1993). The risk associated with partnerships (Doz, Hamel and Prahalad 1989; Kogut 1989; Gulati, Khanna et al. 1994) poses significant information hurdles in the creation of alliances. The access to valuable information can both lower the search costs and reduce the risks of opportunism, which in turn make firms more inclined to additional alliance formation. Second, the embeddedness into an alliance network serves as an indication of reliability. Partnering with multiple organizations supports the focal firm's reputation as an attractive collaborator. Partners can serve as an indicator for capabilities and behavior of the focal firm. For potential partners it is less risky to deal with a highly embedded firm on whom information is available, than transacting with firms whose partnership behavior is unknown. Third, the embedded firm signals potential access to other highly embedded actors (Mizruchi, Mariolis, Schwarz and Mintz 1986). In this perspective, embedded focal firms provide not only their own resources but also a way to access capabilities of other organizations.

In their longitudinal study of network formation, Gulati and Gargiulo's (1999) results suggest that organizations with a higher number of prior direct and indirect alliances demonstrate a higher propensity to form alliances with each other. Moreover, firms more centrally embedded into alliance networks or with structural differentiation in their inter-organizational network increase their probability of forming a new alliance. Structural differentiation is defined as an emergent systemic property that captures the extent to which actors obtain identifiable sets of network positions, which are all characterized by a differentiated relational profile and are defined by an increase in network centralization. Since the position in an alliance network conveys its

willingness, experience and ability to form partnerships, higher structural differentiation of an emerging network conveys clearer information on the firm's relational profile and potential alliance partners.

Structural differentiation reduces the impact on environmental interdependence and increases the effect of network centrality on potential alliance formation. Reduced effects of interdependence are due to increased reliance on differentiated alliance network structures as the information repository in the search for potential alliance partners. The emerging network internalizes relevant information about competencies, needs and reliability of potential partners.

Relying too much on an evolving alliance network structure in later stage partnership formation decisions could represent an obstacle for selecting appropriate alliance partners with complementary resource profiles (chapter 3.2), since firms could select well trusted but inferior partners with limited resources and capabilities. Termed as the 'dark side' of network ties, Gulati and Gargiulo (1999) suggest that some features of strategic alliances illustrate that this trade-off is more than a theoretical possibility. Hazards of inter-firm partnerships together with difficulties in assessing complementary capabilities and the unclear relationship between alliances and firm performance may entice firms to form secure alliances without the full potential.

This facilitative function of generation alliance formation opportunities can be observed in a number of case studies in this thesis: *Intel* as well as *Sun* and *DLR*, *E-plus* and *Sonera Zed* recognize the increase in the number and quality of partnership opportunities, that are conveyed through the current set of partners. However, receiving partnership opportunities and actually mutually committing resources in an exchange between partners are two different things. The availability of valuable resources within the focal firm (Proposition # 9) boundaries represents a more important precondition for forming an alliance of balanced contributions and joint benefits. With greater shifts in alliance formation activities, the dependence on internal resources becomes even more apparent. *Lycos'* and *Sonera Zed's* co-marketing alliances with corporate customers in largely unrelated industries of consumer goods cannot be facilitated by earlier partnerships to infrastructure providers. Other internal capabilities and very selective search processes with the help of external marketing

agencies are required to establish an alliance in a completely new technological and commercial domain.

However, it is reasonable to assume that due to the increase in the number and quality of alliance opportunities based on Gulati and Gargiulo's findings (1999), the theoretical assumptions may very likely be traced back to growing centrality and structural differentiation of alliance networks in this study. Missing data on secondary ties in this study makes an comparison difficult at this stage. However, the 'dark side' of network ties can clearly not be illustrated through findings in this study. Later stage cooperative relationships clearly expand previous firm resources and add a significant magnitude of valuable resources to all case study companies.

On structural differentiation, Gulati and Gargiulo (1999) also note that emerging networks may not always evolve into structural patterns that can be easily discriminated. In extremely dynamic, innovation-driven information technology and telecommunications industries with benefits from alliances for almost every player, the evolution of an emerging network may not reveal any structural differentiation or higher centrality. In this environmental context, no single company clearly has superior command of much needed resources and can guide network formation.

Their study assumes that the evolution of an inter-organizational network structure results from a longitudinal dynamic in which action and structure are closely intertwined. Their models describe the social structure of inter-organizational relations from a bird's eye perspective without focusing on firm-level decisions to get access to resources and to minimize uncertainty. In line with these arguments, Gulati in a related article (1999) considers the inter-organizational network structure only as an enabling condition for alliance formation in which only the second step of alliance implementation may influence firm behavior, allow resource access and improve performance. Alliance network research so far has concentrated on alliance formation from the perspective of missing resources and superficial alliance formation, scholars have paid less attention to the important availability aspect of alliance opportunities and external firm resources, which are highlighted in this study.

Dichotomy of alternative alliance network structures: Balancing costs and benefits

The developing literature on network resources has highlighted network's facilitative role (Burt 1997; Gulati 1999) with their benefits from increased trust, information, and power. However, scholars have been unable to agree on the form of social structures that constitute beneficial network resources, since both strong and weak ties as the relational embeddedness component are considered to have positive effects on firm performance.

Normative recommendations range from densely interconnected networks (Coleman 1988), structural hole rich networks (Burt 1992) to a network with only direct ties (Brass and Burkhardt 1992). Densely interconnected alliance relationships enable trust and fine-grained information exchange between partners (Krackhardt 1992; Larson 1992; Uzzi 1996), but reduce access to diverse and innovative insights. Networks with a high number of structural holes lead to diverse and innovative information (Granovetter 1973), but limit the potential for increased trust. Partners with exclusive ties to other actors can leverage power benefits, but secondary partners can enhance the informational reach within the network.

An established principle of organizational design helps to assess the value of competing benefits of network structures: The optimal structural design depends on the actions that the structure seeks to facilitate (Lawrence and Lorsch 1967): Non-overlapping network relationships (Burt 1992) support an organization in a brokerage position with diverse access to information and technology (Hargadon and Sutton 1997). As a contrast, the densely connected network can be utilized to face a common external threat and to set standards in the high-technology industry (Oliver 1990; Kogut, Walker and Kim 1995). Several categories of benefits and costs of inter-firm networks depend on the informational advantages of the distinct network structure.

(1) Motivated by self-interest, benefits from competition are derived from non-redundant ties (Burt 1992), which leave structural holes between actors and can be leveraged for powerful brokerage positions. Structural holes by definition represent gaps in information flows between partners linked to the same focal actor but not to each other: Achieving control benefits, firms bridging structural holes can arbitrate information flows between firms in this more hierarchical structure and finally accrue

the rent for their behavior. Networks with a large number of structural holes ensure access to mutually unconnected partners and differentiated information flows (Hargadon and Sutton 1997). According to this perspective, increasing the number of structural holes by decreasing the redundancies in relationships represents an important characteristic of constructing efficient, information rich alliance networks (Burt 1992). A network of weak ties represents an information channel for the access to novel information, since these ties provide benefits through efficient access to divergent regions of the network rather than to a connected set of firms (Granovetter 1973).

(2) Alternatively, competing alternative benefits result from redundant ties in the facilitative effect of collective problem resolution (Coleman 1990). Coordination is improved through repeated exchange among stable actors in the network. The overall network structure tends to be flatter and yields rents for all network members depending on the quality of the interaction and relative bargaining power: Firms combining their skills, exchanging high-quality information and tacit knowledge (Uzzi 1996), committing alliance relevant investments and conducting joint projects, generate resource-sharing benefits, which require the existence of significant trust between partners. Trust addresses not only the coordination costs for managing complex tasks across organizational boundaries (Gulati and Singh 1998) but also the issue of appropriation concerns.

In the exchange process for fine-grained information, partner firms gather information about each other's organization, become more dependent on one another and develop relational trust (Larson 1992). Trust between alliance partners facilitates extensive resource sharing, develops common behavioral standards and explicit knowledge sharing routines (Uzzi 1997a; Walker, Kogut et al. 1997; Dyer and Nobeoka 2000). Shared behavioral norms in turn again facilitate efficient knowledge sharing, skill combination, and commitment to large-scale investments (Walker, Kogut et al. 1997). Joint partners can also communicate the norms of expectations and responsibilities in the process of linking previously unconnected firms (Gulati 1995a; Uzzi 1997a).

Implementation of extensive resource sharing requires intense and ongoing information exchange (Auster 1992) and facilitates joint problem solving (Uzzi 1997a, b) based on growing embeddedness in firm partnerships. Ongoing information exchange requires repeated and regular meetings between partners, a focus on

specified objectives, coordination, close contact and mutual dependency (Gulati and Singh 1998). Scholars suggest that repetitive exchanges provide the basis for even stronger ties (Ring and Van de Ven 1994; Gulati 1995a; Doz 1996). Focused on specified objectives, it implies that these ties will be used to communicate a narrow range of issues relating to the goals of collaboration (Rogers and Kincaid 1981). Extensive exchange indicates that both partners have a great incentive and opportunity to share information (Granovetter 1973, 1982; Krackhardt 1992). Representing a strong incentive, multiple trust-based relationships with key suppliers enable the access of lead firms to complementary capabilities and specialized knowledge with a positive effect on the networks as a whole (Lorenzoni and Lipparini 1999). These positive effects could potentially lower the overall coordination and production costs of the network with key external partners or suppliers.

In addition to intensive resource sharing, strong ties promote trust, serve as control mechanisms and govern partnership behaviors. Due to limited control mechanisms, firms participating in an inter-organizational alliance face the risks of opportunistic behavior (Williamson 1985). Formal contracts are often ineffective governance mechanisms, because they cannot fully cover all contingencies and may even undermine collaborative efforts. Studies of supplier relationships in packaging industries (Lorenzoni and Lipparini 1999) suggest the important role of trust in the protection of core capabilities. Especially in networks of horizontal orientation, coordinating multiple partnering firms faces the additional challenge of a heightened threat of opportunistic behavior (Gulati and Singh 1998). Trusted inter-firm relationships are expanded by a sense of community, daily activities in knowledge access or joint development projects. Trust lowers the risk of knowledge dispersion and ensures commitment of external network participants to remain bound to specialized competencies and components of the production process.

A closely connected alliance network can also play a safeguarding role in limiting opportunism (Coleman 1988; Walker, Kogut et al. 1997; Rowley, Behrens et al. 2000). In closed networks, information about opportunistic behavior is widely shared among all network actors, and sanction can be more easily imposed (Walker, Kogut et al. 1997). Potential reputation loss will also discourage firms from engaging in any opportunistic behavior with any single actor in the network. On the positive side, strong ties gradually enhance trust and mutual benefits and promote norms of

reciprocity. Reciprocated exchange of economic opportunities focuses on only a few selected partners, which serve as key informants of new business opportunities. Accepting the principle of reciprocity, an alliance partner shows its willingness to both share the benefits of good economic opportunities in the uncertain future and to bear the possible risks and costs involved in collaboration. This willingness becomes a fundamental basis of trust and a long-term relationship between partners. By behaving reciprocally, a firm can build up a reputation of being a good interaction partner, which makes the firm a very attractive alliance partner to third parties (Coleman 1990). Focused on the long-term perspective, partners downgrade their own individual short-term interests and develop joint problem-solving approaches. Strong ties are governed by relational trust and norms of mutual gain and reciprocity, which are developed through a history of interactions (Powell 1990; Larson 1992).

Positive effects of increased integration in alliance networks may be challenged by disadvantages of saturation (Kogut, Shan et al. 1992): Additional linkages with partners in an industry network place a burden on its management. With evolving alliance networks, the described benefits improve only marginally and the costs of maintaining partnerships increase drastically (Harrigan 1985). Many firms also face the challenge of limited resources and managerial attention to further develop partnerships. (Walker, Kogut et al. 1997) also mention that a Coleman network faces the challenge of possible search limitations and the reduction of variety. As norms spread across this network structure, deviant behavior and innovation is suppressed (Coleman 1988), alliance networks with dense connections can limit a firm's openness to information and to alternative ways of doing things. While some studies see the 'over-embeddedness' as a potential disadvantage (Portes and Sensenbrenner 1993), other more recent studies (Gulati 1999; Ahuja 2000b) have not found this effect of diminishing returns or disadvantages.

All case study firms utilize their alliance network partners to innovate or develop product applications, business models or organizational settings. As discussed above, the suggested alternative effects of network structures support two opposing predictions with respect to alliance network structure benefits. The focal actor's access to diverse information is traded off with the promotion of trust and the reduction of opportunism for more intense resource sharing. These trade-offs between alliance

network structures can only be re-evaluated in the context of actions that the structure seeks to facilitate.

In the assessment of alternative network forms based on changing rents, entrepreneurial brokers due to structural holes capture the rent for increased efficiency in the overall network. Net welfare gains to the network depend on the alignment of incentives that allow actions in collective interests. Burt (1997) has demonstrated that entrepreneurs who improve internal coordination by controlling scarce resources generate significant rents and improve the welfare of the entire system.

Coleman's rent depends not on informational efficiency, but on dense relationships that facilitate monitoring and coordination by matching incentives to contribution. A dense network also enables the sense of collective identity that supports coordinated exchange. Regarding the issue of alliance benefits, Coleman (1990) differentiates between independent and global viability in network associations. Independent viability is based on contributions of individuals to an organization such as closed network with a proportional reward. Global viability, which does not represent a sustainable basis for an organization over time, rewards actors at their reservation price of persistence in a network, allowing for intra-organizational payments to members in an amount that violates rules of proportionality. Whereas Burt implies that group rent is transferred to the broker, a Coleman network assumes that benefits of superior coordination must be distributed in ways to assure participation. Therefore, different concepts of network viability represent a critical distinction between the two types of networks.

Trade-offs of network benefits may explain contradictory empirical findings in alliance network research with respect to innovation, which are also relevant in the context of this study: In the environment of scarce resources, firms can pursue only a limited number of technologies and product innovations, but the network can improve the firm's access to information with benefits in two different forms: Open networks can serve as an information gathering device for the success and failure of many simultaneous research efforts (Rogers and Larsen 1984). On the other hand, a dense network of firms can be leveraged as information for processing and screening (Leonard-Barton 1984). Each additional partner firm can provide information processing, absorption and classification of new developments in addition to the

information processing capability of one single firm. Relevant developments in different technologies may be brought to the firm's attention through its relationships. Faced with specific development obstacles, a focal player can structure and activate its network to identify the resources that are well informed about the specific innovations (Freeman 1982).

In a process study of innovation, (Hargadon and Sutton 1997) illustrate how a firm uses its position in a network configuration with multiple structural holes to develop new products. In study of firm networks in the chemicals industry, Ahuja (2000a) found that an increasing number of structural holes can be related to reduced innovation output. Although Hargadon and Sutton (1997) suggest benefits of loosely connected networks, Ahuja's study differs in the fact that the network consists of collaborative linkages between firms in the same industry. Hargadon and Sutton's network actor operates as a network broker and does not require resource sharing and collaboration of interconnected, closed networks in the less innovative and commodity driven chemicals industry. The desired informational context determines the relevancy of structural holes: The development of more intense collaboration and reduction of opportunism requires the closed network structure. Quick access to diverse information requires the advantages of the alliance network's high ratio of structural holes.

However, many case study companies in this thesis (*Lycos*, *Sonera Zed*, *Elisa* and *Tropolys*) reassess, modify and discontinue their earlier technical, content and city carrier partnerships (Proposition # 13; Proposition # 14), although time and interaction has passed to build up certain levels of trust. Since some of these selective reviews lead to the discontinuation, renegotiation and internalization of alliances, the earlier involvement in alliance formation for these providers of mainly commodity services clearly has not shown benefits for them: Process internalization of initially provided services and discontinuation of relationships obviously results in lost business and further revenue potential.

Early suppliers of *Lycos* and *Sonera Zed* do not play an important role in continuously identifying opportunities of new technology applications and in giving access to ideas. As illustrated in these case studies, the lack of supplier capabilities greatly reduces the focal actor's motivation to expand relationships over the previously defined scope. This observation clearly illustrates that not only embeddedness in relationships, but

also continuously maintained relevance, generate incentives for ongoing collaboration and long-term commitment. Growing resources of online service companies and the *Elisa* and *Tropolys* group made some partnerships obsolete. As studies in manufacturing industries demonstrate, utilization of external partners for defined services and product components reconfigures the competencies of the focal firms. Reducing the overall mutual dependency by improving external parties' capabilities, increased network flexibility reduces the relative stability of all cooperative relationships (Lorenzoni and Lipparini 1999).

Alliance network evolution: Stages of transformation

Although scholars have reached broad agreements regarding the importance of alliance networks for firm growth and success (Dyer and Singh 1998; Gulati and Singh 1998), the short review of empirical studies and conflicting theoretical predictions in the previous chapter illustrate that there is considerably less agreement about the most advantageous network characteristics. However, the described opposing views may become redundant because the great majority of network research has examined firm networks from only a single, static point in time (Hite and Hesterly 2001).

As firms dynamically progress and develop, they require new and additional resources to support continued growth. An evolutionary understanding of resource needs suggests a more dynamic approach to the analysis of alliance networks, which may reconcile opposing network perspectives. Previous studies have already reached agreement on some important issues: As outlined above, networks can have both beneficial and also constraining implications. Changing benefits and constraints have an impact on the dynamic evolution of alliance networks.

On the issue of network dynamics, the question of whether network creation will always follow single linear processes is of particular interest. Prior research on the formation of networks has, in many cases, described the context for the evolution of networks (Burt 1992; Nohria and Eccles 1992; Powell, Koput et al. 1996; Gulati 1998): Scholars have related differences in initial conditions to network characteristics without focusing on the actual formation processes. Initial conditions have been conceptualized as environmental dependencies (Pfeffer and Salancik 1978; Doz 1996; Madhavan, Koka et al. 1998), similar interests (Powell 1990; Powell, Koput et al.

1996) and triggering identities (Lorenzoni and Baden-Fuller 1995; Dyer and Nobeoka 2000).

Selected case studies of network formation (Browning, Beyer and Shelter 1995) or conceptual models (Zajac and Olsen 1993) illustrate the sequence of formation activities, but have not generalized beyond empirical observations. Case studies on formation processes (Larson 1992; Ring and Van de Ven 1994; Doz 1996; Gomes-Casseres 1996; Arino and De La Torre 1998) have identified the sequence of activities, but vary greatly in the degree of detail, which limits their exploratory value. Differences in the influences of previous activities on subsequent activities within the studies are rarely explained. Although none of these studies provide insights into the evolutionary development of networks, there is consistency in the general sequence of activities in the formation process, described in exhibit 3.1.

Theoretical construct	Description
Environmental Interdependence	<ul style="list-style-type: none"> ▪ Collaboration due to identification of interdependency ▪ Reasons range from product standardization or market development to external threats or increased competition
Similar Interests	<ul style="list-style-type: none"> ▪ Interdependency narrows the search for partners ▪ Same interdependencies facilitate converging reasons for cooperation
Triggering Entity	<ul style="list-style-type: none"> ▪ Legitimacy of triggering entity in case of low interdependence, unspecified technology or tacit knowledge ▪ Entity reduces the concerns of potential participants on costs and benefits
Seeking Domain Consensus	<ul style="list-style-type: none"> ▪ Clarification and understanding processes in the negotiation process ▪ Agreement on performance membership expectations and scope of cooperation
Open Solicitation	<ul style="list-style-type: none"> ▪ Early search for partners governed by interdependencies ▪ Membership addition to partnership for strategic reasons and familiarity with focal firm
Expectation of Continuity	<ul style="list-style-type: none"> ▪ Conditions of rising reliance and trust ▪ Shadow of future after initial experience gains
Formal Structure	<ul style="list-style-type: none"> ▪ Ability to deliver on expectations over a sustained period ▪ Changes in external environment require design of formal structures
Learning	<ul style="list-style-type: none"> ▪ Learning due to the process of cooperative activities ▪ Ability to learn and to adapt minimizes the level of conflict
Escalation of commitment and satisfaction	<ul style="list-style-type: none"> ▪ Ability to meet objectives of efficiency and adaptability maintains legitimacy of partnership ▪ Fulfillment of cooperative commitments allows network to grow in scope and duration with additional resource commitment

Exhibit 3-1 R&D networks: Formation activities adapted from (Doz, Olk et al. 2000)

Network evolution and interdependence: Need for a triggering entity?

In their exploratory and empirical study of U.S. research and development consortia, Doz, Olk et al (2000) have explored two distinct network formation paths. Both so-called ‘emergent’ and ‘engineered’ processes lead to the expectation of continuity for the R&D consortium as a precursor for its further commitment, satisfaction and the foundation of a formal structure. The selection between the two process paths depends on the level of environmental interdependence:

Researchers have typically understood network and alliance formation as a reaction to exogenous factors such as the distribution of technological resources. Several studies suggest that organizations enter into ties with other organizations in response to the challenges posed by so called interdependencies they share in their common environment (Aiken and Hage 1968; Pfeffer and Nowak 1976a, b; Pfeffer and Salancik 1978; Berg and Friedman 1980; Duncan 1982). Following this perspective, firms create alliances to mitigate uncertain environments and to satisfy their resource needs (Galaskiewicz 1985; Harrigan 1988; Hagedoorn and Schakenraad 1990; Nohria and Garcia-Pont 1991). Oliver (1990) identifies six broad categories of exogenous drivers for inter-organizational ties: Necessity, asymmetry, reciprocity, efficiency, stability and legitimacy lead to cooperative relationships, which address the needs for external interdependence.

On the ‘emergent’ process for network formation, environmental interdependence aligns similar interests, which facilitates the achievement of domain consensus in the network. Consensus in the consortium can be reached on the structure, its goals, operations and the level of information sharing. A higher degree of consensus then raises the expectations for continuity of the cooperation. In contrast to this self-organizing bottom-up process, the ‘engineered’ process requires a triggering entity that determines consortium memberships in the absence of any open solicitation. In a second step, the triggering identity without the support of higher levels of environmental interdependence also has to establish the expectations of continuity within the partnership network.

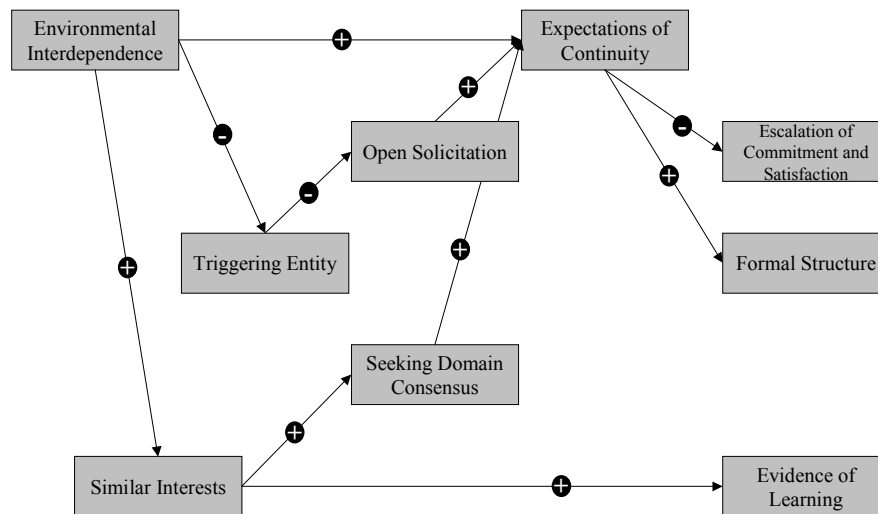


Exhibit 3-2 R&D networks: Relationships among formation activities adapted from (Doz, Olk et al. 2000)

Interestingly, a joint understanding of continuity within network members predicts both an escalation of commitment and satisfaction as well as the establishment of a formal structure. In an adjacent path, similar interests seem to directly influence evidence of consortium learning in the form of joint product development, research and technology transfer mechanisms.

Both processes— emergent and engineered – summarized in exhibit 3.2 will be required for long-term organizational survival. According to a similar dichotomy, Koza (1999) describes the evolutionary dynamics in network organizations as either intentionally/rationally constructed or emergent. Koza (1999) argues that over the course of organizational development, previously emergent network will be intentionally or rationally managed as a result of institutional pressures. In their analysis of the emergent process, Doz, Olk et al. describe environmental interdependence and similar interest – initial conditions in their model – as highly related to each other: Environmental incentives to collaborate motivates organizations to develop similar interests for collaboration and definition of problems. Doz, Olk et al. thus propose that collaboration driven by responses to common threats or a perceived need to gain access to similar resources will follow an emergent pattern without the

active involvement of a triggering entity. Since all case study companies in this thesis are involved in their unique innovation processes to develop new technology-based firms, establish a new organizational model for fixed-line communications or to define online service products, Doz, Olk et al.'s findings (2000) on research and development networks have important implications for this study.

In contrast to the assumptions of the 'emergent' process, the case study of *Elisa* and *Tropolys* (Proposition # 1) clearly illustrates that besides the imminent environmental demand for cost consolidation both the formation and the implementation of an integrated city carrier network require a triggering entity in the form of *Elisa* and *Tropolys*. This triggering entity rules out network actors who do not fit with network objective 'consolidation' and implements the determined cost reduction potential. Although Doz, Olk et al. (2000) suggest a process of self-selection for network membership in the case of environmental interdependence, cost reduction and resource reconfiguration for *Tropolys*' city carriers does not allow free membership. Implementation of unpopular cost reduction initiatives requires a careful selection of capable city carriers and their joint commitment. A strong focal actor is also required to accelerate and control the implementation process: During the identification of improvement potential, a central entity alleviates developing conflicts about best practices in city carrier operations. In the actual implementation process, *Tropolys*' tracking of cost reductions ensures the timely achievement of targeted efficiency gains. Although the environmental interdependence of price decreases in the fixed-line telecommunications market clearly mandates cooperation for cost consolidation, a central entity is needed to propel and ensure the path towards further, more intense cooperation.

In line with *Elisa* and *Tropolys* case study findings, Doz, Olk et al. propose that similar interests between network members facilitate consensus and lead to strong expectations of continuity among network actors. Based on the expectation of continuing collaboration in the network, actors engage in developing a formal structure for the partnership network. In particular, organizations from similar industries may need to protect their competitive interest due to concerns about unequal control of resource allocations.

In their analysis of the ‘engineered’ process of network formation, Doz, Olk et al. (2000) argue that low interdependence and dissimilar interests require the intervention of triggering entities. Although environmental interdependence clearly exists for independent city carriers, the initial internal self-assessment of their business situation in some cases leads to the assumption of achieving profitability without external support as an independent entity. It was up to the triggering entities *Elisa* and *Tropolys*, to encourage an extended and later self-propelling mutual cooperation. However, pride in their previous independent achievements and strong local ties represent a stumbling block for local city carrier management to realize the necessity for extended cooperation. Similar patterns can be detected in the case studies of all online service companies: Unclear initial user behavior requires a trial-and-error approach in assembling service providers for content and infrastructure. The innovation level of services requires an integrating entity, which – in the case of *MSN* – can integrate the emerging objectives of its partners for novel service offerings. In line with these empirical accounts, Dyer and Nobeoka’s case study (2000) of Toyota’s United States component suppliers also illustrates that common interests among suppliers for cost reduction and quality improvement are only transformed into network formation when the triggering entity is highly involved in a “hub-and-spoke” approach.

In contrast to this setting, the absence of environmental interdependence leaves structural holes between firms (Burt 1992), which create entrepreneurial opportunities for the triggering identity. Information transfer on opportunities to potential network participants with collective capabilities and resources to capitalize on this opportunity motivate partnership formation with existing network firms. The central network actor utilizes multiple approaches to target a limited number of firms and to broker a consortium around environmental opportunities and threats. Multiple approaches create awareness for inter-organizational interdependence and carefully select organizations based on appropriate task and partnering criteria. After initial partnership formation, the focal actor mediates consensus among network firms, which explains the missing direct relationship between the triggering entity and seeking domain consensus in the described model. In their framework, an integrating central actor – present in both the ‘emergent’ and ‘engineered’ process – plays a more important role in the early stages of the ‘engineered’ and top-down driven process.

In its top-down approach, the 'engineered' process of network formation suffers from lower expectations of continuity and commitment, but provides the basis for creative exploration: When firms in alliance networks fail to acknowledge similar interests and do not seem to independently seek a domain consensus, the expectations of continuity for their partnership network are much lower in this 'engineered' formation process than in the alternative 'emergent' formation process. In the second step, lower expectations of partnership survival consequently lead to the perception of the alliance networks as only one option among many others. Missing recognition of similar interests and initiative to explore collaboration advantages results in network firms that initially do not commit and invest enough in the respective collaboration opportunity. In this status, a strong central firm as a stimulus for intensifying interaction in a weak alliance network might lead to dissatisfied network actors.

Network evolution and exploitation: Need for closed and embedded networks?

The previous chapter has indicated that industry factors such as environmental interdependence seem to influence the alliance network structures (Auster 1992; Hagedoorn and Narula 1996; Hennart 1997). The described balance between the 'emergent' and 'engineered' process also involves a trade-off of how much to invest either in the exploration of new or refinement of existing technologies to secure returns in the future. Unstable environments with uncertainty mandate firms to increase the rate of innovation through exploration. With a focus on gathering new and broad information on many different alternatives, exploration requires resource commitments, but represents the only option to secure first-hand results (Levinthal and March 1992). In contrast to this strategy, exploitation focuses on refining existing innovation by gathering information that provides deeper insights into one particular domain.

To the degree to which firm strategies and alliance network objectives tend either towards exploration or exploitation, skills and information needed for exploring emerging innovations or exploiting existing technology differ significantly (March 1991). While exploitation utilizes existing information to improve efficiency and returns from present strategies, competencies, and procedures, exploration searches and experiments to find emerging innovations that will produce future profits. March (1991, p. 85) argues that the

“essence of exploitation is the refinement and extension of existing competencies, technologies and paradigms ... [the] essence of exploration is experimentation with new alternatives.”

In recognition of a reasonable balance between the strategies of exploitation and exploration, Afuah (2000) suggests that firms should not invest all of their partnership resources in strong ties to a small group of suppliers and horizontal partners. Technological changes can significantly adjust the competitive advantage, if the firm has focused too much on one strategic position through strong ties to close partners. Therefore, firms also need to allocate resources to building up and maintaining weak relationships with alternative partners as future growth options in the event of technological changes.

In the study of horizontal ties in the semiconductor and steel industries, Rowley, Behrens et al.'s results (2000) help to adjust the appropriate balance according to the industry context. General findings for both industries suggest that weak ties are positively related to firm performance. Interestingly, strong ties are negatively related to firm performance and therefore do not seem to generate performance advantages through trust-based governance or norms of reciprocity. The same pattern has been suggested in the absence of structural holes: A firm embedded with strong ties to its partners, which are also densely connected to each other, gains little additional benefits of alternative social control mechanisms and invests too much into the maintenance of strong ties.

Besides these general findings, their study offers some support for interesting interaction effects. The performance effects of embeddedness in alliance network depend on the environmental industry context: Results suggest that strong ties are positively related to firm performance, when the industry context demands a high degree of exploitation. Following this contingency approach, weak ties are associated with higher performance in exploration contexts. Interestingly, Rowley, Behrens et al. found no detrimental effect of even stronger ties in exploration environments. In the alternative context of exploitation, the densely inter-connected ego network with a reduced number of structural holes provides the firm with a redundant information source, which enables the information received from each source to be thoroughly evaluated and improved. These beneficial effects of strong and dense network

relationships are in accordance with findings in the *Elisa* and *Tropolys* cases and Proposition # 16.

As the ‘engineered’ process driven by triggering entity targets the creation of new relationships and exploration of the described collaboration advantages, the involved alliance relationships tend towards an explorative orientation. The formal structure in these networks may be intended to facilitate creativity and innovation rather than to constrain opportunistic behavior. Consequently, there might be fewer boundaries on technology transfer in a formal structure involving the engineered process in network formation.

Clearly constituting an ‘engineered’ process, focal companies in all case studies determine the constraints and requirements as well as roles and responsibilities of network membership in a top-down approach, especially in more mature stages of network formation. In the *Elisa* and *Tropolys* case, the selected city carriers with a lack of commitment to a consolidation strategy are required to adapt their personnel resources in a top-down approach. In this study, online service providers clearly appear as a triggering entity in selecting providers for content and infrastructure.

Although all case studies involve creativity and exploration driven by a triggering entity, online service providers show only limited earlier signs of knowledge transfer, but increased rates of innovation in their later stage high-value relationships. As the relevance of and trust in partnerships increases over time, the issues of joint partner commitment and technology transfer gain more relevance: Later advertising and co-marketing arrangements need mutual benefits for a sustainable cooperation.

The orientation in the alternative ‘emergent’ process tends to be more focused on exploitation. As network participants experience the initial impact of an opportunity or threat in comparable ways, they will independently consider actions to react to it. Confronted with the inability to mitigate the common environmental interdependence, firms in a network utilize joint and bundled resources until the common threat no longer exists.

In line with theoretical predictions and after the initiation of the triggering entity, *Elisa*’s and *Tropolys*’ city carriers jointly exploit the economies of scale in sharing resources due to commonly perceived industry interdependencies. Challenged by the

inability of independent city carrier reactions, *Tropolys* has established dedicated functional boards, which in their determination of cost reduction potential interestingly have a significant explorative character in creatively defining measures with high effectiveness and easy implementability. Implementation of cost reduction measures in a second step requires a dense and repeated alliance network to develop the required trust and to alleviate the mounting level of conflict.

In this transition between the two network formation processes, firms in an alliance network created by an engineered process tend to make these relational investments (Lorenzoni and Lipparini 1999) and improve their relational quality (Arino and De La Torre 1998; Kale, Singh et al. 2000). In this environment under the supervision and maintenance of an active and triggering focal firm (Lorenzoni and Baden-Fuller 1995; Gomes-Casseres 1996), city carrier partnerships formed by the 'engineered' process might develop into a network governed by the 'emergent' process. Both focal actors and network firms gradually recognize similar interests and opportunities to further capitalize on their initial investments in the form of relational capabilities (Dyer and Singh 1998). In this change process, the impact of the triggering entity decreases and self-organizing principles of the emergent process play a more important role. Similar empirical observations in the transformation from dyads into full networks have been made for a U.S. supplier network (Dyer and Nobeoka 2000) and packaging machinery manufacturer (Lorenzoni and Lipparini 1999).

Although still committed to an engineered process of network formation, all studies of the *Elisa* and *Tropolys* and online service companies show similar patterns: Reduction of and focus on the number of partnerships results in an intensified exchange of resources along with increases in relational quality. In this context, network relationships develop from weak, flexible ties into selective, operational, intense alliances. Intensification of alliance relationships and growing relational qualities trigger the described self-organizing principles, which are sustained with the support of mutual benefits from cooperative relationships.

However, as resource exchange intensity increases with the value of partnership opportunities, the coordinating role of the central node remains very relevant in even later stages of network formation. The more intense explorative nature of the individual alliance relationship requires a coordinating entity for the previously

mentioned reasons. Interestingly, these resource intensive cooperative relationships have only been enabled by the potential exploitation of economies of scale (*Elisa* and *Tropolys*) and previously developed resources (online service companies). These previously developed resources include the technical infrastructure, online services and customer bases, which have been built up earlier with the support of weaker partnerships.

In a related theoretical study on the development of networks around entrepreneurial firms, Hite and Hesterly (2001) argue that firms motivated by growth objectives and driven by a reversed shift from exploitation to exploration tend towards more calculative networks. Their definition of calculative networks aims at combining a larger and more diverse set of purposeful and functional partnerships to underline the firm's capability to proactively manage the network rather than simply accepting the constraints of previous relationships. The evolution towards the combination of a larger and more diverse set of purposeful functional partnerships requires the addition of fewer redundant relationships and the creation of structural holes.

In their assumptions, the transition to more calculative networks is accompanied by the addition of non-embedded relationships. Although earlier embedded ties may be beneficial in overcoming the challenges of resource access and limited awareness of available opportunities, firms in later growth stages develop a broader base of new arm's length ties with similarity to market ties (Powell 1990; Uzzi 1996) without the facilitation of social contacts between parties. In the evolution towards more calculative networks, firms distance themselves from cohesive structures with high density, mutuality and obligation, but without diversity in relationships, resources and information. With the discontinuation of asymmetric exchanges in cohesive networks, growth firms tend to turn towards less cohesive networks for novel information and resources that reduce redundancy and can exploit structural holes.

In all case studies, firms show increasingly purposeful selection of functional alliance relationships and growing capability to proactively manage alliance networks (Proposition # 2; Proposition # 3; Proposition # 4; Proposition # 9; Proposition # 10), which constitutes the clear trend towards the described calculative networks. However, the increasing resource availability generated in very early development phases makes more valuable partnership opportunities available, which require a more intense

resource exchange and interaction between firms. With focus on a limited number of high value relationships, the embeddedness in partnership networks increases over time and provides diversity through complexity of the resource exchange. Therefore, the addition of arm's length relationships is no longer required to increase the diversity in resources and information. The focus on high value and resource intensive relationships also requires a trustful interaction between alliance partners and deliberate absence of structural holes. Proposition # 12 also suggests that focal firm learning in the initial growth phase represents an important feedback mechanism for an even more selective approach in future alliance formation.

In their development of more calculative networks, firms are also assumed to follow the approach of intentionally adapting and manipulating their alliance network. Most previous research assumes an alliance management capability as a specific skill set to intentionally create, adapt, and control the desired network structure and to meet changing resource needs (Anand and Khanna 2000; Dyer and Nobeoka 2000; Rowley, Behrens et al. 2000). However, early ties are limited in their flexibility and adaptability and the limited scope of available resources only further reinforces the path dependence of initial alliance formation (Afuah 2000). Increases in alliance network management capabilities and transition in further firm growth determine the rate at which firms migrate from path-dependent to intentionally managed networks (Hite and Hesterly 2001).

All case studies clearly demonstrate the facilitation of alliance management resources (Proposition # 2; Proposition # 3; Proposition # 4; Proposition # 10). The development of respective skill sets, however, represents only a necessary, but not a sufficient condition for further focal company growth. Valuable additional operational resources are needed to attract alliance partners for a more beneficial and valuable exchange partnership.

3.4 Learning in alliance networks

Learning across interorganizational networks depends both on firm-level and network-level factors. Besides these factors, the sequence of collaborative processes between firms also plays an important facilitative role for resource acquisition.

Learning in inter-organizational networks

From a purely strategic perspective, the decision to acquire resources from another organization can be considered a comparison between risk and return on assets (Teece 1986; Williamson 1991). Due to a possible lack of trust between partners, obstacles to relinquish control, the complexity of a joint project and differential capability to learn new skills, alliance formation involves moral hazards (Powell 1990). Partnering decisions depend on each partner's size and position in the value chain, the level of technological sophistication, and resource constraints. When the set of skills and resources to be exchanged determine the form of partnership (Hennart 1988; Pisano 1989; Parkhe 1993), alliance formation can be regarded as a make-or-buy decision framed largely by transaction cost economics. Firms choose alliance formation to obtain resources and skills that cannot be produced efficiently internally, when the hazards of cooperation can be kept within boundaries.

According to an alternative perspective adopted by this study, inter-organizational learning can also be understood as an alliance network formation process linked to certain facilitative conditions. Knowledge creation is determined by the context of a community, which is fluid and evolving rather than tightly defined and static. Sources of new knowledge cannot be found exclusively within firm boundaries, they are found in the relationships between firms, suppliers and customers (Powell 1990). Supporting this perspective, Kogut and Zander (1996) have argued that the capabilities of a firm primarily lie in an organizational learning process by which new knowledge is replicated or integrated across different parts of the firm. Such an organizational learning process can be understood by analyzing the relationships of inter-firm knowledge sharing. Although the traditional focus of organizational learning is on the individual firm, increasing evidence points towards a network of firms as a critical, but less understood unit of analysis (Powell, Kogut et al. 1996; Dyer and Singh 1998; Yli-Renko, Autio and Sapienza 2001). As a result, the degree to which firms learn about new innovation depends on their alliance formation activity (Levinthal and March

1992). Baum, Calabrese et al. 's studies (2000) show the strong impact of networks on innovation-related performance indicators, which support the widely held assumption that alliance networks form a 'locus of innovation' in high technology fields. In short, various researchers have recognized inter-organizational learning as a critical contributor to competitive success through collaboration with other organizations or internalization of practices.

Inter-organizational learning processes can also reduce high network coordination costs and provide a foundation for the evolution of the described 'emergent' process of network formation (Powell, Koput et al. 1996; Larsson, Bengtsson et al. 1998). However, alliance network formation based only on the 'emergent' process is less prone to discover and develop necessary innovations in response to changing industry conditions, as the consensus of common interests will limit the ability to recognize new approaches (Uzzi 1996). Doz, Olk et al. (2000) therefore suggest a balanced focus on efficiency and innovation-based network formation processes to ensure partnership survival.

Irrespective of the network formation process, scholars suggest extensively defined domain consensus, realistic expectations of continuity and practical network structure to support learning outcomes in an alliance (McEvily and Zaheer 1999; Doz, Olk et al. 2000). An extensive domain consensus seems to have positive impact on focal firm learning, especially in an innovation driven industry with unclear alliance outcomes during the formation of the partnership (Proposition # 5; Proposition # 6). Adaptability in alliance network membership, objective and activities creates a rich environment for firm-level learning of resources for later utilization.

Firm-level and network-level factors with implications for learning

In addition to the general approach of network formation, the external knowledge a firm obtains from external partners depends on multiple firm-level and alliance-level factors: (1) The intensity of the relationship, (2) the quality of the relationship in terms of goodwill, trust and reciprocity, and the (3) similarity of resource bases. The intensity of relationships refers to relational embeddedness between actors (Larson 1992; Ring and Van de Ven 1992). As described above, relationship quality is improved by

increased trust and expectations of reciprocity through interaction (Ring and Van de Ven 1994; Dyer and Singh 1998).

(1) Increasing levels of relationship intensity between actors enhance the knowledge acquisition by improved abilities to recognize and evaluate pertinent knowledge (Cohen and Levinthal 1990; Lane and Lubatkin 1998) and by stronger motivation to exchange and process information. Larson (1992) and Ring and Van de Ven (1994) describe that social interactions develop over time as exchange partners learn about each other's competence and reliability. As a result, the more social interaction develops, the greater the intensity, frequency and breadth of information exchanged. Lane and Lubatkin (1998) argue that interactive learning and intensive information exchange allows a firm to acquire not only the explicit knowledge but also the deeper, tacit components of knowledge (Kogut and Zander 1996). In the process of intensifying the frequency, breadth, and depth of information exchange, social interaction creates relation-specific knowledge. Common knowledge increases the relation-specific absorptive capacity (Cohen and Levinthal 1990), which represents an even greater incentive to invest in learning routines and capacity in recognizing external knowledge. Grant (1996b) defines learning routines as a 'regular pattern of interactions among individuals that permits the transfer, recombination, or creation of specialized knowledge', which can be considered as the capability of managing knowledge flows in inter-organizational networks.

Emerging high-value opportunities in all case studies show the similarity of intensifying relationships. Complex arrangements require high frequency, breadth, and depth of information exchange already in the negotiation phase of co-marketing and advertising relationships. Already minority equity investments in city carriers can be used to assess the reliability and competence of individual companies. To-be advertised product specifications, brand equity and best practices for efficiency improvement include the shared tacit resources at this stage. Therefore, the increasing interaction intensity represents an important contribution to focal company learning (Proposition # 6; Proposition # 7). Established and refined due diligence processes, tailored controlling systems and structured functional boards represent relationship-specific investments and learning capabilities within the focal company. Supporting these propositions, Yli-Renko, Autio et al.'s study (2001) of knowledge exchange relationship between new U.K.-based, technology-based firms and their customers

suggest that social interaction and network ties have a positive impact on the acquired knowledge acquired from relationships.

(2) The quality of the relationship is determined by the extent to which the two parties develop common goals, norms and reciprocal expectations regarding the goodwill and trustworthiness of the exchange partner. Goodwill trust and reciprocal obligations are considered alternatives to formal, arm's length, or third party governance mechanisms (Larson 1992; Dyer and Singh 1998).

Over the course of alliance network evolution, the addition of partnerships increases the potential for alliance redundancy, which raises the importance of relationship quality. To the extent that ties provide access to the similar information (Burt 1992) or non-complementary resources (Gomes-Casseres 1994), focal companies face the risk of inefficient configurations that return less diverse information and capabilities for great costs than a smaller, non-redundant alliance network. Entering into additional alliances without attention to the overall portfolio can also lead to conflict among the firm's partners as duplication of resources creates rivalry among a firm's alliance partners (Gomes-Casseres 1994). As Dyer and Nobeoka (2000) show in their automotive case study, Toyota will not place competing suppliers together in voluntary supplier learning teams. The number of partner firms that perform similar functions or take on duplicate roles fuels potential conflict.

In the case of *Elisa Kommunikation*, the level of conflict between regional carriers might also be influenced by the need to differentiate and to compete against each other. Although focused on distinct regional areas without any overlaps, the directed transfer of competencies in the area of billing, marketing and customer care provides enough motivation for competition and conflict among firms that are extremely comparable in their technological base. Disagreement can focus on the determined best practices, timeframe for the implementation or cost reduction targets. Loss of senior management and initial resistance against the consolidation strategy provides clear evidence for a mounting level of conflict, especially in the transition process from independent entities to a more consolidated group of city carriers.

Referring to the initially discussed open domain consensus, Baum, Calabrese et al. (2000) suggest that internal conflict may have two opposing effects: To a certain extent, a higher level of diverse interaction can increase flexibility, foster innovation

and ensure secure access to critical complementary assets (Proposition # 6). But a higher level of conflict can also pull interests' of competing partners in different directions, and network firms fail to reach sufficient returns to invest in an alliance and moral hazards tend to diminish cooperative efforts.

As strategic alliances are inherently incomplete contracts without a clear definition of property rights and alliance benefits, alliance partners risk the moral hazards of opportunistic behavior. Inter-alliance rivalry retains the potential to severely disrupt an alliance and to harm a participating firm. Particular partnerships risk engaging in learning races (Khanna 1998) in which a partner attempts to extract as much knowledge as possible from its partner by divulging as little as possible. Such rivalries are likely to be most harmful among potential rivals, when firms regard their partnerships as zero sum games when the potential for competition between them is high. Mowery, Oxley et al. (1996) have shown that alliances involving partners who compete in the same industry exhibit lower levels of knowledge transfer. Partnerships with less diversity also do not allow complementary specialization, which enables the focus on only a subset of activities. In their study of the Canadian biotechnology industry, Baum, Calabrese et al. (2000) have found that diverse alliance networks at the founding of start-up companies consisting of ties to incumbents, universities, government labs, industry associations and research institutes contribute to higher learning and subsequent performance. Firms with these founding relationships have access to more diverse information, which raises growth rates for revenue, R&D spending and patenting. However, adding potential rivals to the alliance portfolio has a negative impact on these performance indicators, moderated by the potential rival partners' scope and innovativeness.

Dyer and Singh (1998) suggest that due to the moral hazards of sharing know-how in inter-organizational relationships, effective procedures are required to facilitate knowledge sharing and deter free-riding. According to their perspective, self-enforcing governance mechanisms defined as informal norms of reciprocity and trust support knowledge sharing and prevent free-riding because (a) relational governance norms are valid indefinitely and can increase in value as the relationship progresses, (b) cooperative actions are more likely undertaken, when reciprocal benefits are expected and, (c) the likelihood of violation decreases with the development of high-quality, irreplaceable relationships. Larson (1992) also suggests that norms of reciprocity allow

firms to exchange a larger pool of resources, to take risks, to innovate and to share information without boundaries. Shared norms reduce the need for formal monitoring and bargaining (Dyer and Singh 1998), which leaves more resources for knowledge acquisition. Shared expectations and goals facilitate the creation of compatible systems and culture in the individual relationships. The relative absorptive capacity is also improved, when the knowledge is contained in similar systems generated by compatible expectations.

The negative relation between relationship quality and knowledge acquisition suggested by Yli-Renko, Autio et al.'s study (2001) can be explained as follows: If relationship quality and trust reach a very high level, the required level of monitoring is reduced, which diminishes the level of conflict and of intense processing of information. Although reduced monitoring and bargaining diminishes the costs of knowledge exchange, this effect might also lower the amount of acquired knowledge. In addition, the assessment of high relationship quality may ensure the availability of resources when they are needed and reduce the motivation for prior acquisitions.

In contrast to these findings, focal companies in this study seem to develop increased levels of trust with the formation of high value alliances. Balanced business cases for joint benefits from *Zed's* co-marketing alliances, and *MSN's* open-minded approach to jointly develop products with later distribution of pay-offs clearly illustrates the trustful interaction with partners. Intensification of relationships to remaining content suppliers for *Lycos* and *Zed* might be another indication of growing trust in intensifying partnerships. Therefore, growing relationship quality in combination with shared behavioral norms has a positive impact on learning (Proposition # 6; Proposition # 7). Following this perspective, Kale, Singh et al. (2000) find a positive relationship between strong ties based on trust and the degree of learning in inter-firm alliances. Similarly, Tsai (2000) argues that trust has a very significant effect particularly on the exchange of intangible resources, which requires a more complex communication process.

(3) On the issue resource similarity, Lane and Lubatkin (1998) showed that a firm's capacity to recognize, assimilate and exploit external knowledge is determined by the similarity between partners' knowledge bases, organizational systems and dominant logics. New knowledge with a certain level of familiarity is easier to acquire than

knowledge about an unrelated area. Unrelated knowledge will be difficult to acquire and may, in fact, have limited value because a language to understand the knowledge is lacking (Inkpen 1998). It is difficult to create a linkage for resource exchange between two unrelated actors due to the lack of shared language and common interests which are important for the effectiveness of their communication. As a result, technological distance between partners as an indicator for reduced absorptive capacity is negatively correlated with innovation performance (Lane and Lubatkin 1998; Stuart 1998).

In the subsequent implementation of acquired resources, Cohen and Levinthal (1990) suggest that the degree to which external knowledge is targeted towards the resource needs of the firm will determine the ease of knowledge utilization.

Therefore, internal resources and learning from alliances are never substitutes, but rather important and required complements. Internal capability is indispensable in evaluating research conducted outside while external partnerships provide access to knowledge and resources that cannot be generated within firm boundaries (Powell, Koput et al. 1996). Therefore, external ties are not only a means of gaining fast access to external knowledge, but also a test of internal resources and learning capabilities. To stay up-to-date in a high-technology industry environment, firms must actively participate in the R&D process by conducting cutting-edge internal research and development as well as accessing external sources of knowledge.

This pattern highlights two important enabling conditions of internally developed resources: Growing operational resources improve the technological relatedness, which in turn enhances the capability to learn from external resources (Proposition # 7). Internally acquired resources represent a feedback mechanism for a more targeted and appropriate selection of alliance formation opportunities (Proposition # 16). A more selective approach in future alliance formation ensures complementary resource offerings from external partners.

As an effect of knowledge acquisition, Yli-Renko, Autio et al. (2001) suggest that learning enhances new product development and innovative capabilities in three different ways: By enhancing the breadth and depth of relation-specific knowledge available to the firm with a positive effect on the new innovative combinations, by enhancing the speed of product development through reduced development cycles, by

motivating the new technology-based firm to develop new products for its customer. Externally acquired knowledge is important for the development of technology and end products that can be distinguished from those of competitors. Learning in inter-organizational relationships can be seen as an important option to develop technological competencies.

Network evolution processes facilitating learning

In a review of previous research on inter-organizational learning and an analysis of Toyota's supplier networks, Dyer and Nobeoka (2000) have identified mechanisms to motivate members to participate and openly share valuable knowledge (while preventing undesirable spillovers to non-members), prevent free-riders and reduce costs for information search and access of valuable knowledge as three elements of successful knowledge sharing in the network. For the efficient tacit information transfer in manufacturing and supply chain best practices, Toyota in its final stage has created a highly interconnected network with strong ties (Coleman 1988). This network is well suited for the diffusion and exploitation of Toyota's and suppliers' production know-how. To address all challenges of explicit and tacit knowledge transfer, Toyota has established a variety of bilateral and multilateral processes.

After creating initially weak ties with its suppliers to share explicit knowledge, Toyota later extended its relationships in both frequency and intensity by deploying consultants to transfer valuable, more tacit know-how regarding the Toyota Production System. Toyota consultants were the catalysts for creating the norm of reciprocal knowledge sharing, sense of commitment and creating openness with the supplier network. Apart from becoming familiar with knowledge transfer activities, suppliers also first-handedly experience the economic benefits associated with knowledge sharing. Further establishing the norm of reciprocity, suppliers as beneficiaries were obligated to allow visits from other suppliers in the network.

With the careful selection and assignment of suppliers to learning teams, in a final step Toyota has maximized the willingness and ability of suppliers to learn from each other (keeping direct competitors separate and rotating group membership to maximize the diversity of ideas). These sub-networks have been utilized to support strong ties among suppliers as a requirement for tacit knowledge sharing. In this transformation process,

knowledge sharing evolved from the exchange of only explicit knowledge to the additional transfer of more valuable tacit knowledge in a bilateral and later multilateral setting.

Dyer and Nobeoka (2000) study illustrated that the network can be more effective than a firm in generating, transferring and recombining knowledge, because the network contains a greater diversity of knowledge, also referred to as 'variety generation' (Kogut 2000). To also be successful in knowledge management, the focal actor must set up principles and infrastructure that support coordination among specialized firms and curb opportunistic behavior. Studies suggest that highly interconnected strong tie networks provide the best basis for sharing and exploiting existing knowledge rather than exploring new knowledge (Dyer and Nobeoka 2000; Rowley, Behrens et al. 2000). In line with these arguments, a highly interconnected strong tie network is effective in the transfer of tacit knowledge because missing structural holes makes it easier for network actors to locate potentially valuable information and previously established strong ties generate trust to support the sharing of tacit knowledge.

However, a closely connected network runs the risk of diminishing knowledge diversity over time. As network actors' resources develop into similar resource bases through imitation, the network may lose its effectiveness in generating new knowledge (Kogut 2000). As Afuah (2000) suggests, closely connected networks become so focused on internal issues, that actors reduce their ability to react to technological innovations in the environment. A highly connected network structure seems ideally suited for the diffusion of existing knowledge in a mature industry rather than generating new knowledge in a fast-paced, technologically dynamic industry environment.

The evolution of a knowledge-sharing network takes time to develop processes and ties that facilitate effective learning. As a large firm with a good reputation and a stock of available resources, Toyota is in the position to select partners from among the most capable in the world. In a second step, strong focal actors face the challenge of developing strong ties with and among selected partners.

Dyer and Nobeoka (2000)'s case study illustrates that establishing norms of trust and reciprocity has to be well coordinated with structural changes on the level of the network. Only after establishing active and fruitful operational working relationships

with the central hub Toyota, have selected suppliers been grouped into learning teams. The establishment of learning teams further increases relationship intensity between Toyota and its suppliers and the density of the overall network with relationships between suppliers. These transition processes require time and the adaptation of firm behavior. At all times, the role of the triggering entity remains important. Although much of the learning in the highly embedded network is performed by direct resource exchanges between suppliers, the tacitness and value of the knowledge as well as continued attention to norms of reciprocity requires Toyota's capabilities as the integrating entity.

The *Elisa* and *Tropolys* cases clearly illustrate that the transition from the group of minority stakes in city carriers to a heavily integrated network can be accompanied by discussions and a loss of valuable personnel resources. The established norms of reciprocity and trust could have prevented this initial level of conflict. To some extent, the investment in majority stakes as an enforcing mechanism represents the price to pay for more 'forceful' top-down than more 'emerging' integration. Without any doubt, this integration process requires *Tropolys* as a strong triggering entity at any time of the network transition process.

3.5 Longitudinal model of focal firm and alliance network resources

The following chapter merges all theoretical perspectives discussed in the previous chapters into one consistent framework. This framework is used in the second section to assess the validity of the derived set of propositions.

Combing relevant theoretical frameworks:

Integration of strategic network theory and resource-based view of the firm

As this study focuses on the transformation of alliance networks and evolution of focal firm resources, advantages and disadvantages of alternative network structures represent the key to explore both the motivation and formation of network evolution. At any stage of network evolution, the why, what and how of this change process show dynamic interaction effects. Two factors make the exploration of these transformation processes very difficult: Multi-level longitudinal change processes pose difficult challenges for data availability about network structures, resources and individual relationships. In addition to limited data access, continuous instead of discrete changes provide limited reference points for data measurement (Powell, Koput et al. 1996). To fully explore the embeddedness and temporal interconnectedness of this longitudinal change process despite these challenges, this study aims at providing case studies with rich context for qualitative research, which has the capability of exploring the empirical phenomenon on the alliance network and firm level (Pettigrew 1990).

However as discussed above, an analysis of advantages and disadvantages of alternative network structures on multiple dimensions described in Exhibit 3-3 represents a starting point to better understand the inducements ('why?') behind transformation ('how?') between two alternative network forms.

Theoretical construct	Structural hole rich network (Burt 1992)	Densely interconnected network (Coleman 1988)
Objective	▪ Explorative brokerage and self-interest	▪ Collective problem resolution and exploitation of common interest
Trust	▪ Low due to information arbitration	▪ High supporting shared behavioral norms
Information exchange	▪ Diverse access due to structural holes	▪ Intense, joint and efficient sharing due to close ties
Resource and knowledge exchange	▪ Explicit	▪ Explicit and tacit
Control benefits	▪ High due information arbitration	▪ Low due to lean hierarchy and information dispersion
Hierarchical structure	▪ Steep	▪ Flat
Moral hazards	▪ High	▪ Low

Exhibit 3-3 Network structures: Comparison of characteristics and benefits

Regarding the analysis of the how and why, described transition along these multiple dimensions towards more densely interconnected networks t observed in many case studies requires time-consuming change processes. Shared behavioral norms, as well as intense, efficient information sharing require development recurrent cycles (Dyer and Nobeoka 2000): The positive experience of learning or resource acquisition from inter-firm cooperation only gradually extends current and forms novel relationships for closer cooperation. Besides these given and inherent cycles, firm- and network-level factors influence inter-organizational level learning that merit further discussion in this chapter.

Both alternative network structures in Exhibit 3-3 align goals of network actors for either brokerage or collective problem resolution. In all instances of alliance formation, network participants or firms recognize a certain level of environmental interdependence (Aiken and Hage 1968; Pfeffer and Nowak 1976a, b; Pfeffer and

Salancik 1978; Berg and Friedman 1980; Duncan 1982). This exogenous driver to either access resources or mitigate uncertainty aligns the interests between current and future network actors. Aligned interests reduce the need for the triggering entity to ‘artificially’ establish a domain consensus within the web of inter-organizational partnerships. However, divergent interests and structural holes between potential partners require an appropriate activity level of a triggering entity.

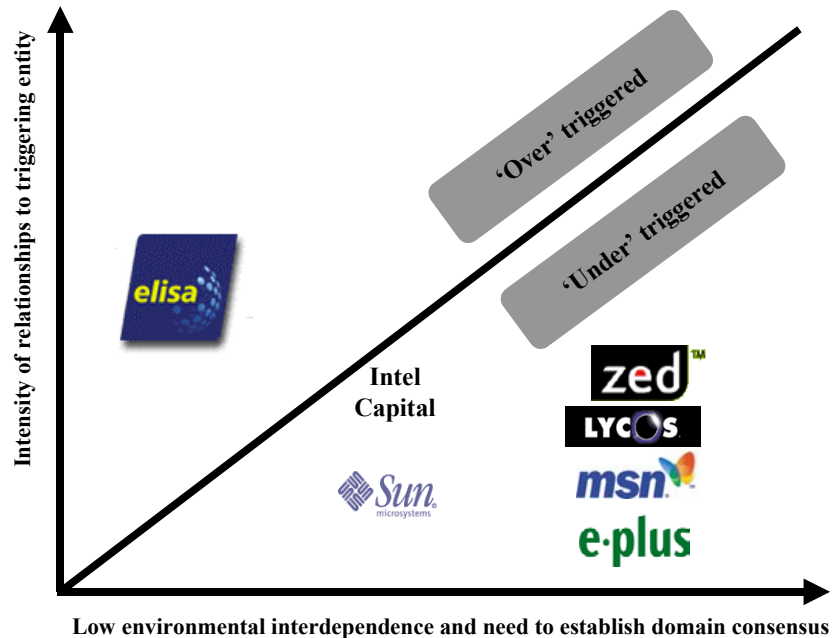


Exhibit 3-4 Relationship: Environmental interdependence and role of triggering entity

Although low strategic interdependence requires a triggering entity, a very high intensity of relationships with an integrating focal actor could result in an overly strong dominance (described as ‘over triggered’), which may have detrimental effects on the relationship quality in the alliance network (Exhibit 3-4):

Tropolys’ major role during the launch of the network represents a good example of this behavior. Rapid integration in a consolidating group with implications for a range of internal company processes requires majority stakes to ‘artificially’ reinforce the relationship to the triggering entity. Relatively high levels of conflict with former stakeholders and loss of senior management proves that the cycle time needed to build up shared behavioral norms and efficient information sharing for collective problem

resolution has not been provided. However, either the unawareness of partners' needs or the need for rapid changes may have resulted in the more dominant focal firm involvement. Applying a different approach of 'self-induced' and later intensifying cooperation, both *Zed* and *MSN* clearly state that they initiate cooperation, await results and share potential benefits at a later stage. This shared behavioral norm might apply to range of high-technology companies, which have to cope with the uncertainty of technology applications and market changes. These examples clearly illustrate the need for balance between the intensity of relationships to the triggering entity and the level environmental interdependency. Although a high intensity of relationships to the triggering entity (*Tropolys* case study) can force the integration process, this transformation towards a densely interconnected network is paid with detrimental effects on the relationship quality. Both the relationship quality and intensity during the described transformation between the two alternative network structures have implications for focal firm learning:

Studies suggest that the reliance on recurrently evolving learning processes, which facilitate efficient and trustful information sharing, require the positive experience of mutual pay-offs. Facilitated additionally by certain firm level factors (Powell, Koput et al. 1996; Dyer and Singh 1998; Yli-Renko, Autio et al. 2001), inter-organizational learning in the alliance network mainly depends on (1) the intensity of relationship, (2) quality of cooperation and the (3) similarity of resource bases. (1) With increasing levels of relationship intensity, the ability to recognize relevant knowledge and motivation to exchange information increases (Cohen and Levinthal 1990; Larson 1992; Dyer and Singh 1998; Lane and Lubatkin 1998). Learning by recurrent cooperation (Ring and Van de Ven 1992) may also be less costly than learning generated from a large number of unrelated parties.

(2) In addition to the relationship intensity, the quality of the relationship in terms of trust and reciprocal obligations also represent important factors for inter-organizational learning. Since the complexity of the partnership network increases with alliance formation activities, an increasing potential for conflict due to moral hazards can have detrimental effects for inter-organizational learning (Gomes-Casseres 1994). According to Dyer and Singh (1998), informal norms of reciprocity and trust represent self-enforcing governance mechanisms against moral hazards as the value of the relationship, the rate of cooperative actions increases and the likelihood of violation

decreases. Shared norms also reduce the need for formal monitoring and bargaining, which leaves more resources for knowledge acquisition. However as described above, the development of self-enforcing governance mechanisms requires time for the internalization of learning experiences along with the network transition process (Dyer and Nobeoka 2000).

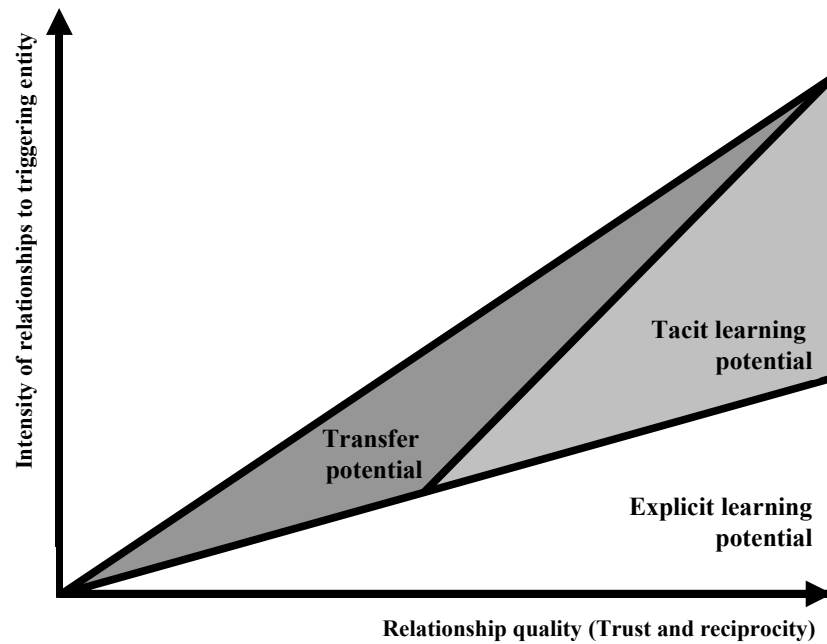


Exhibit 3-5 Relationship: Learning and relationship quality

As both relationship quality and intensity increase, Exhibit 3-5 shows that learning potential for the focal firm improves especially in the areas of the more valuable tacit knowledge (Larson 1992; Kale, Singh et al. 2000; Tsai 2000). In addition to deliberately and openly available explicit and tacit knowledge, increasing the relationship intensity over a certain threshold can force additional resource transfer towards the focal actor due to strong formal governance mechanisms (Proposition # 15). In the case of *Elisa* and *Tropolys*, these governance mechanisms have been established as majority equity stakes.

Although this forced access represents a temporal option for the focal company knowledge acquisition, dominant ‘over-triggered’ firm behavior gradually diminishes the relationship quality and the openly available learning potential. Although this may provide the basis for creative exploration, relying too much on the ‘engineered’

process of network formation suffers from lower expectations of continuity and leads to the perception of this alliance network as only one among many other options (Doz, Olk et al. 2000). Besides missing commitment from network firms to invest enough in the respective collaboration opportunity, a strong central firm as a stimulus to intensify interaction in a weak alliance network might lead to dissatisfied partners in the longer term. Because a dense network of firms in its final stage is expected to perform processing and screening functions (Leonard-Barton 1984), dissatisfied network partners have detrimental effects for the network's information processing, absorption and classification capabilities. Due to unfavorable effects for network partners' underutilized resources, an overly dependent 'satellite' firm may fail to bring relevant innovations to the focal firm's attention. Therefore, highly involved triggering entities may not only diminish the relationship quality, but also the final potential of the converging densely interconnected network.

(3) After any form of focal firm learning, the growing focal firm resource base has a beneficial impact on capabilities for knowledge acquisition. The firm's absorptive capacity to recognize, assimilate and exploit external knowledge (Lane and Lubatkin 1998) grows with knowledge gains that establish an increasing resource similarity of the focal firm's resources with firms in the alliance network.

Due to the effects of learning for further alliance formation, focal firm learning influenced by the described three factors has another effect on emerging resources. Functioning as positive vicious and accelerating feedback mechanism, an attractive resource base generates a greater number of high-quality partnership opportunities (Ahuja 2000b). Studies integrating the concepts of strategic network theory and resource-based view of the firm (Shan, Walker et al. 1994; Dutta and Weiss 1997; Lee, Lee et al. 2001), show clear interaction effects of internal capabilities and changing patterns of alliance formation. In a high-technology environment, Powell, Koput et al.'s findings (1996) suggest that the formation of R&D and non-R&D alliances provide an entry point for developing the capability to manage partnerships. R&D alliances directly or through increased alliance management experience provide the access to more diverse types of partners. Since the formation of additional alliances increases the firm centrality in the overall network, access to diverse information and learning enables firm growth and fosters the establishment of additional R&D partnerships, which reinitiates the described cycle. In any reiteration of this cycle, the

diversity of the alliance portfolio increases and introduces non-R&D and commercial alliances to the entire portfolio. Since Ahuja's results (2000b) suggest no diminishing returns of further alliance formation with size of the network, iteration cycles may continuously increase the diversity of the entire partner network.

Only the ample availability of both commercial and technical focal firm resources has a negative impact on the alliance formation rate. This saturation in focal firm resource levels might be due to the environmental context of Ahuja's study. The commodity-oriented chemicals industry shares resources mainly to consolidate its core businesses. However, all available entrepreneurial opportunities and an explorative strategic orientation call for utilization of internal resources to access an increasing number of valuable partnership opportunities over time. Regarding the dissimilar impact of various resources, Ahuja's results (2000b) suggest that alliance network, technical and commercial resources have an increasingly positive impact on alliance formation activities. This differentiated effect of focal company resources on the alliance formation rates calls for their further classification and operationalization.

As resource-based arguments can obviously be used to explain the differences in strategic firm behavior (Kraatz and Zajac 2001), all case study firms with emerging alliance management resources achieve growing stability in their alliance relationships and smooth the progress of high value alliance relationships. Since alliance management skills as a comparable set of activities (Nelson and Winter 1982; Amburgey, Kelly et al. 1993) are developed with a higher alliance formation rate, they are expected to keep up with the increasing availability of partnership opportunities. According to related research (Gulati 1999; Anand and Khanna 2000), increasing sophistication in this capability is clearly associated with higher value appropriation from partnerships and gradually developed through experience from the entire portfolio. Interestingly, the diversity of partnerships does not seem to have a beneficial effect on their development. However, increases in resource exchange intensity – expected during the formation of either simple licensing contracts or complex joint ventures – have a positive impact on alliance management resource development (Anand and Khanna 2000).

Since learning gradually develops operational resources, which attracts more valuable partnership opportunities as described above, the sophistication of alliance

management resources has to be aligned with upcoming partnership challenges. Underdeveloped alliance management resources lead to unstable relationships (Proposition # 3), higher levels of conflict and unbalanced resource exchanges. Increased levels of disagreement diminish the relationship quality with detrimental effects on learning potential. On the other side, highly developed alliance management resources confronted with inferior partnership opportunities constitute a waste of scarce resources. Supporting this view, a number of case study companies indicate the scarcity of personnel resources in screening, selecting, embedding and maintaining novel partnerships.

Over the course of developing focal firm resources and convergence towards densely interconnected alliance networks, the need for additional explorative initiatives increases: When focal firm resources are enhanced through inter-organizational learning, similarity in the resource bases across the network might reduce the need for collaboration, which reduces the desirable stability of the entire network (Lorenzoni and Lipparini 1999). Caused by densely interconnected networks, disadvantages of increasing saturation (Kogut, Shan et al. 1992) result from only marginal increases in partnership benefits (Harrigan 1985), search for limitations of novel alliance opportunities and reductions in variety (Walker, Kogut et al. 1997). As behavioral norms spread across a dense network structure, deviant firm behavior and innovation to generate variety are suppressed (Coleman 1988). To maintain sustainability of the entire network structure, the converging alliance network requires the addition of explorative partnerships to extend the capabilities of both the focal actor and network firms. This rationale also explains the balance of weak and strong ties that has been suggested by a number of scholars:

The right balance of dense firm networks and weak dyadic partnerships leverages central capabilities throughout the whole alliance network and generates variance (Uzzi 1997b). Advantages of cohesive networks and structural holes complement each other and serve the focal actors in different strategic contexts. Therefore, maturing and converging networks with intense relationships should be open to the integration of new actors driving innovativeness of the whole system. The redundancy of externally added competency and knowledge creates different and optional inputs, which then generates innovation and change (Nonaka 1994). Especially relevant in high-technology industries, this change towards novel partnerships reinstates the need for a

triggering entity and introduces novel sources of knowledge to both network companies and the focal actor.

Although converging networks tend to follow the ‘emergent path’ of network formation more closely with positive effects on the relationship quality and cost of maintaining the relationships, shifting distribution of rents represents a disincentive for the focal actor (Doz, Olk et al. 2000). According to theoretical predictions, dense relationships facilitating close monitoring and coordination generate a Coleman rent for both the focal actor *and* network firms (Coleman 1990). Based on contributions with a proportional reward, a Coleman network assumes that benefits of superior coordination must be distributed in ways to assure continuing participation.

The undesirable prospects of shared benefits and rents may induce the focal actor to introduce entrepreneurial opportunities to converging and densely connected network partners. Implementation of innovations requires the addition of dyadic partnerships and a more pronounced role for the triggering entity, which both provide a higher level of information diversity.

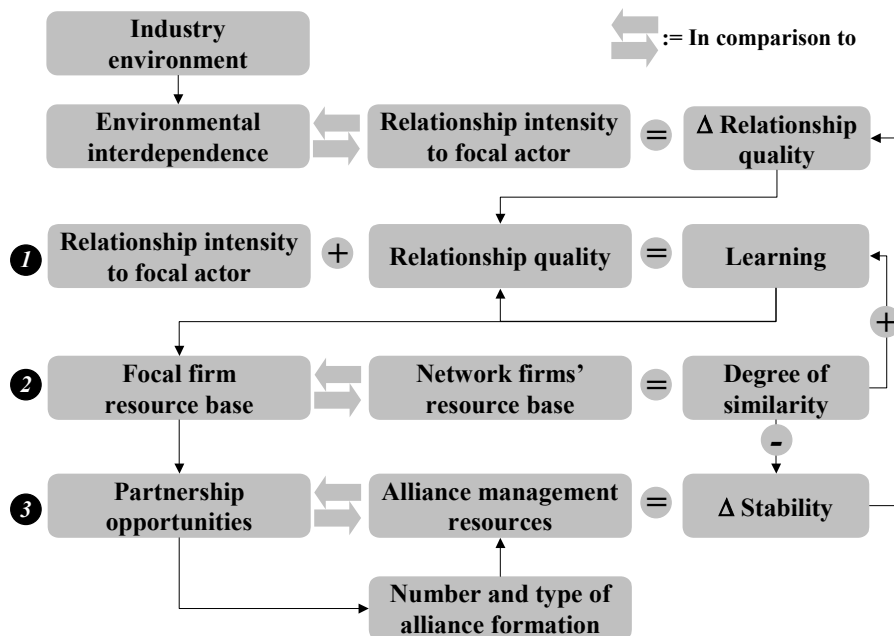


Exhibit 3-6 Summary: Integration of theoretical constructs on network evolution and focal firm resources

In integrating all perspectives and research results on the converging alliance network evolution and focal firm resources, three related constructs have to be balanced for a successful alliance network evolution (Exhibit 3-6)

(1) Relationship intensity as the indicator for the ‘hierarchical’ orientation and strength of the triggering entity in comparison with environmental interdependence perceived by all network partners has an effect on the quality of relationships in the network. ‘Over-triggered’ dominance discourages partners with implications for learning and the long-term potential of inter-organizational networks. Both quality and intensity contribute to focal firm learning.

(2) An increasing degree of resource similarity, although beneficial for the absorptive capacity of the focal firm, reduces environmental interdependence in the network. The resource procurement motive as an inducement for aligning objectives and further cooperation may gradually lose its relevance, which results in a decreasing stability of the network.

(3) Developing focal firm resources attract more valuable partnership opportunities, which require appropriate alliance management resources to turn options into alliances. The number and type of historical alliances contribute to developing this capability. As defined in Proposition # 3, well-developed capabilities ensure stability of the partnership with implications for a low level of conflict and unintended resource exchanges. Harmonized relationships also have a positive impact on the future quality of the relationship.

As the resource-based view of the firm in this study regards the firm as a bundle of operational, alliance management and alliance network resources (Penrose 1959; Wernerfelt 1984; Barney 1991; Amit and Schoemaker 1993), the accumulation and deployment of these valuable, rare and inimitable capabilities generate synergies and rents (Wernerfelt 1984; Barney 1986; Dierickx, Cool et al. 1989; Barney 1991; Mahoney and Pandian 1992; Peteraf 1993; Barney 2001).

Regarding the issue of sustainability to this competitive advantage, resource characteristics of tacitness, complexity, and specificity create barriers to inimitability (Reed and DeFillippi 1990). As partnership structures converge towards more densely connected networks, the mere nature of knowledge and resources exchange clearly

fulfills the requirement of tacitness. Complexity and specificity can be closely linked to the path-dependent and idiosyncratic character of network evolution as described in Exhibit 3-6. All activities needed to maintain the described balance on three dimensions constitute multi-level, evolutionary processes, which clearly establish complex path dependencies (Levinthal and Fichman 1988; Gulati 1995b; Walker, Kogut et al. 1997; Gulati 1999). Complex relationship structures, various dependencies between network relationships, required organizational principles are also very much idiosyncratic to the specific partnership network (Kogut 2000). All presented resource characteristics impose high barriers to limitability for alliance network resources and the operational resources that are accessed.

Reviewing tentative propositions

In this stage of the study, the combined theoretical framework is fully confronted with the set of tentative propositions derived in chapter 2.5. Besides the comparison of theoretical concepts with the empirical accounts and case study findings in the sections preceding chapter 2.5, this confrontation with the developed framework represents the second step of theory review.

The value of this confrontation depends on improving the internal validity of this study as an important component of qualitative research. At this stage, the set of tentative propositions is compared with the described framework summarized in Exhibit 3-6, which assesses the generalized theoretical concepts against empirical accounts from all case studies.

This assessment can then identify and thus support what the framework does explain in an unambiguous manner. Equally significant, the comparison can show where the developed framework remains vague or where it does not hold explanatory power. For a simplified comparison with the framework of the previous chapter, Exhibit 3-7 provides an overview of the tentative proposition as presented in chapter 2.5.

Tentative Proposition	Definition
Proposition # 1	Determined by an assessment of a focal firm's operational resources, more selective alliance network objectives as guidelines in the alliance formation process have a negative effect on the alliance formation rate.
Proposition # 2	With an increasing number of accumulated alliance formation activities under constant alliance network objectives, the focal firm develops valuable alliance management resources of refined selection criteria and processes to successfully screen, form and advance alliances in its network.
Proposition # 3	Better-developed alliance management resources contribute to higher stability in alliance relationships between the focal company and its alliance partners.
Proposition # 4	More stable alliance relationships reduce the magnitude of unintended resource exchange and the level of conflict in partnerships.
Proposition # 5	Lower magnitude of unintended resource exchanges reduces the focal firm's level of innovation and exploration beyond the originally defined alliance objectives.
Proposition # 6	A higher level of conflict and unintended resource exchange in alliance relationships increases the learning potential for partners involved in the alliance.
Proposition # 7	Higher learning potential and closer resource base relatedness of alliance partners with the focal firm have a positive impact on focal firm learning.
Proposition # 8	Initial alliance formation for the support of technical processes across the alliance network aims only at the availability and narrow exchange of operational resources.
Proposition # 9	The growing base of internally developed and externally acquired focal firm resources creates additional and more valuable alliance formation opportunities.
Proposition # 10	Emerging alliance management resources facilitate the selection of high-value alliance formation opportunities and their beneficial transformation into partnerships of higher resource exchange intensity.
Proposition # 11	Alliances of higher value and resource exchange intensity mandate a higher degree of customization and complexity in resource exchange.
Proposition # 12	Focal firm learning through changed alliance network objectives represents a valuable feedback mechanism for refined selection criteria as a component in alliance management resources.
Proposition # 13	Initial and less resource intensive alliance relationships face value reviews in their comparison to internally developed and externally available focal firm resources.
Proposition # 14	Value reviews may lead to the internalization of resources, rebalancing of resource exchange or the discontinuation of the relationship based on efficiency considerations.
Proposition # 15	An increase in the relationship intensity over a certain threshold allows for the transfer in addition to learning about network company resources.
Proposition # 16	Motivated by a transformation from exploration to exploitation in alliance network objectives, an adaptation to the resource exchange between the focal firm and other network firms requires more intensive alliance network relationships to the focal firms and between network firms.

Exhibit 3-7 Overview: Tentative propositions

The development of alliance management resources (Proposition # 1; Proposition # 2; Proposition # 12) is widely reflected in the developed theoretical framework. However, the merged model provides an important extension for Proposition # 2: Not only the number of partnerships forged, but also the type of alliance relationship determines the contribution to a growing level of alliance management resources. The merged framework remains unspecific, however, as to whether various alliance types contribute either to screening criteria or process capabilities. Also, the impact of changing alliance network objectives on the value of alliance management capabilities remains unexplained.

Proposition # 3 suggests higher stability in alliance relationships between the focal company and alliance partners with a developing level of alliance management capabilities. As a conceptual exception, this relationship in the merged framework has

only been based on empirical accounts from firms in this study to establish a sound system of relationships between the theoretical constructs. This link remains an issue for subsequent research.

Related to the topic of inter-organizational learning (Proposition # 4; Proposition # 5; Proposition # 6), various notions on the impact of conflict on inter-organizational learning have been discussed. Although some scholars argue that open domain consensus and diverse interaction have beneficial effects on learning (Doz, Olk et al. 2000), overwhelming literature underlines the favorable effects of trust and reciprocity on knowledge exchange. Therefore, the merged framework contradicts the set of tentative propositions in this area. Further research on a limited, acceptable and favorable level of conflict and diverse interaction as stimulus for innovation processes may prove to be valuable in this context. In comparison to the merged model, Proposition # 7 on focal firm learning has been confirmed and can be extended: Not only resource similarity, but also the quality and the intensity of the relationship have a positive effect on focal firm learning.

To establish a starting point for alliance formation, Proposition # 8 suggests the availability of a basic operational infrastructure with the initial support of inter-organizational alliances. The developed theoretical model offers no explanatory power due to missing research in this area. With regard to this aspect, Powell, Koput et al. (1996) only suggest that technically oriented R&D alliances serve as a starting point for a cycle of network formation. Due to the unspecific research results, classification and operationalization for the resource base and alliances remain two important areas for further research. Further complicating this issue, the set of resources are of industry-specific value to and relevance for focal firms.

Proposition # 9 on growing alliance formation opportunities receives clear support from the merged model. Besides the discussed issue of operationalization, the value of certain operational resource types for providing alliance formation opportunities represents a promising area for further research. According to Proposition # 10 and Proposition # 11, more valuable alliance formation opportunities require the customization of arrangements and more complex combination of exchanged resources. Since the combination of resource exchanges in the network have not be

covered so far in related research, also this area leaves compelling and open research questions.

Discontinuation of partnerships (Proposition # 13; Proposition # 14) has been covered in the merged model through reduced environmental interdependencies. The options of rebalancing these relationships and the factors relevant for choosing between these alternatives remain open issues for further research. The same applies to the issue of forced resource transfer (Proposition # 15), which has been introduced to the merged model to complement the system of propositions.

The transition from exploration to exploitation (Proposition # 16) with effects on the entire network structure has been fully reflected in the merged model and is fully compatible with relevant research cited in this study.

The objective of this chapter was to validate the newly developed model with the case-based tentative proposition in order to increase the model's internal validity. The model has achieved this by utilizing the grounded theory approach on the foundation of cases and theoretical deliberations. The preceding comparison of the developed framework with the set of tentative propositions has proven the explanatory power of the new framework. Since all of the tentative propositions were derived directly from empirical accounts of all cases, the overwhelming majority of their aspects despite contradictions in some areas can be thoroughly explained by the new model.

As expected after concluding grounded theory research, some tentative propositions could not be adequately explained. The detection of shortcomings and the exploration of needs for future refinement and research are discussed in the subsequent chapter 1.

4 Conclusion

In a final review of this study's results, the concluding chapter 4 summarizes managerial implications and issues for further scientific research. Managerial implications should recognize the complexity of interaction effects between developing resources, emerging networks and changing performance. Further research issues should simultaneously cover alliance-, firm-, and network-level factors of network and resource evolution. The breadth of factors and multiple interaction effects only further complicates already existing issues of resource and network operationalization.

As implications for daily management practice, executives should aim at anticipating the effects of network participation and seek partners with rich learning opportunities. In designing their networks, managers should consider all consequences of future alliance formation and their impact on the entire alliance network. This 'forward-looking' approach is – for example – supported by Powell, Koput et al.'s path-dependent cycle of learning (1996), although certainly not all collaboration consequences can be foreseen during the early formation of one specific partnership.

However, some firm- and network-level factors can be used for managerial decision-making: For example, the informational benefits of ties to central actors represent an important corresponding decision criterion in alliance formation. Major strategic initiatives should be directed by the alliance formation with centrally located firms that facilitate further development of future partnerships. This basic understanding of the targeted network structures and anticipation of network dynamics then allows for path creation strategies (Gulati 1999). On the firm level, higher absorptive capacity, developing alliance management skills, increasing awareness for alliance opportunities and a growing reputation as a valuable partner can result from existing alliances and also contribute to future collaboration. Revolving alliance benefits continue to motivate firms for further – although also more selective – partnership formation.

The set of tentative proposition suggests that learning from external operational resources results in a more selective approach of choosing future alliance partners for the entire network. To prevent a decrease in innovativeness and exploration across the network, alliance management resources should be confronted with a sufficient share of 'experimental' partnerships adding a more diverse set of resources to the network.

When additional actors in the network contribute entrepreneurial orientation and keep the system alert, the overall potential of the entire network may increase as well. *Intel's* technology roadmap described in the first case study can serve as an appropriate approach for benchmarking current and detecting missing technological capabilities.

In a mature stage of network development, alliance management resources facilitate the transfer of partnership opportunities into active alliance relationships. However, alliance management resources should be kept in balance with the level of alliance opportunities. Lacking skills in this area may result in not generating all potentials from available alliance opportunities. Centralized bundling of management capabilities, systematic screening of alliance opportunities, defined key performance indicators and strong awareness for multiplicity of interests across the partner network represent good examples for enhanced alliance management resources. The 'trilogy' of rich alliance opportunities contributing new resources, developed alliance management resources and a leveraged combination with already existing internal company resources finally generates the potential for enhanced company performance.

From a management research perspective, contributing factors on multiple levels illustrate the complexity of alliance network and resource-based research with a simultaneous focus on firm performance. Covering all relevant areas in a longitudinal setting imposes significant definition and measurement challenges. However, longitudinal data on all relevant units of analysis could help to explore the sources of dynamic relationships between internal capabilities, alliance networks and performance. Sufficiently detailed data sets could also be useful to explore whether external networks facilitate the repetitive accumulation of internal capabilities, which as a result leads to the formation of additional ties with more valuable partners.

In the area of resource acquisition, further research could cover the more detailed definition of alliance management resources. Both process skills and screening criteria offer valuable areas of further exploration. In the event of network objective change, an open question also remains whether current capabilities in alliance management can be transferred to new industries and technological domains. Across all case studies, developing alliance management capabilities seem to have a positive impact on partnership stability. Further research could cover the issue of alliance stability and its impact on potential benefits for alliance performance. Higher levels of stability could

on one hand facilitate a timely execution of earlier defined alliance objectives, but may on the other hand also limit the search for new entrepreneurial opportunities beyond the immediate scope of collaboration.

Powell, Koput et al.'s (1996) path-dependency of alliance formation results in the open question what nucleus should be chosen as the set of initial alliance relationships that later potentially triggers mutually beneficial effects of emerging resources and more valuable alliance opportunities. Justifying a trial-and-error approach, utilization of an alliance network does not always guarantee performance improvements. More research is therefore needed to fully understand the heterogeneous pathways firms take in learning from partnership experience and improving performance.

These pathways are determined by the rate at which firms enter into alliances of a particular type depending on attributes such as position in alliance networks or industry conditions. As another extension, scholars could also assess the value or resource contribution of the firm's strategic partners (Stuart 2000). The set of propositions suggests a growing complexity of more valuable resource contributions. Industry-specific definition, operationalization and complexity measurement of exchanged resources also represent promising areas for further research. The magnitude of resource contributions also links to the question, whether a certain threshold allows for resource access instead of resource learning. 'Forced' resource access may later have a detrimental effect on relationship quality with impact on the future network path.

Since performance consequences seem to be tightly connected to partner characteristics, further research should also explore the factors that enable valuable partnership opportunities. In addition to performance implications of particular types of alliances options, which have been the primary focus of past research, the overall composition of an alliance network may contribute significantly to firm performance. Several factors, including partner redundancy, the described internal conflict or the mentioned complexity may influence the effectiveness of the entire alliance network configuration.

Conclusion

Various factors influencing alliance network performance across multiple units of analysis, open question of resource measurement, broad scope of either direct or also indirect alliances in partnership portfolios as well as multiple contributions of certain resources types make progress in alliance network research a complex and challenging endeavor. To cover all mentioned areas in a longitudinal setting and to establish links to firm performance only further complicates the detailed data requirements for future studies.

However, shortening innovation cycles, increasing competitive pressures and limited availability of dispersed knowledge in high technology industries require the intense collaboration across multiple partners. Although some trends in the information and communication technology industry mandate further consolidation and cost efficiencies, innovativeness and exchange of entrepreneurial opportunities remain on the top of executive agendas. Restricted company resources only underline the strong necessity to achieve more innovation through actively involving appropriate partners in alliance networks.

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