Tomas Bata University in Zlín
Faculty of Management and Economics

Doctoral Thesis

# Strategic Networking as a Management Tool

Strategický Networking jako nástroj managementu

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I came to Zlín in October 2008 fully inspired by an internship at Trimedia Austria (now Grayling Austria) and my diploma thesis, with the goal to make Strategic Networking measurable and prove its contribution to the performance of a firm. I knew exactly what I wanted to do, though not yet how. After the participation on the Trier Summer School on Social Network Analysis in Trier (Germany) the "fog" significantly cleared up, as I found in Social Network Analysis the tools and measures I needed for reaching my goal. Hereby I would like to thank all the staff of the University in Trier for their support and inspiration.

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## Abstract

Social Networks have attracted enormous interest in the scientific community in recent years. The characteristics, components and impacts of social networks have been studied through different kinds of aspects, such as sociological, geographical, ethnological, political and economical. In economics social network studies have been performed on intra- and inter-organizational levels, though rarely simultaneously. Furthermore the strategic aspects of fostering and controlling informal organizational networks as well as the outcomes of these managerial attempts on the network characteristics and the performance of the organization have not been sufficiently studied yet. However, the need to develop, foster and manage networks efficiently is given for preventing negative effects and provoking positive ones. Therefore this study contributes to scientific theory and practical business development by exploring the influence of Strategic Networking in inter- as well as intra-organizational business-fields. In this dissertation thesis the author develops and defines Strategic Networking as the strategic and target-oriented analysis, development, fostering and control of (inter- as well as intra-organizational) networks on the basis of trust, with the intention to reach certain (organizational) goals and tests its applicability and effects in an extensive survey on three levels: intra-, inter-organizational and regional networks (cluster). The study showed that Strategic Networking goes in line with favourable network characteristics as well as the success of a firm in terms of financial and non-financial performance measures.

## Abstrakt

Sociální sítě přitahují v posledních letech enormní zájem vědecké obce. Charakteristiky, komponenty a dopady sociálních sítí byly studovány z mnoha různých hledisek, jako např. sociologického, geografického, etnologického, politického či ekonomického. V ekonomice jsou studie sociální sítě prováděny na intra- a inter-organizační úrovni, ačkoli zřídkakdy současně. Kromě toho, strategické aspekty podpory a řízení neformálních organizačních sítí, stejně jako výsledky těchto manažerských pokusů o charakteristiku sítí a výkonnost organizace zatím nebyly dostatečně prostudovány. Nicméně, potřeba efektivně rozvíjet, podporovat a spravovat sítě je dána pro prevenci negativních vlivů a vyvolávání vlivů pozitivních. Proto tato studie přispívá zkoumáním vlivu Strategického Networkingu v inter- i intra-organizační oblasti podnikání k vědecké teorii a praxi rozvoje podnikání. Autorka v této disertační práce rozvíjí a definuje Strategický Networking jako strategickou a cílově-orientovanou analýzu, vývoj, podporu a řízení (inter- i intra-organizačních) sítí na základě důvěry, se záměrem dosáhnout určitých (organizačních) cílů a zkoumá jeho použitelnost a účinky v rozsáhlém průzkumu na třech úrovních: inter-organizační, intra-organizační a regionální sítě (klastr). Studie ukázala, že Strategický Networking je v souladu s příznivými charakteristikami sítě, stejně jako úspěchem firmy z hlediska finančních a nefinančních měřítek výkonnosti.

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# ROZŠÍŘENÝ ABSTRAKT

Vliv sociálních sítí spočívá v úsporách z rozsahu (synergické efekty) stejně jako v úsporách ze škály produkce, které jsou zaměřeny na kvalitu a inovaci. V rámci organizací přispívají neformální vztahy zejména k dosažení organizačních cílů a jejich charakteristiky mají vliv na obrat, absentismus, pracovní spokojenost, sdílení znalostí a mnoho dalších (Cross a kol., 2001; Granovetter, 2005; Krackhardt a Brass, 1994). Pozitivní dopady neformálních inter-organizačních sítí závisí především na zakotvení v důvěryhodném vztahu se stakeholdery (zájmovou skupinou) a přispívají ke snížení transakčních nákladů, sledování nákladů a rychlejšímu rozhodování (Uzzi, 1997).

Za účelem dosažení pozitivních účinků organizačních sítí je třeba podporovat a rozvíjet neformální vztahy řízením sítí. Potřeba je dána vzhledem k tomu, že sociální sítě mohou vést ke ztrátě strategické autonomie a nekontrolovanému toku znalostí, což je třeba vzít v úvahu a předejít tomu pečlivou analýzou a správou sítě (Fuller-Love, 2009). Nicméně, modely správy sítě jsou vzácné a bylo provedeno jen málo výzkumů o vlivu manažerských pokusů na charakteristiku organizačních sítí a výkonnost organizace. Proto se autorka snaží přispět k vědecké teorii a praxi rozvoje podnikání hlubším zkoumáním této oblasti zaměřené na neformální intra-, inter-organizační a regionální sítě (klastr).

Hlavním cílem této studie je zhodnotit nástroj pro správu sítě - Strategický Networking (vyvinut a definován autorkou) v praxi a prokázat, že přispívá k výkonnosti sítě.

V rámci této studie budou zodpovězeny tři následující otázky:

- *RQ1: Jak jsou organizační sítě (intra-, inter- a regionální) řízeny v praxi?*
- *RQ2: Jak vypadá intra-, inter-organizační a regionální síť řízena Strategickým Networkingem?*
- *RQ3: Je síť, která je spravována Strategickým Networkingem úspěšnější, pokud jde o finanční či nefinanční opatření?*

Sběr dat, stejně jako analýza byly rozděleny na mikro úrovni (intra-organizační sítě), meso úrovni (inter-organizační sítě) a makro úrovni (klastry). Údaje byly shromážděny prostřednictvím vícevrstevného sběru dat, včetně on-line dotazníku, skupinových rozhovorů a výzkumu od stolu, informacích o intra-organizačních sítích 3 rakouských malých a středních podniků, 8 inter-organizačních sítích (4 rakouské, 4 české), 52 rakouských a 30 českých klastrů. Analýza ukázala, že Strategický Networking je v souladu s příznivými charakteristikami sítě, stejně jako s úspěchem z hlediska finančních a nefinančních měřítek výkonnosti.

# EXTENDED ABSTRACT

The effects of social networks lie in the economies of scale (synergy effects) as well as in the economies of scope, which are focused on quality and innovation. The informal relations within organizations greatly contribute to the achievement of organizational objectives and their characteristics have an impact on turnover, absenteeism, job-satisfaction, knowledge-sharing and many more (Cross et al., 2001; Granovetter, 2005; Krackhardt & Brass, 1994). Positive impacts from informal inter-organizational networks result mainly from the embeddedness in trustful relations with stakeholders and contribute to lower transaction costs, monitoring costs and faster decision making (Uzzi, 1997).

In order to achieve positive effects of organizational networks it is necessary to foster and develop informal relations by network management. The need for it is given, as social networks can lead to loss of strategic autonomy and uncontrolled flow of knowledge, which has to be taken into account and prevented by attentive network analysis and network management (Fuller-Love, 2009). However, network management models are scarce and little research has been done on the effect of managerial attempts on the characteristics of organizational networks and the performance of an organization. Therefore, the author aims to contribute to scientific theory and practical business development by exploring this field further, focused on informal intra-, inter-organizational and regional networks (cluster).

The main target of this study is to evaluate the network management tool Strategic Networking, which has been developed and defined by the author, in practice and to prove that it contributes to the performance of a network.

Three research questions shall be answered in the scope of this study:

- *RQ1: How are organizational networks (intra-, inter- and regional) managed in practice?*
- *RQ2: What does an intra- , inter-organizational and regional Network managed by Strategic Networking look like?*
- *RQ3: Is a network that is managed by Strategic Networking more successful in terms of financial or non-financial measures?*

The data collection as well as the analysis has been split on micro-level (intra-organizational networks), meso-level (inter-organizational networks) and on macro-level (clusters). By multi-layered data-collection including an online questionnaire, group interviews and desktop research, information about the intra-organizational networks of 3 Austrian SMEs, 8 inter-organizational networks (4 Austrian, 4 Czech), 52 Austrian and 30 Czech clusters has been gathered. The analysis shows that Strategic Networking goes in line with favourable network characteristics as well as the success in terms of financial and non-financial performance measures.

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| | |
|---|---|
| ABA | Austrian Business Agency |
| BSC | Balanced Scorecard |
| CMS | Consultancy Management Standard |
| CVF | Competing Values Framework |
| DULV | Deutscher Ultraleichtflug Verband |
| EVA | Economic Value Added |
| ICCO | International Communications Consultancy Organisation |
| ION | Inter-organizational Networks |
| ISO | International Organization for Standardization |
| KC | Kunststoff-Cluster |
| LAA CR | Light Aircraft Association of the Czech Republic |
| LUB | Least Upper Bound |
| MPO | Ministerstvo průmyslu a obchodu |
| NGO | Non-governmental organization |
| NPO | Non-profit organization |
| OCAI | Organizational Culture Assessment Instrument |
| OECD | Organisation for Economic Co-operation and Development |
| OeNB | Österreichische National Bank |
| PR | Public Relations |
| ROA | Return on Assets |
| ROE | Return on Equity |
| SME | Small- and Medium-Sized Companies |
| SNA | Social Network Analysis |
| TIC | Technology Innovation Centre |
| TQM | Total-Quality-Management |
| VNL | Verein Netzwerk Logistic (Association for Network Logistics) |

# 1. INTRODUCTION TO SOCIAL NETWORKS

To form social networks is a human need and ability; from early childhood on we are members of networks, our family, school classes, sports clubs and many more. This seems to be far away from the network definition of social network analysis, where networks are described as a defined sum of nodes or elements and the sum of the edges/ties between them (Jansen, 2006). Indeed nodes are the individuals, such as persons, corporate stakeholder, companies, ministerial accounts or countries. Other authors define social networks as a defined set of persons, and the linkages between them (Tichy et al., 1979). Furthermore networks are a set of relations, which differ in aim and duration.

## 1.1 Types of Networks and their Players

Various ways of distinguishing social networks exist. Basically a social network can be formal, e.g. a sports club, or informal, e.g. a group of friends. The difference between them is unproblematic; formal networks are networks whose members are listed in a certain way and the question about being a member of the network is evident, because the network borders are clearly defined. Of a sports club a list of members exists and it is easy to differentiate who is a part of the network and who is not. For the informal network of friends it is not that clear to tell, who belongs to the group and who does not. These informal networks are classified into "communication and influence" and "exchange and negotiation" networks irrespective of their actual topic (Jansen, 2006).

A company's network can be further distinguished into an *intra-organizational* and *inter-organizational network*. Intra-organizational networks are the relations between employees, while inter-organizational networks form relations to shareholders, suppliers, costumers, competitors and any other possible stakeholder as for instance regulatory authorities. Inter-organizational networks can be further distinguished into local/global, simple/complex, obligatory/promotional/, open/closed or symmetric/asymmetric networks among others (Sydow, 2006).

Moreover social networks can be divided into open and closed networks. Within open networks, which are heterogeneous, not all members know each other. Closed networks illustrate an exclusive and homogeneous network, where all members know each other (Antcliff et al., 2007).

Clusters are another type of networks, which occur, or are aimed to be built, often in nowadays economics. On one hand there are cluster areas in networks, which are more densely connected to each other (Rosen, 2000). On the other hand there are local clusters defined as geographically concentrated firms of different sizes, horizontally and/or vertically linked and operating in the same line of business (OECD, 2001).

Social Network Analysis offers tools and ways not only to measure, but additionally to visualize social networks. These studies and researches provide information about all network characteristics, though in practice firms mostly neither have the time nor possibility to analyse their network as detailed as social network analysis asks for, therefore cognitions from this field can be used in practice even without deep analysis.

Different positions within a network can be identified and visualized as in Figure 1. Global players are people with a lot of influence, while insiders do not have a lot of influence, but good connections to global players. Information brokers have a lot of relations, while local players only have a lot of relations in a certain branch or area (Friedschröder, 2005).

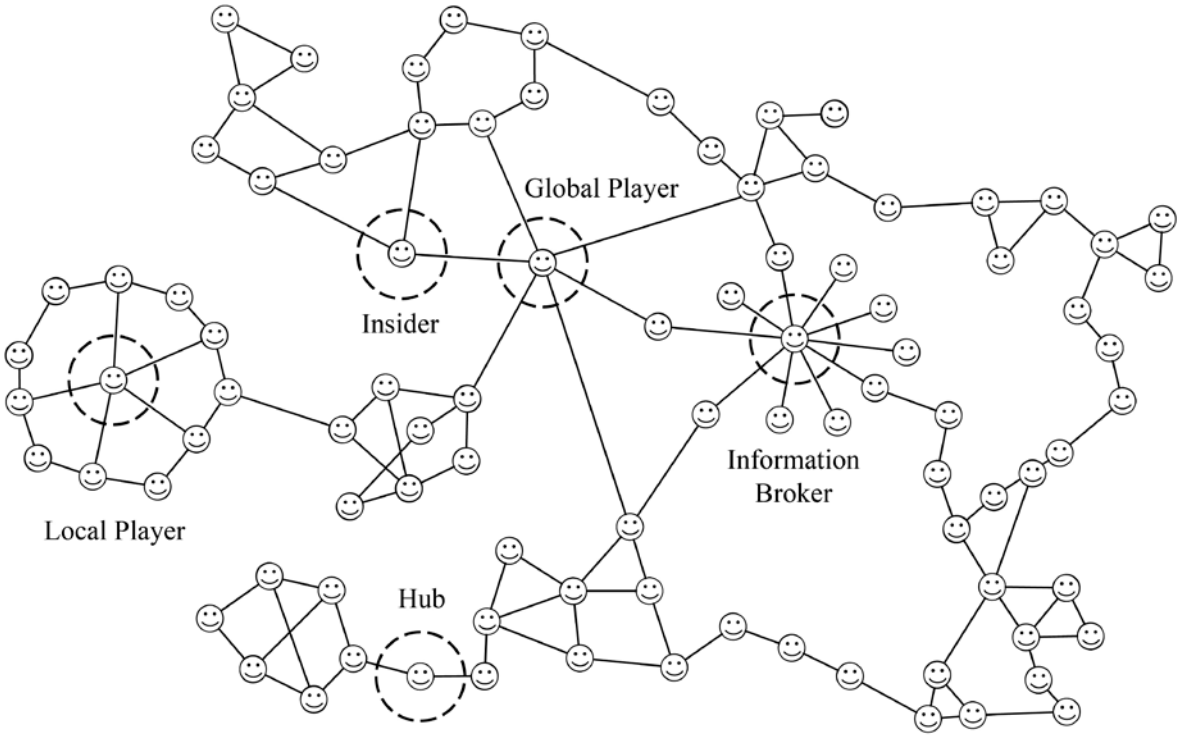


Figure 1: Positions in a Network
*Source: Friedschröder, 2005, p.70, mod.*

Cross and Prusak suggested a different model with four role-players. Some role-players are new, while others just differ in nomenclature. The central connector, who links most people in a network with each other, can be equalized with the global player. Boundary spanners are defined because of their characteristic to link different network parts, which is equal to the hub. The next role player, the information broker, is defined by Cross and Prusak as a combination of Friedschröder's local player and information broker. Peripheral specialists are consulted for specialized information (Cross & Prusak, 2002).

Network hubs shall be highlighted once more as having a big influence on the network and the information spread within. Network hubs can be recognized due

to their adjectives with the ACTIVE formula. Hubs are ahead in **a**doption, highly **c**onnected, they are **t**ravellers, **i**nformation-hungry, **v**ocal and **e**xposed to the media more than others (Rosen, 2000).

## 1.2 Social Network Relations and Structure

The smallest part within a network is the so called dyad, the relation between two nodes or individuals as it is shown in Figure 2. A dyad can be one-sided or reciprocal and represents a rather weak and instable relation, which can be enforced by adding more people to this relation. Relations between three nodes or individuals constitute a so called triad. Bigger sections in networks after dyad and triad are groups and cliques (Jansen, 2006).

A network differs in the structure of the relations it consists of, but furthermore the type of relation and the characteristics of this relation can be distinguished. A famous differentiation of networks is the weak and strong tie differentiation by Granovetter. A graphical differentiation between weak and strong ties is shown in Figure 2. Granovetter defines a strong tie as a relation with close and intensive intercommunications, e.g. friends and families. Weak ties are defined as loose relations as to acquaintances, which have the advantage of adding new information to the network, while the advantage of strong ties is the generation of trust and solidarity (Granovetter, 1983).

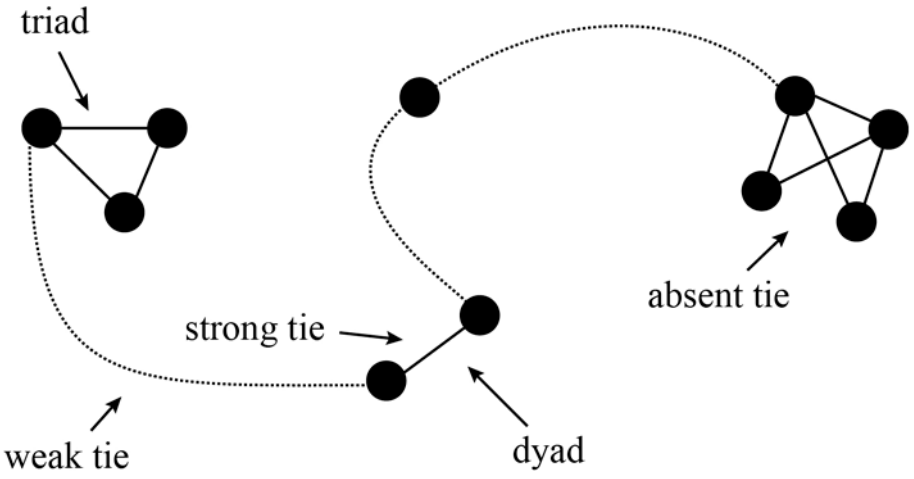


Figure 2: Ties and Nodes in a Network
*Source: Author's own*

The structure of social networks has been researched in various studies. The first and probably most famous study was done by Stanley Milgram in 1967. In an experiment, he proved that the average distance between people who do not know each other directly is 5.2 steps (Travers & Milgram, 1969). This is possible due to the structure of social networks, which are highly clustered, with a high density. Cohesion and density in networks provokes redundancies, a

condition which leads on one hand to trust and cooperation but on the other hand to a lack of new information (Gargiulo & Benassi, 2000). ‘Small-world-networks’ are neither ordered, nor randomized. These networks, such as social networks, the internet, the human brain, street networks and many more, show ordered as well as random links, leading to a high resistance against (random) attacks. However, these networks are because of their decentralized structure easy to destroy with pointed attacks. This is possible because of their network hubs and connectors, which are part of this ‘aristocratic network’ because of preferential attachment. This structure, neither random, nor ordered, happens naturally and seems to be a natural source of security and stability (Buchanan, 2002). This structure is logical, when thinking about our social networks. Most contacts are sorted around us, neighbourhood, work, school, sports clubs, etc. but some contacts do not fit into this scheme and are acquaintances from far away. How many contacts someone has in common with his contacts can be measured and expressed by the degree of clustering (Buchanan, 2002).

An impact relating from the structure of a network is the decrease or increase of corruption. Hierarchical forms of networks lead to corruption and decrease in trust and economic development, while horizontal and more egalitarian forms of networks increase trust and economic development and moreover decrease corruption and lead to more effective governments (Halpern, 2005).

Another important aspect is complexity. More complex networks tend to fluctuate less and are more stable than simple networks (Buchanan, 2002), which seems to be highly important for firms and their intra-organizational network.

## 1.3 Factors of Influence

In networks there exist basically two factors of influence: Trust and Power. While trust always assumes positive consequences, power assumes negative ones. This means that in a network composed of power the individual acts because of being afraid of negative consequences, such as sanctions. Money, knowledge and democracy can be classified as a kind of power (Sydow, 2006). Trust is defined as the expectations of a partner’s reliability with regard to his obligations, predictability of behaviour, and fairness in actions and negotiations and is further more a product of the successful integration of norms and values within a network (Fukuyama, 1995; Beugelsdijk & Van Schaik, 2005). Furthermore, network closure and the presence of cohesive ties promotes the development of trust (Gargiulo & Benassi, 2000).

Power appears in two ways, as legitimate power due to hierarchy, or a power due to structural holes (Burt, 1995). Control benefits from a brokerage relationship between other players. Structural holes, moreover generate information benefits (Burt, 1995) and prevent amplified reciprocity. This is one kind of (negative) network consequences and leads to sanctions. Amplified reciprocity is the pressure on a person to reciprocate past favours in order not to

risk gaining a tarnished reputation that may restrict the ability to make new contacts (Antcliff et al., 2007).

Reciprocity in general is a pervasive and an economically significant value in networks, no matter, if these are long-term relationships, sporadic or anonymous relations. Reciprocity is the propensity to reward generosity and punish opportunism (Sethi & Somanathan, 2003). Reciprocity is not a kind of altruism but moreover an expectation of future benefits from their action (Fehr & Gächter, 2000). From this underlying principle derives the networking principle 'Do ut des', [lat.: I give so that you may give].

Another factor in social networks is shaming as a kind of sanction. This mechanism makes social relations work, as contacts suffer the sanction of shame from their close contacts, if norms and values were offended. This goes in line with behaviour setting, a mechanism which develops common rules, cultural understandings within a social ecosystem. The members of a network, for instance a neighbourhood, school or firm, ensure these common rules and values by informing, enforcing and ejecting. This can happen in positive as well as negative means (Halpern, 2005).

Another important factor of influence within the network is the members' characteristics. Social competence is an important ability needed to cooperate successfully within networks. There are five main competences, which have been discovered to exert influence. These are social perception, the ability to correctly gauge current moods or emotions of network partners, impression management of the own appearance and image, persuasion and influence. The ability to adjust to a wide range of social situations and to feel comfortable with individuals from diverse backgrounds (Social Adaptability) counts as well as emotional intelligence, the ability to regulate one's own emotions and have influence on the emotions of others (Beugelsdijk & Van Schaik, 2005). With this the need for proximity in social networks goes in line. Proximity is the quality of relationships in psychological, cultural, social and physical dimensions that influences the quality and quantity of communication (Becerra & Huemer, 2002), (Lechner & Dowling, 2003), (Gössling, 2007).

A factor of influence deriving from all the above mentioned factors is Social capital, which is defined as the outcomes for individuals from networks with shared norms, values, and understandings that facilitate co-operation within and among groups (OECD, 2001). It is a resource embedded in social structure, which can be accessed as well as mobilized in purposive actions (Lin, 1999). As Social capital is rooted in social networks and social relations it must be measured in relation to these roots and its three ingredients, the structural (embeddedness), the opportunity (accessibility) and action-oriented (use) aspects (Lin, 1999).

Social capital has been discussed much and analysed, if it is really a form of capital or not. Capital is defined as something accumulated which contributes to higher income or better outcomes. Furthermore, it is something, which can be

used in the production of other goods and services (Robinson et al., 2002). Does social capital, even though sometimes defined as sympathy, fulfil these and other characteristics to be called capital, beside financial, human, organizational and cultural capital? Moreover, some theories put into question, if social capital or social networks range first. Here it will be assumed that networks are the origin of social capital, which is based on trust and norms and can improve the efficiency of coordinated actions (Robinson et al., 2002). An argument for Social capital is that one can invest in Social capital, even though it is a slow progress, and Social capital can be overused (Halpern, 2005). Lin proposes three arguments for Social capital. One can invest in social capital, access and mobilize it and gain returns from it. The returns can be categorized into returns to instrumental action and returns to expressive action (Lin, 1999). Returns on instrumental actions are economic, political and social return. Economic return can be the increase of turnover due to a new customer, political return due to the influence on a legislative change and social return can be a contribution to a better reputation. Return on expressive action enforces and secures one's resources against possible losses. Moreover, these effects make a positive contribution to one's physical and mental health as well as life satisfaction (Halpern, 2005; Lin, 1999).

Basically there exist two forms of Social capital, Bonding, an inward-looking integration with strong ties, and Bridging, an outward-looking linking with weak ties (Putnam, 2000). Both kinds of Social capital have the function of building transparency in the meaning of information-flow and reduction of transaction-costs and rationalization (Halpern, 2005).

Bonding social capital emerges from strong social ties, which are based on a social identity, like family, kinship, gender, ethnicity, religion or organizational culture, leading to strong trust and proximity (Van Staveren & Knorringa, 2007). Bonding social capital is basically an outcome from a homogenous network, where members are predominantly 'like me' (Antcliff et al., 2007). Bridging social capital emerges from weak ties across the society, in which an individual is embedded. Nevertheless those networks are held together through group membership and the sharing of common values. Horizontal and vertical relations build a heterogeneous network, where members are predominantly 'unlike me' (Van Staveren & Knorringa, 2007; Antcliff et al., 2007).

## 1.4 The Effect – Influence Concept

There exist various theories about social resources, though they partly contradict each other. On the one hand the structural holes theory of Burt, which says that benefits from social capital derive from structural holes (lack of network closure) and leads to brokerage opportunities and competitive advantage (Burt, 1995). On the other hand the view of social capital is the one from Coleman, who stresses that trust and trustworthiness, norms and social

structure as well as information-flow and cooperation derives from network closure and the presence of cohesive ties (Coleman, 1988).

Podolny and Baron link those two views, when underlining that the effects of structural holes are positive for ties that convey resources and information, but negative for ties that transmit identity and expectations (Podolny & Baron, 1997). Granovetter points out, that especially the weak ties to acquaintances bring more new information to an actor in a network than the strong ties to close friends (Granovetter, 1983), because many of the possible ties are present to the actor and bring, therefore, no 'fresh' information. A famous example for the 'strength of weak ties' is the search for a new job.

Therefore, it might be stressed that structural holes are useful for gathering new information and other resources, but for the creation of trust, proximity, norms and values, which is needed in successful co-operations, cohesive ties (network closure) are more advisable. Furthermore, the risk of amplified reciprocity can be avoided with the help of structural holes, but such a network lacks optimization possibilities of the network (Podolny & Baron, 1997). A lack of structural holes can therefore lead to coordination failures within the network. Moreover, cohesive networks are a warranty against defection from cooperation and are the basis for support and cooperation (Gargiulo & Benassi, 2000). In a firm the advantages and disadvantages from dense, cohesive networks and networks with structural holes have to be evaluated according to business needs and structures.

The findings from the literature research discussed in sections above will now be summarized in a concept, showing, how the specific features of a social network contribute to the effects. Figure 3 builds an overview from the single actor to the returns of networks, starting with the actor(s), who influence and decide consciously or not, what kind of network type they build, whether the network is formal or informal, private or public, open or closed, global or local. The actors also have influence on their links and how close they are. Certain contacts we cannot choose, e.g. family or colleagues, but we do choose how close we are with them, as according to sympathy, personal interests and targets we form a closer or weaker relationship.

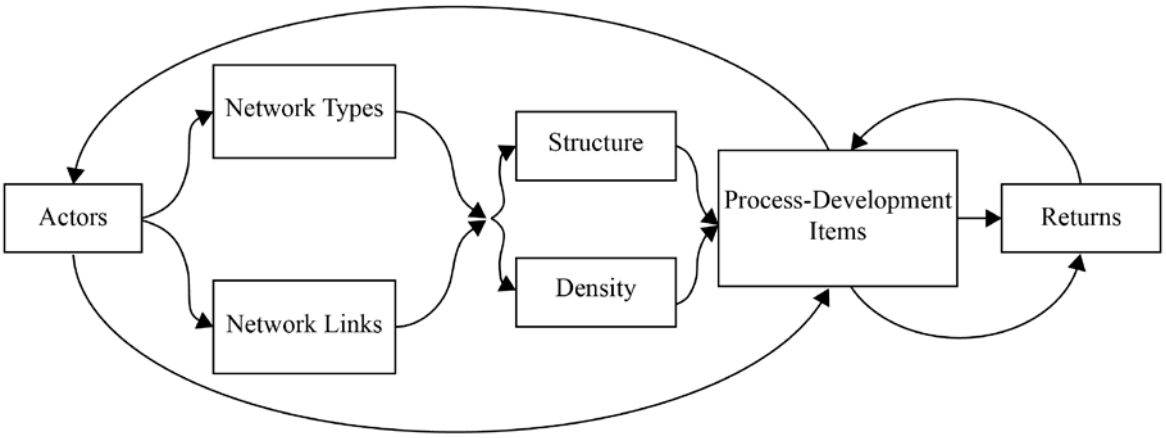


Figure 3: Impact of Network Characteristics on the Effects
*Source: Author's own*

The next step shown in Figure 3 is the connection from the types of networks and their links to structure and density. Both types and links affect the structure, and density of a network. A formal network has a certain number of members and often a given structure, e.g. the hierarchy in a students' union. Moreover the links influence as well structure and density, simple because of time limitations, which are given as one actor cannot deal with more than a certain number of close contacts. The structure of a network and the density of the contacts embedded can show various characteristics. A network can have a high hierarchy and close contacts, or be egalitarian with weak links, or vice versa. All previous mentioned 'ingredients' build the 'Process-Development-Items' such as norms, values, trust, proximity and power. These items are, furthermore, influenced by the actors' characteristics and social skills. At the same time these items have a certain influence on the actors, as received or lacked trust, proximity and reciprocity may influence the actor's characteristics and his course of action dealing in future with social networks. Even so these 'Process-Development-Items' mainly influence the possible returns of networks, which can be instrumental action or expressive action. Conversely the gained returns from networks influence the 'Process-Development-Items', e.g. an actor, who managed to improve his reputation due to expressive action returns, might build up his trustworthiness in the network and create proximity.

As an actor normally does not have a single network, his total return from networks is built up by the return of every single network he is member of. Therefore, benefiting from density as well as structural holes at the same time is no contradiction.[1]

[1] A previous version of this chapter has been published in: Proceedings of the International Bata Conference; April, 2, 2009, Zlín. ISBN 978-80-7318-812-2.

# 2. ORGANIZATIONAL NETWORKS

After introducing the general characteristics and components of social networks, organizational networks and their characteristics shall be discussed in more detail. Organizational social networks can be subdivided into intra-organizational and inter-organizational networks. Intra-organizational networks are the relations between employees, while inter-organizational networks form relations to shareholders, suppliers, customers, competitors and any other possible stakeholder, as for instance regulatory authorities (Sydow, 2006).

Moreover there exists another type of organizational networks, the strategic and regional networks, which describe relations between companies that have characteristics of a primary organizational form and serve economic activities (Sydow & Windeler, 2001). An example for this kind of networks are joint ventures, strategic alliances, and furthermore clusters. Clusters are a specific type of coherent network (Rosen, 2000) or groups of geographically concentrated firms of different sizes, horizontally and/or vertically linked and operating in the same line of business (OECD, 2001), they occur or are established more often these days. This is mainly because they are a source of innovation as being based on collaboration, proximity and networks that result in a process of mutual learning, emulation of positive role models and personal contacts (Ionescu, 2002).

The effects of social networks lie in the economies of scale (synergy effects) as well as in the economies of scope, which are focused on quality and innovation and are therefore the primary target of many companies. Another advantage of social networks lies in the transaction-cost theory, which says that the costs for coordination and transaction can be reduced due to social networks. Transaction costs such as costs for searches and information, bargaining, policing and enforcement, can be limited with the help of social networks due to trust, proximity, reciprocity and social responsibility (Payer, 2002).

## 2.1 Intra-organizational Networks

Beside the formal relations, which are defined by the organizational charts, there exists another dimension of social networks within an organization, the so called informal relations. Informal relations contribute to the achievement of organizational objectives by building a supplement to the formal communication and exchange links. Those informal relations can in their greatest extend replace the formal structure (Rank, 2008). Research showed that it is more likely that the horizontal dimension of formal relations to be disregarded than for the vertical dimension. Moreover it seems that for the management in particular vertical cooperation links have a greater importance than links on the same hierarchical level (Rank, 2008).

The formal and informal social networks within organizations differ from each other in their basic characteristics. While in the formal organization the

underlying goals are the organizational ones, informal networks are driven by individuals' goals. Moreover the basis of communication derives from proximity in terms of physical, professional, task, social and formal distance, while in formal relations offices are formally related. Moreover the control mechanisms in informal networks are norms not rules and therefore the leadership implicit instead of explicit (Waldstrøm, 2001). Within informal networks the basis of power derives from the network structure (Burt, 1995) and not from legitimate authority.

The informal intra-organizational networks are influenced mainly by three conditions: the formal organization (which can be vice-versa also influenced by the informal organization), the organizational demography and the organization's technology and environment, as for instance a turbulent corporate environment leads to a more flat structure and more information intensive organizations show higher cohesiveness (Flap et al., 1998). A lot of research has been done on the influence of organizational demography with inconsistent findings. Differences in education, age, sex and race, seem to lead to greater commitment to the organization while at the same time commitment of majorities decreases when the number of minority groups grow (Flap et al., 1998). Especially the impact of homophily and heterophily in terms of sex is an often researched field. Ibarra (1992) showed in her research that men are more likely to form multiplex homophilous ties, while women enjoy social support and friendship from other women and are linked to a greater extend to men in order to enjoy instrumental network access. Preference for homophily in general is a natural mechanism as it makes communication easier, behaviour more predictable and evolvement of trust more likely. Moreover interpersonal attraction can be explained by homophily (Ibarra, 1992).

Before analysing the characteristics of content, links and structure of an informal intra-organizational network (Tichy et al., 1979) it shall be elaborated why informal networks exist. As Waldstrøm stated *"Individuals do not stop being social beings when placed in a formal workplace setting"* (Waldstrøm, 2001, p.7). Therefore employees have affiliation needs and want to belong to a group, for friendship and support. Moreover identity and self-esteem can be developed, enhanced and confirmed by belonging to a group. Other drivers are defence mechanisms, risk reduction and the craving for knowledge (Baker, 1981 and Han, 1983 in Waldstrøm, 2001).

- *The Content* of informal intra-organizational networks reaches from advice over trust to communication links and can be grouped into four main contents: affect, production, political and cultural. Affect describes friendships, trust and intimate relations, production links can be advice, exchange of technical/instrumental knowledge and innovation. Political content is described as the influence, power and authority of its actors. The cultural dimension of content is communication and flow of information, which is said to have a great influence on the performance of

an organization (Bryan et al. 2007). The organizational culture is a property of the network as the culture is to a great extent influenced by it and can be described as the glue which holds the network together (Krackhardt & Kilduff, 1990). As not only the culture is a property of the network, so the informal organization is a product of the culture (Waldstrøm, 2001). This leads to a self-perpetual circle of influences, where shared norms, values and visions are spread and ensured in social interaction between trusting individuals (Tsai & Ghoshal, 1998). Shared norms and visions moreover enable information flow and knowledge sharing as knowledge in general and tacit knowledge in particular, which depends on interaction and exchange of experiences based on trust and common understanding (Krebs, 2007).

- *The properties of the links or relations* can be described as its strength, hereby Granovetter's "Strenght of weak ties" theory (Granovetter, 1983) is important. The theory states that while strong ties lead to trust and cooperation, weak ties have the advantage of providing new information to the network, as strong ties have the tendency to close each other (Granovetter, 1983) and lead therefore to redundant information (see Chapter 1.2 and 1.4). Another characteristic of links is their reciprocity and symmetry. Multiplexity of links, which leads on the one hand to stronger and more stable relationships (Skvoretz & Agneessens, 2007), but on the other hand if too high can also lead to information overload and stress (Krackhardt & Brass, 1994).
- *The structural characteristics* of a social network, which have the greatest impact, are according to Tichy et al. (1979) the size of the network as well as its density (connectedness), the ratio of all realized links in the network to all possible links. The degree of clustering describes whether densely interconnected areas exist in the network. Openness of networks stands in contrast to closed networks, which are described as a more egalitarian structure, which leads to collective support and higher trust. Openness on the contrary is connected to more individualism and information flow (Antcliff et al, 2007). A hierarchical network structure is connected to higher efficiency due to better information flow and increased stability especially in turbulent times, as it is less attackable Krackhardt, 1994). Other scholars such as Halpern (2005) state the complete opposite. Halpern claims that hierarchy leads to corruption and the decrease of social trust and economic development, while more horizontal / egalitarian networks increase trust and economic development. Buchanan (2002) outlines that a decentralised and hierarchical network is easier to attack, because of its hubs. Insight to this tension brings the 'small world' research, which proved that natural networks, such as a swarm of fireflies, the brain, street systems, telephone systems as well as the internet, consist of ordered as well as random links and have similar characteristics in

terms of centrality and degree of separation. The small world structure is therefore a natural source of security and stability in networks (Buchanan, 2002), which can be used also in organizational life.

Manifold fields of influence of intra-organizational networks have been researched. To the positive effects of intra-organizational networks can be counted knowledge-sharing, which depends on the knowledge about another person's knowledge, the accessibility of that person, the willingness of the person to provide information and moreover the degree of safety of the relationship to promote learning and creativity, which is highly connected to trust (Cross et al., 2001).

Moreover intra-organizational networks influence turnover and absenteeism. Turnover, as on one hand a snowball-effect comes into action, when connected employees leave, and on the other hand because of the "rotten apple"-syndrome, which leads to the fact that the job motivation and satisfaction of employees densely connected to somebody who left increases after the person left. Absenteeism is influenced by the set norms, values and work attitudes, which are communicated, negotiated and enforced by informal relations (Krackhardt & Brass, 1994).

Job-satisfaction can be linked to centrality, as (Roberts & O'Reilly, 1979 in Krackhardt & Brass, 1994) found central actors to be more satisfied than peripheral actors. Even though Brass (1981) found different result, other findings suggest that satisfaction derives from the interaction with others. Nevertheless, for certain is that socially better integrated workers have higher internal motivation (Flap et al., 1998). Concerning stress, research showed that too high density as well as multiplexity leads to stress, therefore an optimum level has to be found (Krackhardt & Brass, 1994).

Conflicts and their handling is also a product of its social networks, as the network conditions influence whether a conflict comes into public and how it is solved. Research showed that a high level of strong, multiplex ties goes together with the absence of disruptive conflicts; especially the existence of brokers prevents conflicts (Flap et al., 1998; Krackhardt, 1994). The latter can be showed by the existence of Least-upper-boundedness (Krackhardt, 1994), which is a predictor for the profit of an organization. The same way as intra-organizational social networks have an influence on the performance of an organization, good performance of an organization affects the social relations within that organization (Flap et al., 1998).

## 2.2 Inter-organizational Networks

Inter-organizational networks are a natural phenomenon in organizational life, even though not always named network, they shape the economic transfer (Uzzi, 1997), survival and growth of an entrepreneurial firm (Lechner & Dowling, 2003) and many more. Inter-organizational networks for instance evolve as

partnerships, strategic alliances, coalitions, cooperative arrangements, and collaborative agreements.

The positive influences, mainly from embeddedness in an inter-organizational network under the existence of trust, contribute to lower transaction costs, reduced monitoring costs and faster decision making. Embeddedness in a network can be understood as a structural, cultural, political and cognitive aspect (Uzzi, 1997). Trustful inter-organizational networks (IONs) contribute to overcome the principal-agent problem due to lowering of information asymmetries (Uzzi, 1997). Inter-organizational networks enable growth and survival especially for small firms and start-ups, which tend to suffer from lack of information resources as well as liabilities of newness and smallness (Lechner et al., 2006). The effects of inter-organizational networks can be grouped into structural, process and outcome effects. The structural ones includes the embeddedness, density and multiplexity of the firms' networks; the process effects cover mutual learning, trust, fairness, legitimation and power, while the outcomes of inter-organizational networks contain contributions to innovation, survival, financial and non-financial performance such as quality and customer satisfaction (Provan & Sydow, 2008).

Though especially for the structural aspects it is essential to note that the rule is not the more the better. Over-embeddedness in an inter-organizational network leads to redundant information, strong liabilities and unforeseeable forces (Uzzi, 1997). In inter-organizational networks growth barriers emerge when the maximum number of strong ties is reached. Moreover inter-organizational relations consume time, energy and require certain meta-capabilities of the management (Lechner & Dowling, 2003). Those capabilities are anchored on a relational dimension in order to select the right partners for the network, on a combinatory dimension in order to recognize possibilities and finally on an absorptive dimension, which is needed to integrate external knowledge through the network (Lechner & Dowling, 2003).

Research on inter-organizational networks showed that the network size as well as the relations a network consists of differs in the various development stages of a firm (Lechner & Dowling, 2003, Lechner et al., 2006). Five types of network types were identified: social networks and reputational networks, which are crucial at the early stage of a firm; co-opetition networks, which give flexibility by allowing to concentrate on the core business in the medium stage of development; Marketing-networks and KIT (Knowledge, Innovation, Technology)-Networks, which allow to overcome growth barriers by incorporating new weak ties (Lechner & Dowling, 2003).

Even though heavily researched there exists a lack of consensus about the correct measures and approaches for inter-organizational network analysis (Lechner et al., 2006). In particular the level and perspective of analysis differs. The egocentric perspective enjoys a longer tradition in research though in recent years the whole network approach has been pushed by certain scholars (Provan

& Sydow, 2008, Provan et al., 2007). Egocentric perspective conducts the research from the point of view of a focal organization and allows the analysis of the impact of relations and the types of relations. Moreover the network position and its shift over time can be analysed from this perspective (Provan et al., 2007), while sociocentric (whole, total) network analysis is focused on the characteristics of the network itself and the actors involved.

The stakeholder approach is a level of analysis of inter-organizational networks that includes all relations to stakeholders, which are defined as *"any group or individual who can affect or is affected by the achievement of the firm's objectives"* (Freeman 1984, p.25). Therefore looking at all groups and individuals who have any influence on the company's performance ensures the analysis of all relations influencing the latter.

In a rather heuristic approach Vandekerckhove & Dentchev (2005) are looking at the opportunities due to indirect or missing contact to stakeholders, whereas Rowley (1997) provides a classification of positions of the focal firm in its inter-organizational network as *„the existence of relationships between stakeholder can affect the behaviour of stakeholders and focal organizations"* (Rowley, 1997, p.892). Deriving from the density of the inter-organizational network and the centrality of the focal organization four types of roles are assigned to the focal organization. Table 1 provides an overview of the roles a focal organization can play in its stakeholder network.

Table 1: Classification of Stakeholder-Network-Positions.

| | **High Centrality** | **Low Centrality** |
|---|---|---|
| **High Density** | Compromiser | Subordinate |
| **Low Density** | Commander | Solitarian |

*Source: Rowley, 1997; p.901*

Due to the high or low density, the ratio between the realized relations to all possible relations, and the high or low centrality of the focal organization in the inter-organizational networks, certain positive and hindering effects can be assigned to the different role-models (Rowley, 1997):

- *Commander:* Due to its high centrality the focal organization is able to shape the formation of the behavioural expectation in its network and resist stakeholder pressures, as stakeholders who are not united play a passive role (Mintzberg, 1983). Even though limiting the general information flow, this role provides the most benefits to the focal organization due to the powerful position (Burt, 1995).

- *Compromiser*: This type is also able to resist stakeholder pressure due to the high centrality, though stakeholders have constraint on the focal firm due to the high density of the networks, which allows moreover efficient flow of communication. Another positive impact of this type of network is that due to

the better information flow the shaping of shared behavioural expectation, is enabled.

- *Subordinates*: Focal organizations that have a position as a subordinate are in a vulnerable position and due to the low centrality unable to influence the information exchange between the stakeholders, even though efficient communication is possible due to high density.

- *Solitarian*: Focal organizations with a low centrality in a network of low density play the role of a solitarian and are therefore in a position of no possibilities of influence in their network. Moreover this kind of network does not enable the manipulation of norms.

Even though criticised by Vandekerckhove & Dentchev (2005) for being undesirable from an ethical point of view, the classification of stakeholder networks by Rowley (1997) provides the most concrete example of definition of the level of analysis as well as a model for classification and evaluation of inter-organizational networks.

## 2.3 Regional Networks - Cluster

A big trend in recent years has been the usage of networks as a primary organization in order to overcome transaction costs and foster innovation (Sydow, 2006; Porter, 1998). As networks form a new hybrid dimension between hierarchy and market (Powell, 1990; Belussi & Arcangeli, 1998), they are able to provide the benefits of both.

Sydow distinguishes four major types of inter-organizational networks, which incorporate the call for networks as a primary organization between market and hierarchy (Sydow, 1992, 2006). These are strategic networks, regional networks, project networks and virtual organization. While strategic networks and project networks are more hierarchic, regional networks are more heterogenic and balanced concerning stability and dynamic. Virtual organizations are balanced according to hierarchy and heterogeneity as well as according to stability and dynamic.

Clusters are the most prominent and important example for regional networks, which have enjoyed enormous attention in recent years, as being a valve for regional competitiveness and innovation (OECD, 2007), and consist typically of small and medium sized companies in a local agglomeration (Sydow, 2006). Clusters have been described as critical masses in one place that show an unusual success in a particular field (Porter, 1998). While Sydow states that the advantages from regional networks derive from economies of size and innovation, they lack a strategic leadership, which is typically for strategic networks. Those are defined as networks strategically governed by at least one focal organization (Sydow, 2006). Moreover strategic networks include companies of divers size and are spread over-regional, till even international (Sydow, 1992). Notwithstanding clusters do show attempts of strategic management (Terstriep, 2008), Network Administration Organization (NAO)-

Governance (Provan & Kenis, 2005, 2008) and inter-cluster cooperation (e.g. Porter, 1998), which brings them closer to being strategic networks, in their original definition and origin they count as regional networks defined as *"geographically concentrated interconnected companies and institutions in a particular field"* (Porter, 1998, p.78). Cluster members can be related downstream or laterally and cooperate while being competitors at the same time (Porter, 1998).

Clusters provide a competitive advantage in a global economy by enabling the flow of items which depend on proximity. Those "*local things*" are knowledge, relations and motivation (Porter, 1998). Especially knowledge flows through informal contact channels more easily, and as similar firms create an environment of similar values and culture and vertically and horizontal related firms benefit from trust and mutual understanding. Knowledge therefore flows more easily within the cluster than outside the cluster (Dahl & Pedersen, 2004).

Several clusters possess worldwide renown and acknowledgement, such as the furnace industry in Cleveland (UK), the California wine cluster, Silicon Valley, Hollywood, the Italian Leather Fashion cluster or the high-performance car companies in southern Germany (Porter, 1998; Dahl & Pedersen, 2004). The roots of clusters can be traced back to industrial needs, changes in economy, environmental specifications or needs, such as in Finland, where environmental cluster emerged due to pollution problems created by local industries (Porter, 1998). Clusters may also be triggered by innovative companies or research institutions (Porter, 1998), or cluster programmes and policies, which indentify cluster potentials by top-down or bottom-up approaches (OECD, 2007). The development of a cluster to its full potential takes a decade or even longer, though not all clusters succeed and not all cluster programs are successful. Porter (1998) points out that the aim of cluster policies has to be the reinforcement of the development of all clusters, regardless of industry, in order to build on existing and emerging clusters and not to attempt to create entirely new clusters. Though "*once a cluster begins to form, a self-reinforcing cycle promotes its growth, especially when local institutions are supportive and local competition is vigorous. As the cluster expands, so does its influence with government and with public and private institutions"* (Porter, 1998, p.84).

The characteristics and positive effects of clusters have been outlined by many scholars as manifold and therefore clusters are a central tool in the regional, science and technology, industry and enterprise innovation policies (OECD, 2007). While increasing economic coordination, clusters reduce bureaucratic control and enable learning and knowledge transfer (Belussi & Arcangeli, 1998). Moreover economies of specialization and labour pooling are externalities of clustering (Dahl & Pedersen, 2004). All companies within a cluster region benefit from better access to employees and suppliers as well as specialized information (Porter, 1998). This also stimulates new business as market entry barriers as well as exit barriers are smaller (Porter, 1998).

Technology and knowledge spill-over (Dahl & Pedersen, 2004) are drivers of innovation and increase productivity within clusters (Porter, 1998).

The benefit of reduced need for bureaucratic control depends on the trust between the member firms (Belussi & Arcangeli, 1998). Trust moreover counts as a key issue for knowledge diffusion as sharing of information and knowledge between network partners is reciprocated like a favour (Østergaard, 2009). Whether two actors have been working together in the past facilitates future knowledge flow (Østergaard, 2009). Therefore project networks seem to be a supporting factor of clusters.

Group-thinking and active participation of members within the cluster are important requirements for successful cluster cooperation. Moreover it seems that a balance between cluster focus and market focus is needed as a cluster can suffer from too many inward-looking actors (Porter, 1998).

Even though many possibilities for benefiting from a cluster exist, a company participating bears also risks from membership in a cluster organization. The major one results from lock-in as being tied by long-term investments and strategies, which makes it difficult for individual firms to change the track (OECD, 2007). Other dangers can derive from over-reliance on key-firms in the cluster. A risk which has to be taken into consideration by the policy makers and supporters of cluster programmes is that a cluster approach can lead to insufficient economic diversification of a region (OECD, 2007). Here lies another problem of clusters. Although many attempts, proposals and tools have been published (Terstriep, 2008; Knápková et al., 2010), still common acknowledged cluster evaluation tools and measurements for comparison are not available. This makes comparison of cluster performance as well as the impact of policies on cluster and regions difficult (OECD, 2007).

# 3. NETWORK MANAGEMENT

Management is a function as well as an institution within a company, the tasks and duties of which are coordination, structuring, planning, organizing, leading and control. In general, operational and strategic management are distinguished. Strategic management determines the direction of the company by setting up the strategies and providing the general basis for fulfilling them. Operative management deals with the concrete actions of realizing strategies (Staehle, 1992). Network Management is defined by Sydow and Windeler (2001) as the organization of activities and relations between the companies involved. Sydow and Windeler (2001), propose four specific network management tasks: selection, allocation, regulation and evaluation.

## 3.1 The need for Network Management

The need for network management is a given, as social networks can build a market entry barrier for firms outside the network. Moreover, the possible barrier to growth for firms with overly strong informal networks has to be taken into account and prevented by attentive network analysis and network management (Fuller-Love, 2009). Table 2 shows a compilation of opportunities and risks of inter-organizational networks. It can be observed, that some opportunities, such as the coordination costs can be an opportunity when decreasing and a risk when increasing due to higher negotiation demands.

Table 2: Opportunities and Risks of Inter-organizational Networks

| **Opportunities** | **Risks** |
|---|---|
| Increase of strategic flexibility | Lock-in due to specific investments |
| Access to resources/markets | Loss of strategic autonomy |
| Spread of risk/diversification by cooperation | Responsibilities |
| Decrease of Production costs (external Scales) | Impede of strategic control |
| Decrease of coordination costs | Increase of coordination costs |
| Inter-organizational learning, development of core competences | Loss of core competences |
| Decrease of capital needs | Loss of organizational identity |
| Acquiring of new process-knowledge | Uncontrolled flow of knowledge |

*Source: Sydow, 2006, p.402.*

Also intra-organizational networks bear risks, in case certain employees grow too powerful by acquiring a network position as a hub or central player, which makes the network instable and the management weak. Moreover, problems can occur due to homophily concerning sex or departments, so that communication and information flows only within the same department or strictly between men

and men and women and women. While too loose networks hinder efficient communication and knowledge sharing, too tight networks lead to inefficiency and hinder innovation. (Cross et al., 2001; Tsai & Goshal, 1998; Bryan et al., 2007; Krebs, 2007)

Nevertheless, both formal as well as informal networks both are strong factors of influence for a company's success, and their usage clearly shows various advantages, as they are a basis for innovation, communication and collective support. Therefore, networking should be a proactive task and strategy, moreover as networks are an important factor for the development of an entrepreneurial firm (Lechner et al., 2006). The managerial approach has to take into consideration how to design, change and control the networks in order to reduce uncertainties and improve the firm's competitive position (Provan et al., 2007).

In order to achieve the best results and prevent disadvantages, certain conditions have to be fulfilled in a social network. Network members have to complement each other in their interests and expectations, which have to be coordinated. Moreover, the forms and methods of working as well as the infrastructure of a network have to be suitable for the aim of the network.

An important benefit of social networks is knowledge sharing. In order to boost this behaviour, a clear mission and goal have to be developed by management. At the same time, social networks that share these goals have to be established, as they significantly contribute to attitudes towards knowledge sharing and the intention to share knowledge within the organization (Chow & Chan, 2008).

Problems in traditional strategies towards knowledge management often occur due to high complexity and efforts that make knowledge management too time-consuming for employees. Group cohesion, trust, fault tolerance, open mindedness, responsibility and employee-orientation of the management are factors which on the one hand facilitate the emerging of networks and on the other hand support knowledge sharing (Killich & Kopp, 2005).

Networking must be a year-round priority for a company and its management, as the goal has to be the creation of stable long-term relationships. In order to achieve benefits out of a network, investments have to be made in advance. Strategies have to be developed, but also opportunities taken when they arise. Following up calls, thank you-notes, business lunches as well as the forwarding of interesting news articles should be standard business behaviour for expanding a professional network (Messmer, 2002).

## 3.2 Network Management Models

Network-management models have on one hand emerged from practical experience and on the other hand been developed by empirical science. Before introducing scientific management models two network management models derived from practical application will be presented.

‘EQUAL’, a programme of the European social fund for fighting discrimination, realizes its projects within networks. In their case networks emerge due to definition of the team, the operative and transnational partners and the coordinative centre. The experience out of these programmes was that, a competent network management is necessary, though the classical hierarchical organizational principals are not applicable. Therefore, they established a guideline of tasks and questions for network management. The objective of Network management is to choose the right network members, ensuring knowledge transfer and target orientation and acting as a moderator and promoter within the team and as a communicator outside of the network (Hellmann-Flocken & Unger, 2005).

Howaldt and Ellerkmann (2005) provide a guiding compendium that divides the development of networks into seven phases: Idea and impulse (idea of one or more promoters), Design of the partnership (Selection according to target and willingness), Constitution of the network (Establishment of identity, organizational structure and form of business), Working phase (where work on the target of the project is done), Evaluation of the project (continuous evaluation and monitoring), Metamorphosis (Change or transformation into a legal form of enterprise) and Conclusion (documentation, formal ending).

### *3.2.1 From Sydow and Windeler to Strategic Networking*

One of the most famous network management theories is the one developed by Sydow and Windeler (2001), which proposes four additional functions to traditional management: Selection, Regulation, Allocation and Evaluation. In the first step of selection, the network members and organizations are selected. During the step of allocation the tasks and resources in the network have to be coordinated and the scope of alliance defined. Coordinating committees, controlling and conflict resolutions are part of the regulation process, and this is also, where formal and informal norms are established. In the final step of evaluation, achievements of the network as well as its relations have to be coordinated. The four network management functions are recursively related to each other and they are recurring and not singular in order to fight controversies such as, trust and control, cooperation and concurrency, formality and informality, flexibility and stability, market and hierarchy, that exist in the network (Sydow, 2006; Payer, 2002). Eckenhofer (2009) adapted the model of Sydow and Windeler towards Strategic Networking, which is defined as *“the strategic and target-oriented analysis, development, fostering and control of (inter- as well as intra-organizational) networks on the basis of trust, with the intention to reach certain (organizational) goals”* (Eckenhofer, 2009, p.380). In the adapted model the target of the network is allocated in the centre followed by network analysis as can be seen in Figure 4.

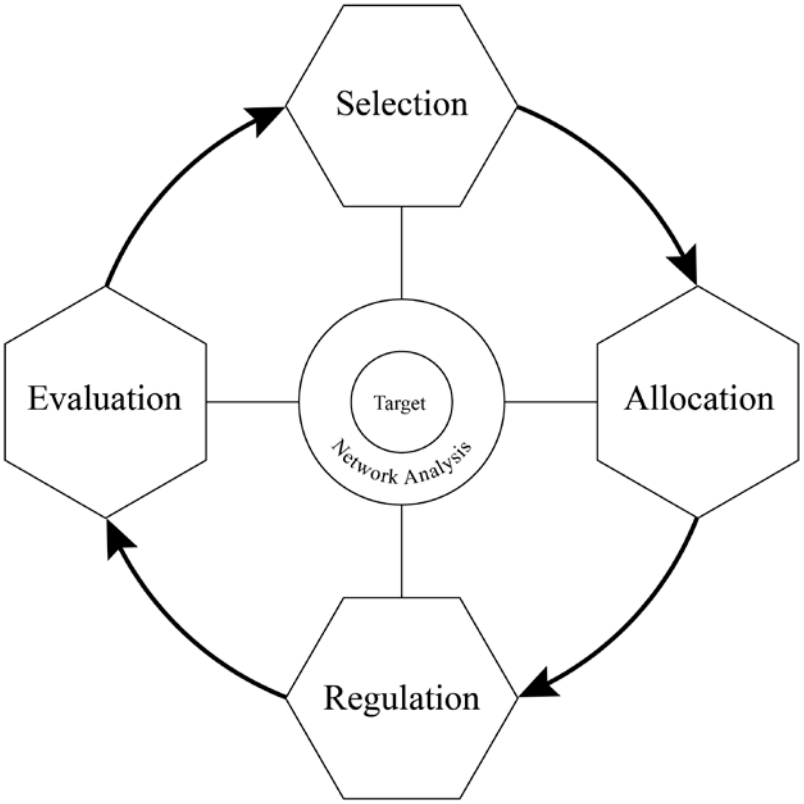


Figure 4: Strategic Networking
*Source: Sydow, 2006, p.409, mod.*

The core of Strategic Networking is a strategic target, which could be a new market, a new customer or the introduction of a new product. On the basis of regular network analysis, the characteristics of the network could be modified so that the stated goal could be reached. This is mainly because network analysis helps to visualize the network and achieve knowledge about the company's network while being focused on the target at all times (Eckenhofer, 2009).

### *3.2.2 Network Management Framework*

A rather holistic concept is the network management framework by Riemer and Klein (2006) that combines the network view, the firm‘s view on network management, the view of the network environment and the mode of network management.

- Network View: The network life cycle emphasises the on-going dynamics of the network development and divides them into the stages of initiation, configuration, implementation, transformation and eventual dissolution. The network management areas within the network view include strategy finding, the organization of tasks, roles, linkages and processes as well as the network information management, which is the coordination of activities and resource sharing.

- Firm View: As results and quality of network operations depend on the network and the individual firm, the intra-firms structures have to be aligned to external network requirements in the three domains of strategy, organization and technology.

- Network Environment View: Because networks affect the markets and industries around them, they are also affected by their environment. General factors such as consumer behaviour, market rules, technological changes, typical industry patterns and specific regional conditions such as institutional policies have an impact on the emergence of a network.

- Network management mode: The network management mode includes four interdependent functions, which aim at ensuring the success of networks while facing the limits of managerial control in boundary management, creating potentials and improvisation in networks. This also includes the designing of governance structures, coordinating exchanges, fostering social integration and the facilitation of shared visions and values.

### *3.2.3 Governance of Networks*

In many firms, governance is done by the board of directors, who have a legal obligation to represent and protect the interests of shareholders (Provan & Kenis, 2005; Regierungskommission DCGK, 2008). The legal duty is not valid for social networks as they are not legal entities though there are a number of factors, which necessitate governance in networks. A higher number of network participants create complexities. Therefore, governance is desirable because the needs and activities must be accommodated and coordinated. Another condition for the emergence of governance is the shared competences of the organizations or network members for coordinating tasks according to their competences. Provan and Kenis (2005, 2007) proposed four forms of network governance: Participant-Governed Networks, Lead Organization Governed Networks, Network Administration Organization (NAO) (separate administrative entity) and hybrid forms of network governance. The forms of governance partly evolve and partly are given depending on the purpose of the network. Furthermore, the form of governance may change as the size of network grows or network tasks are becoming more complex (Provan & Kenis, 2008).

## 3.3 Network Management in Praxis

Using semi-structured interviews, nine Austrian networking experts, from industry, politics and consulting, were asked by the author in 2008, about network basics, their personal opinion on network development, fostering and management, and about network management in their company. The average duration of every interview was 45 minutes and the interviews were recorded and transliterated verbatim. In order to follow a structuring interpretation of qualitative content analysis (Mayring, 2003, 2009), a criteria was defined to serve as a basis for the analysis. For every variable different codes (flexible

characteristics) were set and defined (see third and fourth column in table 3). The qualitative content analysis summarizes the number of times a variable had a specific characteristic (see the last column in table 3).

Table 3: Results of the Qualitative Content Analysis

| No | Variable | Definition | Code&Characteristic | Sum |
|---|---|---|---|---|
| 1 | NW-Start | Reasons for start and development of a social network. | Problem | 0 |
| | | | Project | 7 |
| | | | Corporate Goal | 7 |
| | | | Information | 2 |
| | | | New Position | 4 |
| 2 | NW-ABZ | How the development of networks is organized. | Targeted | 4 |
| | | | Hazard | 0 |
| | | | Both | 5 |
| | | | future-oriented | 2 |
| 3 | NW-AB | Networking approach. | Direct | 6 |
| | | | indirect over contacts | 7 |
| | | | Events… | 2 |
| 4 | NW-MM-form | Network management | Formal | 0 |
| | | | Informal | 6 |
| 5 | NW-PF | Network fostering | Personal | 3 |
| | | | Email, telephone… | 0 |
| | | | Both | 6 |
| 6 | NW-MM | Network manager necessary? | Yes | 5 |
| | | | No | 1 |
| 7 | NW-Org | Organization of networking within the company. | Network-responsible person | 1 |
| | | | CRM-DB, directories,… | 6 |
| | | | internal official meetings | 3 |
| | | | internal unofficial meetings | 6 |
| 8 | NWMM-V | Responsible persons for network management / network governance. | Management | 4 |
| | | | everybody | 4 |
| | | | Teams/Projects | 3 |
| 9 | NW-Abs | Protection of the network against loss / drop out. | no protection | 1 |
| | | | internal networks | 8 |
| | | | illustrations and tables | 3 |
| | | | protection due to buddy-systems | 1 |
| 10 | NW-Eff | Effects of networking for the company. | Information | 4 |
| | | | Corporate Goal | 4 |
| | | | Efficiency | 2 |
| | | | Market position, turnover | 2 |

*Source: Author's own*

It can be observed in Table 3 that the reason for developing a network (Variable 1) is never a problem; but rather, it is triggered by a new project or the corporate goal. From the responses of the experts interviewed, it was revealed that network development is never left completely to chance; some experts act strategically and others, both strategically, while being open to unexpected or future eventualities (Variable 2).

As indicated by the experts, the main network development approach (Variable 3-6) is indirect - over contacts and if this fails, the direct approach is used. A clear result is given for network management which is never done formally, but from all those interviewed, it was found to be done in an informal manner. This goes in line with network fostering, which is never done simply by telephone and email, but either through personal contacts or by telephone, email and personal contacts. Even though five interviewees answered that the position of a network manager should be created in the company, no one actually could report the successful implementation of such a position. One expert described an experience from a project, which was aimed at introducing a network manager, but failed due to the fear of losing power.

Networking is organized in the companies mainly by databases, address directories, CRM-Databases and internal unofficial meetings, which are used to clarify the existence of contacts (Variable 7).

Concerning network governance (Variable 8) the answers were not coherent - whether it is the duty of the management, every employee or teams and project. This seems to be problematic, as it was unclear as to who should manage the networks and who is responsible for it. The most important protection method (Variable 9) against loss or drop out of network parts due to retirement or fluctuation seems to be by internal networks. Protection by network illustration and lists was mentioned three-times.

The main effects of networking (Variable 10) according to the experts were not only in the information benefits and the fulfilment of the corporate goal, but also in the improvement of efficiency and contribution to market position and turnover.

With the findings of the expert interviews as a background, Strategic Networking shall be discussed and enhanced, in order to develop a model demonstrating a scientific deduction from empiric findings and serving as a compendium for practical application.

## 3.4 Strategic Networking

Having its origins in business training sessions held by public affairs and public relations agencies, Strategic Networking has not been discussed in scientific literature yet. Therefore, based on the meaning of the words “strategy” and “networking”, and keeping in mind how providers of Strategic Networking workshops define the objective of their workshops, a definition of Strategic Networking has been developed (Eckenhofer, 2009).

Networking is defined by Furnham (1997) as the process of building relationships within and between groups, although he fails to mention the targets of networking. Scheler (2000) explains networking as a methodical and systematic action for contacting people, fostering relations on a long-term basis with the intention of reciprocal advancement and reciprocal personal advantage.

Strategy derives from the greek word '*strategia'*, which means the art of war. Since the 1960s and 70s, strategy has been used in business studies. A company's strategic decisions define its position in a certain market and secure provision with resources. Simply, strategic decisions always affect a goal in the future and try to find a way to achieve this goal.

Providers of Strategic Networking workshops, like Thomas Landschof from Hamburg (Landschof, 2007) promise that participants of his seminars will learn how to change their networks strategically to reach private, business, and organizational goals. Networks should be analysed and visualised, and because of this it should be recognized ,which actions have to be undertaken for reaching strategic goals. Eupronet, the European Promotion Network (Eupronet, 2010), offers support in every phase of business contacts development, so that the right persons are provided with information at the right time.

The Business Referral Organisation (BRO, 2011) defines Strategic Networking as *"the process by which you identify your business objectives and develop an action plan to achieve those objectives through networking."* Morch (2011) outlines that Strategic Networking is the principle of initiating and maintaining professional relationships, which is critical for controlling one's business and recognize opportunities. Benjamin Wirtz founder of the Handy Elephant sees Strategic Networking as "*aligning your network towards achieving your goals"*, on a strategic, tactical and operational level (Wirtz, 2010).

The aspect of strategy, the different levels and kinds of networking as well as the trust factor have not been formulated in those previous definitions; therefore, as a result the definition shall be expressed as follows:

*Strategic Networking is the strategic and target-oriented analysis, development, fostering and control of (inter- as well as intra-organizational) networks on the basis of trust, with the intention to reach certain (organizational) goals* (Eckenhofer, 2009).

Figure 5 shows the authors adaptation of Sydow and Windeler's Network Management Model and Eckenhofer's Strategic Management Model (2009), derived from practical demands on network management, which have been elaborated by the expert survey described in chapter 3.2.

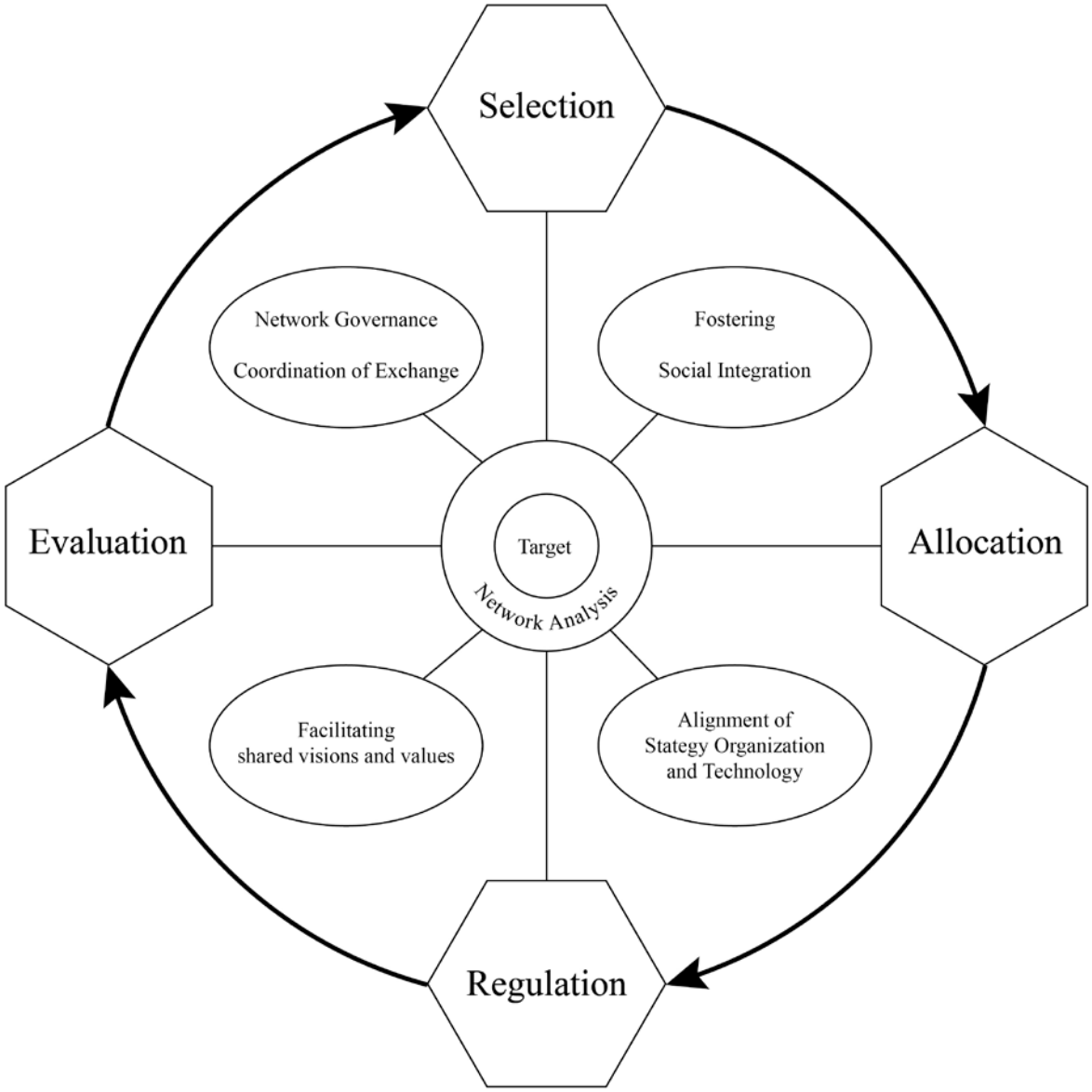


Figure 5: Enhancement of Strategic Networking.
*Source: Author's own*

In the centre of the Strategic Networking-Model is the aim or target of the network, surrounded by Sydow's and Windeler's model of network management. Selection, allocation, regulation and evaluation are seen as the management of the network development and, therefore, an ongoing process in a social network. Another central tool is network analysis, which should be done regularly in order to give an overview of the network, the roles and positions of the network members and to identify needs for network development. The most important tasks for managing the work within the network are network governance, coordination of exchange, alignment of strategy, organization and technology, facilitating shared visions and values as well as fostering of social integration. These tasks are circular, unsystematic and with reciprocal influence and are therefore located in the inner circle of the model. The network

development processes, namely, selection, allocation, regulation and evaluation are in the same way not a singular process but circular as long as the target of the network is valid for all network members. As the expert interviews showed, an accurate model of network development is not necessary, these four steps describing the process of network development, build a loose guideline, but do not prescribe every single step in the network development process. As the network development provides the basic structures of the network, while the network management tasks influence the processes in the networks, they build the outside circle of the model, which symbolizes the framework of the network.[2]

The development of the Strategic Networking model by the literature survey done and the expert survey conducted, provides first insights on the first research question RQ1 "*How are organizational networks (intra-, inter- and regional) managed in practice?"* It has been shown that network management is never left totally to hazard, but is future- and target-oriented allowing coincidences to happen, while an emphasis is laid on personal networking. The overly informality of networking and the use of indirect methods for network development showed how subtle networking is done in business. The network management model Strategic Networking attempted to meet those criteria and characteristics in order to support the need for network management and governance.

The applicability of the proposed model and its contribution to the performance of a firm in financial and non-financial means and in particular in terms of network characteristics, shall be studied, evaluated and discussed in the following survey.

[2] A previous version of this chapter has been presented and published in: Proceedings of the fourth international conference on Economics and Management of Networks (Emnet) at the School of Economics and Business, University of Sarajevo, from September 3 to September 5, 2009. The revised, updated and extended version is accepted for publication at the European Conference on Knowledge Management 2001 in Passau.

# 4. AIM AND METHODOLOGY

Literature review showed a need for further research in the particular field of intra- and inter-organizational networks, their network management and impact on the network efficiency. Waldstrøm (2001, p.38) calls for answering "*How does the managing of the informal networks affect organizational efficiency?*" Moreover it has been stated by Flap et al. (1998) that only a few studies deal with internal and external networks of firms simultaneously. Therefore this doctoral thesis focuses on the impact of the management of organizational networks as it has been outlined by Flap et al. (1998), stating that research on intra- and inter-organizational networks and performance in the economic sense of profit are scarce. The authors assume that the reason behind it is that managers and employees are afraid to provide information on performance in an economic sense. Also other difficulties and limitations for research in this particular field are known. Due to the sensitivity of the data, it is highly difficult to get access to companies for data collection of organizational networks (Flap et al., 1998), therefore small research samples are common in organizational network research (Provan et al., 2007). Another difficulty is the fact that real-life settings like organizational and inter-organizational arrangements for performing experiments are too costly, time-consuming, difficult to control over a specified period of time, and moreover ethically problematic (Clarke, 1999 in Provan & Sydow, 2008). Therefore the methodology has to be adequately chosen in order to overcome the difficulties and to answer the research questions in an objective, valid and reliable manner.

The main target of this thesis is to evaluate the network management tool 'Strategic Networking' in practice and to prove that it contributes to the performance of a network.

As an evaluation of Strategic Networking is not possible by way of an experiment due to sociological restrictions and lack of firms' readiness to cooperate, it has been analysed how many aspects of Strategic Networking are implemented in the network management, while controlling for influencing factors. Strategic Networking has been analysed and evaluated on a micro-, meso- and macro-level, because of that the data collection was in the same way split on three levels, the intra-organizational (micro), inter-organizational (meso) and regional (macro) level.

- *On a micro level* the intra-organizational network of three Austrian small-sized firms, which employ a minimum of 50 to a maximum of 150 persons, were analysed. The reasons for the restriction in the number of employees lie in the scope of social network analysis, as social networks with a small number of actors are not feasible for analyzing department homophily, and networks with more than 150 employees are too large for conducting socio-centric network analysis usefully. Moreover the

requirement was that the networks should be of similar size for matters of comparison.

- *On a meso level* the inter-organizational networks of eight small-sized firms were analysed and evaluated according to their financial performance and network management. Out of the total sample four companies were from Austria and four from the Czech Republic. This sample design moreover provides interesting insights into the cross cultural differences in network management. The choice of companies has been limited on small and medium-sized companies, regardless of the age of the firm, its corporate field or legal institution, as all firms do depend to the same extent on the relations to their customers, suppliers, competitors, administrative authorities, media, shareholders and other stakeholders.
- *On a macro level* the whole network of all clusters and their members in the Czech Republic and Austria was analysed and compared to each other. For each sample the cluster manager (management) of one well and one poorly performing cluster in terms of their structural position in the whole network (degree, betweenness) has been interviewed.

## 4.1 Research Questions and Assumptions

The study is led by three main research questions, which shall be answered by the data collected and the analysis done:

- *RQ1: How are organizational networks (intra-, inter- and regional) managed in practice?*

The first question aims to describe which activities are performed in practice in order to manage organizational networks. Hereby the Strategic Networking model is used as a benchmark for analysing and comparing the network management activities of the companies surveyed in this study.

- *RQ2: What does an intra- , inter-organizational and regional network managed by Strategic Networking look like?*

In order to answer this question the social network measures of those companies and networks applying many aspects of Strategic Networking in the study will be compared to those companies and networks that apply fewer activities.

- *RQ3: Is a network that is managed by Strategic Networking more successful in terms of financial or non-financial measures?*

Due to time restrictions, lack of the firm's readiness to participate and sociological restrictions to test Strategic Networking in a practical experiment in the sense of implementing it and evaluating after a necessary time period, the companies' network management will be evaluated by measuring how many aspects of Strategic Networking they practice compared to their financial and non-financial performance. In this context several measures oriented on the Balanced Scorecard (BSC) have been thoughtfully chosen in order to answer this question precisely.

**Assumptions:**

Thanks to previous scholarship, several assumptions on the possible outcomes of the research can be made, which in due course shall be evaluated by the actual research conducted. Two main reasons call for the usage of assumptions as a guideline of the research and against the formulation of research hypotheses. Firstly the topic is a social one, analysing social relations of human beings, which is thanks to Social Network Analysis measureable, but does not allow to be treated like purely quantitative data. The second reason is the research sample, which is already big compared to other surveys in the field, but concerning inductive research methodology is still a case study and therefore has to be treated like that.

*Micro-Level:*

A1. It is assumed that Strategic Networking leads to denser and more central intra-organizational networks, with high multiplexity and low homophily between the departments, improving the performance of the company (Krackhardt, 1992; Payer, 2002).

A2. It is assumed that the hours employees spend on networking within the company and with company stakeholders will be positively related to the outcomes, as experiments prove that simple "coffee breaks" enhance performance significantly (Waber, 2010).

A3. It is assumed that intra-organizational networks that are well managed and fostered by more aspects of Strategic Networking are to some extent less hierarchical than networks which fulfil less aspects of Strategic Networking (Krackhardt, 1994).

A4. It is assumed that the organizational culture has a vivid influence on the intra-organizational networks and that only certain cultural types such as Clan and Adhocracy Culture support dense and multiplex networks (Eckenhofer & Ershova, 2009).

*Meso-Level:*

A5. The inter-organizational network, the network between a focal firm and its stakeholders can be categorized into four types according to the density and centrality of the focal organization (Rowley, 1997). Due to the focused fostering and development of the inter-organizational network by Strategic Networking, it is assumed, that a focal organization, which conducts many aspects of Strategic Networking, is a commander in its network resulting from a high centrality of the focal organization and a low density of the stakeholder network.

A6. As structural improvements and higher social capital increase the company's performance, the effect will be visible in the returns of the company, as transparency and rationalization are assets deriving from social capital leading to a better flow of information, reduction of

transaction costs and uncertainty, as well as enhancement of flexibility (Halpern, 2005; Lin, 1999).

A7. It is assumed that inter-organizational networks that are managed and fostered by more aspects of Strategic Networking are to some extent more efficient than networks which fulfil fewer aspects of Strategic Networking (Krackhardt, 1994).

*Macro-Level:*

*A8.* It is assumed that Strategic Networking is a model which is applicable not only for the management of intra- and inter-organizational networks, but moreover for regional networks and clusters in particular, as clusters are a specific kind of network that enjoy high density (Rosen, 2000).

*A9.* It is assumed that regional networks (clusters), which are central not only by terms of degree, but moreover in their closeness centrality, are managed by more aspects of Strategic Networking as network management helps to find suitable partners, to coordinate interests and expectancies and to raise work effectively (Becker et al., 2005).

*A10.* It is assumed that the longer the tradition of regional networks (clusters) the more clusters are established, as the development of relations and networks takes time to evolve (Arto & Monroy, 1999). Moreover it can be assumed that with the increase of the clusters, the general density decreases. (Lechner & Dowling, 2003; Dahl & Pedersen, 2004).

## 4.2 Data Collection

The data collection is described for the three levels, micro, meso and macro, as for every level different approaches and tools were used. The data collected is to the same extent quantitative and qualitative.

*Micro-Level:* The data about the intra-organizational networks has been collected via online questionnaires, which were addressed to all employees of a company or to all employees of a specific department in order to calculate valid whole networks, where a participation of a minimum of 70 percent of a defined group is needed (Schnegg & Lang, 2002). The questionnaire for the employees consists of five parts, which were developed and adopted by the author for the purpose of this study, and can be found in Appendix A. The first part asks the role of the person in the company, the second one asks about the type of communication within the company, the third part evaluates the corporate culture using a modification of Schwartz's motivational value types (Schwartz, 2007; Mohler & Wohn, 2005) and the competing values framework (Cameron & Quinn, 2006). In the fourth part of the questionnaire the employees are asked to tell what kind of relationships they have with their colleagues. Seven types of informal relationships with other employees of the company are offered: Talking

regularly about business topics (Relation 1), working on joint projects (Relation 2), asking for professional advice (Relation 3), talking about private topics (Relation 4), meeting in free time (Relation 5), asking about private advice (Relation), and the probability of lending 200 Euro (Relation 7). The last section of the questionnaire implies trust and demographic questions.

*Meso-Level:* The data about the inter-organizational network of a company has been collected through team-workshops with the management of a firm using a semi-structured questionnaire, which can be found in Appendix B. This method has already proved useful because in a diverse team more aspects of the company's network can be allocated. Moreover, it builds a platform to enable communication about the network and might lead to a better insight into the network within and around the company than would be possible by standard interviews. The decision, whether the interview has been done in team with several managers, or only with the CEO or owner of the company, was merely taken by the firms, as the paramount requirement was to have the interview with someone who has a good overview over all relations towards all stakeholder groups.

For the data collection of the stakeholder network an egocentric approach has been chosen: in a qualitative and participative interview with the management of a firm, their point of view of the firms' relation to their stakeholders has been collected. The semi-structured, open questionnaire started with a name generator (Wolf, 2006), which is generating lists of contacts to stakeholders (Friedman & Miles, 2006). Afterwards, the participants were asked to sort their contacts in concentric circles according to their relation and to draw the relations to their contacts and between them, using four relational types: formal, informal, trustful and critical. The usability of the existing stakeholder network has been tested afterwards by two questions, asking the workshop participants to imagine a specific situation.

Data about network management has been collected by a structured questionnaire consisting of semi-open questions following the interview about the stakeholder network. The interviews took in average between one and two hours and have been recorded, a transcript being done subsequently. Two participants refused the recording of the interview; therefore notes were taken during the interview. The questions about the network management aimed to evaluate, how many aspects of Strategic Networking the management put into practice. Starting by asking how target-oriented the networking is performed, it has been asked afterwards whether network analysis is done in this firm. The next question was which activities are applied for aligning strategy, organization and technology, fostering shared visions, values and norms, triggering social integration, developing their network, governing the network and coordinating the exchange of information and resources in the network.

For evaluating the performance and success of the company the categories of the Balanced Scorecard (BSC): financial, customer, mission, values, vision and

strategy, internal process and employee learning and growth have been adapted for the purpose of this study, creating a mix of financial and non-financial performance measures (Bloxham, 2003; Niven, 2002; Kaplan & Norton, 2006; McClure, 2005).

In order to compensate for abnormal changes, all measures were asked regarding the last three years. For the category 'employee', the number of dismissals and number of sick days have been chosen. For the category 'customers', the turnover and market share has been asked. 'Processes' were evaluated by asking whether a quality management system like Six Sigma or Total Quality Management (TQM) exists. The following financial measures were chosen: Return on Equity (ROE), Return on Assets (RoA), Net Profit Margin and Debt-To-Equity Ratio. The broad number of measures chosen is justified by the scientific discussion about financial performance measures saying that there is not one perfect financial performance measure that would be suitable in every imaginable case (Bloxham, 2003; Loth, 2007; Niven, 2002). The Economic Value Added (EVA), which is handled in scientific discussion as a suitable performance ratio (McClure, 2005) is neither calculated by firms nor are they willing to provide all necessary data.

*Macro-Level:* The data about the regional networks has been gathered via desktop research, using the internet presentation of the clusters. The list of all clusters and their members for the Czech Republic and Austria can be found in Appendix D and E. By two-mode network analysis the relations between clusters, via member-companies or regional agencies, have been illustrated and numerous network characteristics calculated in order to identify a well and a poorly performing cluster in terms of network measures. For each sample those two clusters have been interviewed about their network management in order to analyse whether beside the difference in their network position also a difference in their network management is visible. For the interview the questionnaire in Appendix B (Part II: Network management), has been used adapted to clusters.

Table 4 shows the above described in numeric way as the statistics of the total sample split on the different levels of focus.

Table 4: Sample Statistics for each Level of Analysis.

| **Level** | | **Country** | **Actors** | **Replies** | **Ret. Rate** |
|---|---|---|---|---|---|
| **Micro** | **Company 1** | Austria | 47 | 32 | 68.09% |
| | **Company 2** | Austria | 86 | 41 | 47.67% |
| | **Company 3** | Austria | 30 | 30 | 100.00% |
| | | | | | |
| | | **Country** | **Actors** | **Ties** | **Density** |
| **Meso** | **Company 1** | Austria | 66 | 224 | 5.10% |
| | **Company 2** | Austria | 34 | 246 | 20.70% |
| | **Company 3** | Austria | 52 | 302 | 11.00% |
| | **Company 4** | Austria | 45 | 190 | 9.20% |
| | **Company 5** | Czech Rep. | 31 | 116 | 11.19% |
| | **Company 6** | Czech Rep. | 15 | 64 | 26.70% |
| | **Company 7** | Czech Rep. | 17 | 86 | 28.10% |
| | **Company 8** | Czech Rep. | 40 | 168 | 10.20% |
| | | | | | |
| **Macro** | **Country** | **Clusters** | **Nodes** | **Ties** | **Density** |
| | Austria | 51 | 4825 | 5966 | 0,026% |
| | Czech Rep. | 30 | 793 | 1684 | 0,268% |

*Source: Author's own*

## 4.3 Social Network Analysis

Social network analysis is a socio-anthropological method used to measure and visualize the social structure of a group as a whole and the social embeddedness of its individuals (Jansen, 2006; Wasserman & Faust, 1994).

Social network analysis can be attributed to Jacob Moreno, who first developed the sociogramm and claimed that *"before the advent of sociometry no one knew what the interpersonal structure of a group "precisely" looked like"* (Moreno, 1953, p. lvi).

Social network analysis distinguishes between the analysis of an egocentric network and a socio-centric (total, whole) network. Ego-centric networks are collected from the point of view of an individual (ego), who is asked to provide his contacts according to the research question by a name generator. The names generated are called alteri and further more the relations between Ego's alteri are asked. Whole network analysis deals with all relations (according to the research question) between a defined set of actors. Social network analysis uses special software for the calculation of network measures and the graphical illustration e.g. Ucinet, Pajek, Visone, Gephi, Netdraw, or Vennmaker. (Jansen, 2006; Schnegg & Lang, 2002).

### *4.3.1 Centrality and Prestige Measures*

Social Network Analysis incorporates three main schemes to describe social network data mathematically: graph theoretic, sociometric and algebraic. In the graph theoretic scheme a relation is seen as a graph between nodes joined by lines, in the sociometric the data is represented in a two-way matrix and the algebraic is used for studying multiple relations (Wasserman & Faust, 1994).

The most important measures for characterizing social networks can be calculated for the whole network as an average of all actors. Those measures are density, describing the ratio between existing relations and all possible relations, cohesion, defined as the number of bidirectional choices in relation to the number of dyads in a network, and network multiplexity, which calculates the share of multiplex relations in all possible relations. Another important measure within networks is the measurement of the degree of homophily, which describes whether actors with similar attributes are more connected between each other than to actors with different attributes.

Other important measures for networks are centrality and prestige, concepts based on the idea that the actor, who has plenty of relations within the network, is, therefore, more central and visible. There exist three types of centrality measures of actors: degree-based, closeness-based and betweenness-based.

Degree-based centrality is measured by the outdegree of an actor, which computes all outgoing relations to other actors, in the case of an asymmetric and directional network. $C_{D(n_i)} = od_i = \sum_j x_{ij}$ for i≠j.

Closeness-based centrality measures not only the direct but moreover the indirect relations to other actors (path distances). These relations are weaker than direct relations though important as they contain a lot of new information and are easier to handle, as they do not afford a lot of time (Granovetter, 1983).

$$C_{C(n_i)} = \left( \sum_{j=1}^{n} d(n_i, n_j) \right)^{-1} \quad \text{for i} \neq \text{j.}$$

Betweenness-based centrality follows a different logic than degree-based and closeness-based centrality as it starts from a dyad and computes the shortest path distance from one to another, called geodesic. The idea behind it is the probability that a communication from j to k will run over i. The ratio between the number of geodesics (g) between j and k going through i to the total number of shortest paths between j and k is computed in order to get the betweenness-based centrality: $C_b(n_i) = \sum_{j<k}^{n} \sum^{n} b_{jk}(n_i)$ for i ≠ j ≠ k;

$$b_{jk(n_i)} = \frac{1}{g_{jk}} \times g_{jk(n_i)}$$

The centrality measures of a network show the capacity of solving problems within a group. Moreover the speed and efficiency of spreading information and solving tasks is shown by centrality. Prestige concepts cover the level of control of actors over resources and how much authority as well as attention they have in the network. (Jansen, 2006; Wasserman & Faust, 1994).

### *4.3.2 Network Modes*

In social network analysis different types of social networks can be studied, according to the number of sets of actors and the properties of the ties among them. A one-mode network is a single set of actors (people, subgroups, organizations, collectives, etc.) and the relations between them. Relations can be individual evaluations such as friendship, liking, respect, or transactions. interactions, movement, formal roles or kinship. Moreover the attributes of the actors, additional information to the relation, can be analysed in social network analysis. A two-mode network allows for two sets of actors, which can be of different type, and at least one relation between them. A special type of social network, which stands in the centre of analysis of this study, is the affiliation network between one set of actors and one set of events. Here relations between a set of actors (mode one) are calculated through their joint affiliation with events (mode two). The nature of events can be manifold depending on the type of actors involved. Social functions can be membership in clubs, subgroups, committees or clusters, such as in this study. (Jansen, 2006; Wasserman & Faust, 1994).

### *4.3.3 Groups, Cliques, Roles and Positions*

The target of the analysis of subgroups and cliques is to see which parts of the network are more densely connected between each other than to the rest of the network. Subgroups are classified as components, bi-components and cliques. A component is a maximal connected sub-graph, a bi-component is a cohesive group, which does not include any cutpoints or bridges. A cutpoint is a node, which if deleted splits the network in new components, a bridge is the critical to the connectedness of the graph (Wasserman & Faust, 1994). A maximal cohesive subgroup of three or more actors is called clique (Hanneman & Riddle, 2005).

The clustering coefficient of an actor is a measure for calculating the openness of an actor's neighbourhood and describes a measure for the stability of the network. It describes how many contacts he has in common with his direct contacts (Buchanan, 2002). The measure was first discovered in the Small World Surveys by Watts who found out that all small world networks have a similar clustering coefficient (Watts, 1999).

Social positions and social roles are theories for describing network structure. Procedures for analyzing actors' structural similarities and patterns of relations in multi-relational networks are for instance structural equivalence, CONCOR

(CONvergece of iterated CORrelations), Blockmodels and QAP (quadratic assignment procedure). Those procedures split the actors according to their structural similarity or dissimilarity in groups and allow the comparison of matrices (Jansen, 2006; Wasserman & Faust, 1994).

The most important measure for calculating social roles within social networks has been proposed by Gould & Fernandez (1989). The brokerage procedure calculates measures of five kinds of brokerage: Coordinator, Consultant, Gatekeeper, Representative and Liaison. Brokerage occurs when, in a triad of the nodes A, B and C, A has a tie to B, and B has a tie to C, but A has no tie to C. That is, A needs B to reach C, and B is therefore a broker. The brokerage roles derive from membership in different groups, as displayed in Table 5:

Table 5: Overview of the Brokerage-Roles

| | |
|---|---|
| Coordinator | A → A → A |
| Gatekeeper | B → A → A |
| Representative | A → A → B |
| Consultant | B → A → B |
| Liaison | B → A → C |

*Source: mod. Fernandez & Gould (1994), Hanneman & Riddle (2005)*

Table 5 illustrates the composition of the five brokerage-roles, whereas the letters symbolize the membership in different groups and the arrows the direction of the ties. Another measure used for analysing brokerage within a network is the honest broker index, which measures the number of times an actor is an honest broker, a node which is trusted by two third parties that don't trust each other (Hanneman & Riddle, 2005).

### *4.3.4 Graph Theoretical Measures of Structure*

Simon (1994) claimed that hierarchy exists in any system, even in informal organizations, as it allows the system to operate more efficiently and survive disturbances. He argued that as informal organizations evolve naturally they follow the trend that communication flows tend to centralize, even though they might have a flat hierarchy disregarding the official communication patterns. Deriving from that idea Krackhardt (1994) proposed four measures for evaluating a social network's hierarchy. Those measures are the connectedness, the hierarchy, the efficiency and the least upper bound. The idea of those measures is to compare a given social network to an outtree, an archetype of a perfect hierarchical system. All of Krackhardt's measures are based on the number of outtree violations calculating a continuously varying value from 0 to 1. The *degree of connectedness* is defined as the number of violations of the connectedness condition, whereas a violation is defined as two points unable to reach each other. The *degree of hierarchy* is defined as the number of violations

against the reachability digraph, and measures the extent to which paths are not reciprocated. The idea is that in an outtree (such as the organizational chart), a subordinate cannot be the boss of a boss. The *degree of graph efficiency* measures the extent of existing redundant ties, which are not bridges and where a deleting of the ties does not lead to a splitting of a component. The idea behind it is that links are not without costs in a social system, and take time and resources. Therefore a social network is more efficient if it only consists of necessary relations. Therefore graph efficiency reflects the cost of a dense network. The *degree of least upper bound (LUB)* measures whether every pair has access to a common third person in the organization to whom they both can "appeal", which is a measure for conflict resistance in a network (see 2.1). In an outtree the calculation of all above presented measures gives a value of one (Krackhardt, 1994).

## 4.4 Further Methodology

### *4.4.1 Qualitative Content Analysis*

Qualitative content analysis (QCA) is a systematic and rule guided approach to analyse texts. Meant to preserve the advantages of quantitative content analysis, QCA is defined as *"an approach of empirical, methodological controlled analysis of texts within their context of communication, following content analytical rules and step by step models, without rash quantification,"* (Mayring, 2009, p.2). The subject of analysis can be all sorts of recorded communication like transcripts of interviews, protocols or video tapes. Therefore, this method appears to be ideal for analysing expert interviews and recordings of team workshops (Mayring, 2003).

Within qualitative content analysis there are several different techniques known, among those the summarizing technique, which reduces the content systematically until a short text emerges, the analysis of the context using lexical, grammatical definitions as well as the context and the structuring technique. Target of this technique is to find a certain structure in the material. With the help of a categorical system, text findings are extracted to a category in order to receive the structure. Hereby an inductive category development or deductive approach can be applied. The technique, which will be used in this survey, follows a deductive category development process (Mayring, 2009):

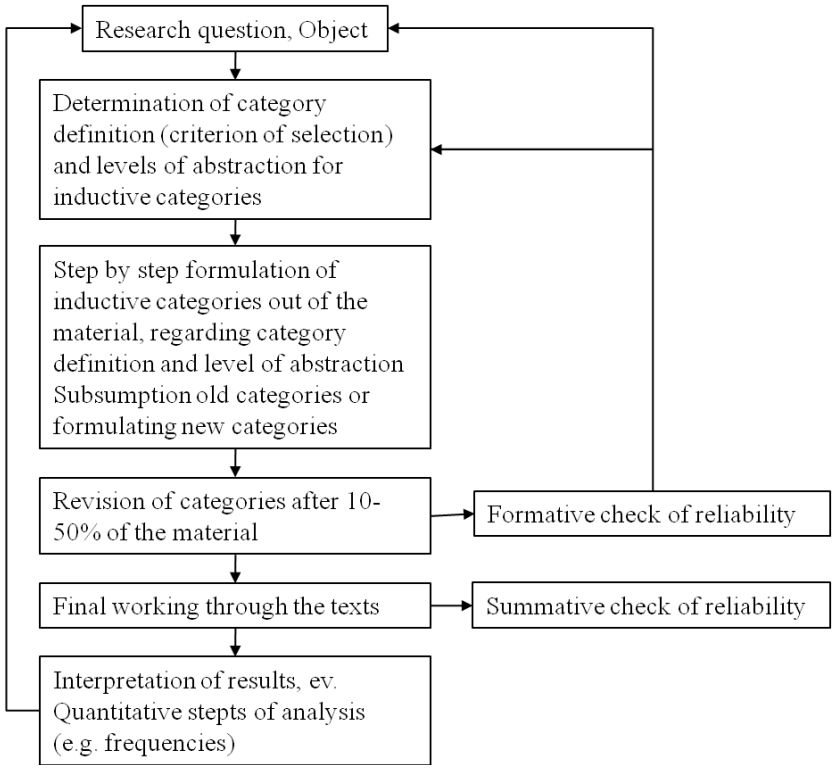

Figure 6: Deductive Category Application of QCA
*Source: Mayring, 2009*

### *4.4.2 Statistical Analysis*

Descriptive statistical analysis has been put into use for summarizing and presenting the findings from the non-relational part of the questionnaire as well as the interviews with the management of organizations and clusters. The central tendency measures like arithmetic, geometric and harmonic mean as well as dispersion measures like variance, distribution and standard deviation will be calculated. Also for the data of the relational part descriptive statistics are applied for measures calculated by Social Network Analysis.

As the sample size does neither allow generalizations nor inductive theory building about a total population, inferential statistics are used to draw conclusions about interrelations in the data collected and not to conclude to a total population.

Correlation tests are used for evaluating the relationship between two variables, measuring covariance and the correlation coefficient. As covariance is not a standardized measure, unless both data sets were measured in the same units, the Pearson correlation coefficient will be used for standardization. In order to find out more about the relationship between variables, linear regression analysis was performed. An overall F-test was used for testing the significance of the model against the null-hypothesis $H_0 : \beta_0 = \beta_1 = \ldots = \beta_k = 0$.

In addition a t-test has been performed for testing the significance of individual coefficients against the null-hypothesis $H_0 : \beta_i = 0$. (Attwood & Dyer 1994/1995; Fields, 2009; Sheather, 2009)

## 4.5 Prospect to the Findings

In line with data collection split on a micro-, meso- and macro-level, the results of this survey are presented for each level individually. In each of the three following chapters the findings of one level are presented and at the end of each chapter the assumptions evaluated.

In chapter 5 the micro-level of the survey, the organizational culture, communication and intra-organizational networks of three Austrian companies is presented and the impacts from their networks and the network management applied analysed.

In chapter 6 the findings on the meso-level, the inter-organizational networks of eight small and medium-sized firms presented and their network management according to the aspects of Strategic Networking, are evaluated.

Chapter 7 is devoted to the macro-level and the results and conclusions of the analysis of the socio-centric cluster network in Austria and the Czech Republic as well as the network management of four specific clusters.

The evaluation of the network management-tool Strategic Networking follows in chapter 8, where also answers to the research questions are given and the impact for science and practice outlined.

# 5. INTRA-ORGANIZATIONAL NETWORKS

The three companies participating in this survey are all located in Austria. Companies 1 and 3 are from lower Austria and Company 2 is placed in Vienna. The companies, which can be categorized as small-medium sized companies, are situated in different business fields:

- Company 1 is a supplier of software solutions with 48 employees and has been in the market for 25 years.
- Company 2 is a coating producer with 143 employees and has been in the market since 1937.
- Company 3 is specialized on polymer processing and mould making, having 100 employees and founded in 1964.

In the following Table 6 the demographical data about the employees of the three companies shall be presented, which has been raised by online questionnaire.

Table 6: Employee Demographics of all 3 Companies

| | **Company 1** | **Company 2** | **Company 3** |
|---|---|---|---|
| Employed since: (average) | 1998 | 2000 | 1992 |
| Standard deviation | 7.7 | 11.3 | 11 |
| | | | |
| Male | 78.8% | 55.6% | 56.7% |
| Female | 21.2% | 44.4% | 43.3% |
| | | | |
| Average Year of Birth | 1969 | 1966 | 1966 |
| Standard deviation | 13.1 | 8.7 | 11.2 |
| | | | |
| Prof. / Technical Education | 38.2% | 28.2% | 10.00% |
| Apprentice / Trainee | 0.00% | 5.1% | 0.00% |
| Apprenticeship completed | 17.6% | 20.5% | 60.00% |
| Professional School completed | 29.4% | 20.5% | 16.67% |
| Degree from a University of Applied Sciences | 0.00% | 10.3% | 0.00% |
| University Degree | 8.8% | 12.8% | 6.67% |
| No professional education | 0.00% | 0.00% | 3.33% |
| other | 5.9% | 2.6% | 3.33% |

*Source: Author's own*

Table 6 shows that in Company 2, the employees have been employed on average since 2000, even though it is the company with the oldest history. In Company 1, the youngest firm in the sample, the staff has been employed since 1998, with the smallest standard deviation. Company 3 has the team with the longest tradition, as their employees have been working for them since 1992.

While Company 2 and 3 have a comparable share of male and female staff, Company 1 has much more male staff (79%) than female. This fact may result from the kind of industry, which is focused on informatics and software engineering. Comparing the age of the employees we can observe that Company 1 has the youngest staff with the highest diversity. Company 2 and 3 have on average employees with the same age, even though the diversification in Company 2 is higher.

The next block of data in Table 6 shows the education of the employee. In Company 1 the majority of employees have a complete a professional / technical education, professional school or apprenticeship. In Company 2 the situation is similar; most of the employees finished a professional / technical education, professional school or apprenticeship. Moreover 23% hold a university degree in Company 2 (12.8% from a University and 10.3 % from a University of Applied Sciences), which counts to more than double as much University degrees as in Company 1 and 3. The educational situation in Company 3 is different from the other two firms as the majority of the staff completed an apprenticeship, which is double as much as in the other two firms. Moreover, Company 3 is the only one with employees without professional education. As other education is concerned, most respondents indicated that they are holding a high school graduation certificate.

Table 7: Professional Roles and Communication.

| **Job Position** | **Company 1** | **Company 2** | **Company 3** |
|---|---|---|---|
| Executive Manager | 20.0% | 28.6% | 20.0% |
| Self-dependent employee | 51.4% | 35.7% | 46.7% |
| Employee bound by instructions | 22.9% | 19.0% | 23.3% |
| Assistants | 2.9% | 7.1% | 3.3% |
| Other position | 0.0% | 2.4% | 6.7% |
| | | | |
| **Communication with Colleagues** | | | |
| Formal (vykat [cs], Siezen [de], to address formally) | 0.0% | 22.0% | 3.3% |
| partly - partly | 0.0% | 61.0% | 16.7% |
| Informal (tykat [cs], duzen [de], to address informally) | 100.0% | 17.1% | 80.0% |
| | | | |
| **Stakeholder-Contact in daily business** | | | |
| yes | 82.4% | 41.5% | 20.0% |
| Rather yes | 14.7% | 19.5% | 53.3% |
| Rather no | 2.9% | 24.4% | 20.0% |
| no | 0.0% | 14.6% | 6.7% |

*Source: Author's own*

Table 7 shows the share of job positions for all three companies as well as the communication between colleagues and the amount of stakeholder contact the respondents have in their job. In all three companies the biggest share of employees are in a self-dependent position, whereas Company 1 has the biggest share. In Company 1 more than half of the employees are in positions with own responsibility. Comparing the three companies, Company 2 has the smallest share of self-dependent employees and the biggest share of executive managers (29%). Company 2, moreover has the highest amount of assistants (7%), while Companies 1 and 3 employ only 3% assistants. Other positions in Company 3 represent sales men with a self-employed agreement and in Company 2, Controllers.

Interesting insights brought the question about the communication with colleagues. In Company 1 all employees are on an informal communication level, on first names basis. 80% of the employees in Company 3 communicate informally, while in Company 2 the communication is more formal and only 17% of the employees are addressing each other informally. 22% of the employees in Company 2 are having a formal communication level with their colleagues and 61% are having a partly formal and partly informal communication-basis.

The next block of data is focused on the amount of stakeholder contact an employee has in daily business. 97% of the employees of Company 1 are having stakeholder contacts in their daily job, and only 3% indicated that they have rather no contact to stakeholders. Company 3 is on second place with 73% responses for yes, or rather yes. In Company 2 two thirds of the employees indicated stakeholder contacts and the rest of the staff has no or rather no stakeholder contacts.

## 5.1 Organizational Culture

Organizational culture is an important phenomenon, which influences the behaviour of groups and individuals within the organization, has been defined by Schein (1985, p.18) as *"a pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration, which has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems."* Culture has therefore impact on how decisions are made, who makes them, how rewards are distributed, who is promoted, how people are treated, how the organization responds to its environment, how social networks emerge and which characteristics they incorporate (Harrison & Stokes, 1992).

A methodology how culture can be assessed has been proposed by Cameron and Quinn (2006) as the Competing Values Framework that consists of the dimensions 'internal focus and integration' versus 'external focus and differentiation' as well as 'flexibility and discretion' versus 'stability and

control'. As displayed in Table 8 these categories form the four culture types: clan, adhocracy, market, and hierarchy.

Table 8: The Competing Values Framework

| | **Stability/Control** | **Flexibility/Discretion** |
|---|---|---|
| **Internal Focus/Integration** | Hierarchy | Clan |
| **Ext. Focus/Differentiation** | Market | Adhocracy |

*Source: Cameron & Quinn, 2006, p.46*

Each of the cultural types has a different orientation, leader type, value drivers and theory of effectiveness (Cameron & Quinn, 2006). An organization is composed of all four cultural types, even one or two are typically predominant (Ershova, 2011). Eckenhofer and Ershova (2009) argued that the building of solid, dense intra-organizational networks is most natural and inherent in clan culture and partly in adhocracy culture, as social networks emerge best when the personal factor in a company is high. The reasons are that factors which are supporting the development of dense social networks, such as the importance of personal, face-to-face interaction, good relationships, open communication and exchange, as well as common interests and targets, are features of clan culture. In a case study Eckenhofer and Ershova (2011) tested this assumption and proved the contribution of clan culture on network density. Based on the Competing Values Framework (CVF) (Cameron & Quinn, 2006) the Organizational Culture Assessment Instrument (OCAI) was adopted for the purpose of measuring the current state of culture. In an online questionnaire the employees of every firm were asked to divide 100 points among four different statements representing culture types according to the CVF to assess six different areas of culture such as overall organizational characteristic, leadership, target orientation, employee stimulation and commitment. The average number of points spread on each cultural dimension, provides the basis for the OCAI plots.

In this study in addition to the Competing Value Framework an assessment of Schwartz's cultural dimensions has been used. The Schwartz Value Survey (2007) together with Hofstede's value dimension (power distance, individualism, masculinity and uncertainty avoidance) (Hofstede, 1984) is the most famous methodology for studying values cross-culturally. While Hofstede's categorization is intended for comparing values of nations, Schwartz's value system is focused on individual values and is therefore more suitable for intra-organizational value assessment. Schwartz (2007) is using 56 specific values, which can be grouped under the ten basic values: Power, Achievement, Hedonism, Stimulation, Self-Direction, Universalism, Benevolence, Tradition, Conformity and Security. Multidimensional Scaling of over 200 samples resulted in a system of two orthogonal dimensions: Self-enhancement vs. Self-transcendence and Openness to Change vs. Conservation

(Schwartz, 2007). In this survey deducted from Schwartz' (2007) and Mohler & Wohn's work (2005) 28 keywords, seven for each cultural dimensions have been chosen, while in an online questionnaire the fit to the company has been assessed by the employees.

In the following the cultural assessments using the Competing Values Framework (OCAI plots) and Schwartz's cultural dimensions of the three participating companies shall be presented and discussed.

Figure 7 shows the OCAI Plots of all three companies in one graph.

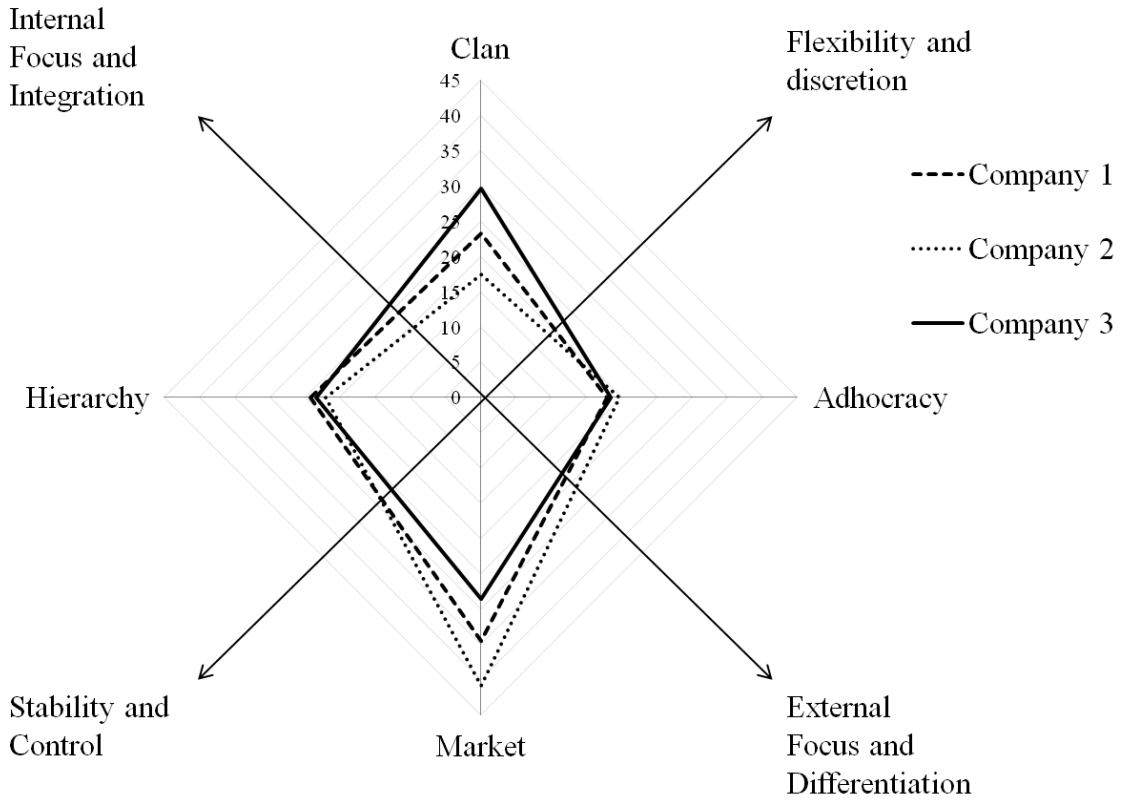


Figure 7: OCAI Plots of all three Companies.
*Source: Author's own*

It can be observed in Figure 7 that all three companies have a similar tendency towards hierarchy and adhocracy. While Company 3 (solid line) has a stronger focus towards Clan culture, the focus of Company 2 (dotted line) is on market culture. Company 1 (dashed line) lies in the middle between the other two companies concerning market as well as clan culture. According to Cameron and Quinn (2006) cultures with more than 25 points can be considered as dominant ones. Therefore, it can be stated that the dominant culture of Company 1 and 2 is the market culture, while Company 3 has the clan as well as the market culture predominant, which can be observed in Table 9.

Table 9: Overview of Cultural Shares according to CVF

| | **Company 1** | **Company 2** | **Company 3** |
|---|---|---|---|
| **Clan** | 23.26 | 17.43 | 29.59 |
| **Adhocracy** | 17.91 | 19.70 | 18.52 |
| **Market** | 34.62 | 40.87 | 28.53 |
| **Hierarchy** | 24.21 | 22.00 | 23.36 |

*Source: Author's own*

Company 1 shows a clear focus on market culture, even though not as predominant as Company 2, where the market culture has almost 41 points.

The cultural profile of Company 3 is interesting, as it demonstrates a paradox of incorporating two equally strong culture types, which are opposite to each other. A market culture indicates a result-oriented workplace, led by tough and demanding leaders towards market share, goal achievement and profitability. The Clan culture on the other hand represents a friendly place to work, which is perceived as an extended family. Leaders are seen as mentors or even parent figures, which hold the organization together by loyalty and commitment. This paradox can be a strength as well as a weakness at the same time, depending on how the organization utilizes this cultural combination. Opportunities of this combination lie in the flexibility and possibility of contradicting behaviour, which allow on the one hand, creating a warm, family-like atmosphere, which is typical for clan culture, and on the other hand demand output and achievements from employees, which is common for market culture. If an organization is able to harmonize these two approaches, it can create a culture of team spirit and belonging, which is able to compete and achieve results in the market. Nevertheless, lack of harmony might result in confusion, slow decision-making and conflicts (Cameron & Quinn, 2006). A balance of cultural values towards goals-based and values-based approaches has already been identified by Ershova (2011) as a driver of long-term efficiency.

Figure 8 shows the cultural profile of all three companies according to Schwartz's cultural dimension. For each of the cultural dimensions, seven expressions were available. The 28 expressions were listed alphabetically and the participants were asked to choose those suiting to the organization. For the dimension *openness to change*, the expressions diversity, innovation, creativity, 'joie de vivre', independence, change and pleasure were listed, which represent the value types hedonism, stimulation and self-direction. *Conservation* was listed by the expressions of authority, proper behaviour, moderate, family orientation, obedience, security and tradition, which represents security, tradition and conformity. For *Self-Transcendence* the expressions community, equality, helpfulness, communication, loyalty, tolerance and environmental protection were listed, representing the values of universalism and benevolence. The values of power and achievement in the dimension *self-enhancement* were

built by recognition, esteem, success, financial gain, precision, power and respect. (Schwartz, 2007; Mohler & Wohn, 2005).

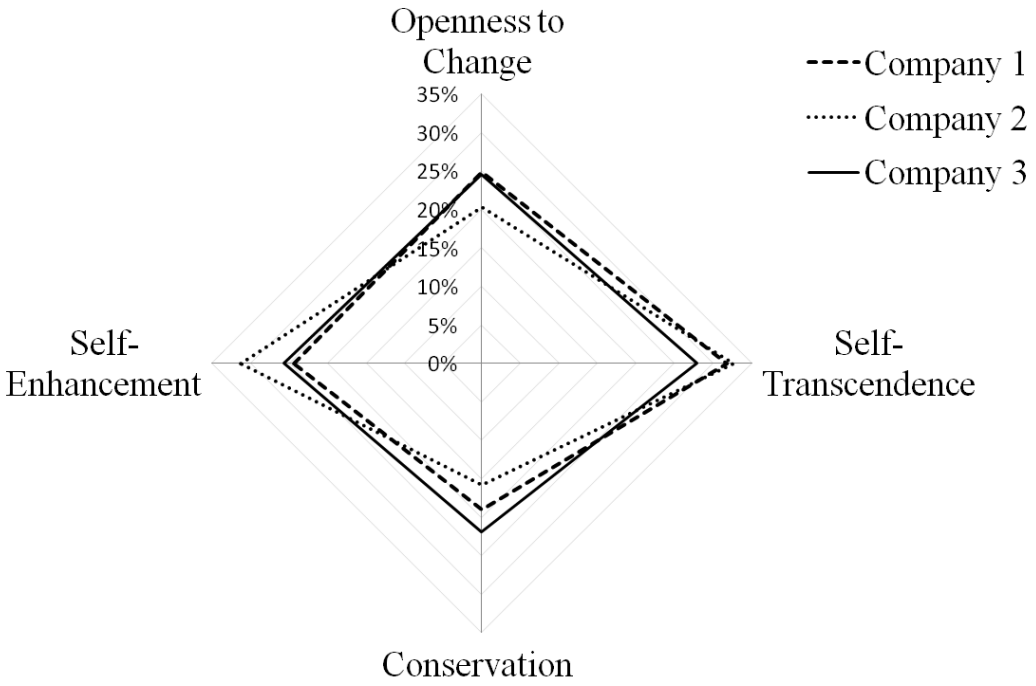


Figure 8: Schwartz's Cultural Dimensions of all three Companies
*Source: Author's own*

Company 1 (dashed line) has a strong tendency towards self-transcendence, representing universalism and benevolence, which are values contributing to evolvement of trust and networking. Company 2 (dotted line) has apart from self-transcendence a strong focus on self-enhancement, representing power and achievement, both values hindering the development of trust and knowledge sharing. Company 3 (solid line) even though showing a more balanced picture of its value-dimensions, compared to the other two companies, has also a predominance self-transcendence. Compared to the other two companies Company 2 has the smallest shares of conservation as well as openness to change and Company 3 the highest tendency towards conservation, which represents security, tradition and conformity. Security is also a trust supporting value, as a secure environment promises absence of fraud. Tradition has a similar effect as it enables reliance and continuity in the organizational social network.

The share in percentages of the Schwartz's Value-Dimensions is summarized in Table 10.

Table 10: Share of Schwartz's Value-Dimensions

| | **Company 1** (%) | **Company 2** (%) | **Company 3** (%) |
|---|---|---|---|
| Openness to Change | 24.81 | 20.27 | 24.54 |
| Self-Transcendence | 31.78 | 32.65 | 27.88 |
| Conservation | 18.99 | 15.81 | 21.93 |
| Self-Enhancement | 24.42 | 31.27 | 25.65 |

*Source: Author's own*

Another insight into the organizational culture bring the mission and vision of a company. The respondents were asked to state a possible mission or vision for their company. The statements of the Company 1's employees confirm the focus on market culture and self-transcendence. The most frequent answers were the official Mission-Vision-Statement *"We make a significant contribution to the functioning of the community"*. Other answers were *"Our Solutions. Your Future"* as well as *"We are more than living long-term partnership"*. All three statements show the market focus, the focus on the stakeholders as well as the focus on the community, loyalty and helpfulness.

Also in Company 2 the replies of the employees fit to the evaluation of the cultural profile. Statements were *"Good Lack"* (Lack [de] – polish), *"Tradition and Innovation"* and *"Team spirit"*. These answers confirm the focus on both self-transcendence as well as self-enhancement, as the most frequently named expressions were success (8%), environmental protection (8%), financial gains (7%) and diversity (7%). The slogan *"Team spirit"* is confirmed by a number of replies for community (6%).

In Company 3 the most named statement was the official mission of the company "We make your life easier". Other statements were "the office is your second home" and "do the best for the customer". The official statement is focused on the customers, clients and employees, which fits to the organizational culture of both market and clan. Moreover, the two individual statements support the focus on the clan culture, which creates an atmosphere like an extended family, and the market culture, which is stakeholder oriented.

## 5.2 Social Networks and Communication

Beside the organizational culture another important factor of influence on social networks is the communication in a company and its perception. Therefore, data about the average communication between employees and to the outside with stakeholders, has been collected as well as the perception of the communication evaluated.

Table 11 shows the perception of communication within the companies, which has been evaluated in the online questionnaire by the employees. Company 1 has the highest percentage of answers indicating free and open communication within the organization. Problems can be addressed directly the

most in Company 3, where moreover the highest percentage of answers indicating that "In general we talk a lot" is valid. Both in Company 1 and 2 "free communication is just possible on the same hierarchical level" for 6-7% of the employees, while in Company 3 only 3% think so. The same situation appears in the next category, similar perception in Company 1 and 2, while fewer employees in Company 3 think that the official communication channels have to be kept. The biggest difference, though the same tendency, show the answers to the questions whether communication is encouraged. Almost 21% of the answers indicate that in Company 3 communication is encouraged, while 9% in Company 2 do so and 3% in Company 1. A reason could be that communication is already free and, therefore, no need for further encouragement exists. The only company where communication is perceived as not being encouraged is Company 2. Other answers were in Company 1, that problems are taken personally, and in Company 3, that communication to certain departments seems to be disregarded.

Table 11: Perception of Communication in the Companies

| | **Company 1** (%) | **Company 2** (%) | **Company 3** (%) |
|---|---|---|---|
| Free and open communication is possible | 38.9 | 21.8 | 25.00 |
| Problems can be addressed directly | 25.0 | 30.8 | 29.17 |
| In general we talk a lot | 19.4 | 23.1 | 18.06 |
| Free communication is just possible on the same hierarchical level | 6.9 | 6.4 | 4.17 |
| The official communication channels have to be kept | 5.6 | 5.1 | 1.39 |
| Communication between employees is encouraged | 2.8 | 9.0 | 20.83 |
| Informal communication between the employees is NOT encouraged | 0.00 | 1.3 | 0.00 |
| Other answers | 1.4 | 2.6 | 1.39 |

*Source: Author's own*

After looking on how the communication is perceived and evaluated by the employees, the average hours of communication per week shall be analysed. Table 12 shows the average number of hours employees talk per week with colleagues of the same company about private or professional topics and with contact persons of other companies (stakeholders).

Table 12: Average Hours of Communication per week

| | | **Company 1** | **Company 2** | **Company 3** |
|---|---|---|---|---|
| With colleagues | private Topics | 1.35 | 2.14 | 1.75 |
| | professional Topics | 5.81 | 11.02 | 11.66 |
| With Stakeholder | private Topics | 0.41 | 0.86 | 1.22 |
| | professional Topics | 6.28 | 11.01 | 5.55 |

*Source: Author's own*

Table 12 shows that private communication with colleagues is spread more widely in Company 2 than in the other two companies. Company 1 shows the least hours per week of communication between colleagues both for private and professional topics. Both in Company 2 and 3 employees talk about 11 hours per week about professional topics. While Company 1 and 2 talk less about private topics with stakeholders, employees of Company 3 talk more than 1 hour per week with stakeholders about private topics. About professional topics most communication is done in Company 2, where on average 11 hours per week is spent talking about professional topics. In summary it can be stated that both within as well as outside the company the most hours of conversation takes place in Company 2. That this result does not contribute to the characteristics of the social networks will be clear after looking at the intra-organizational networks of these three companies.

As for Company 2 only a return rate of 48% and 68% for Company 1 has been achieved (Company 3 had a return-rate of 100%), while a minimum return rate of 70% would have been necessary (Schnegg & Lang, 2002) for a valid whole network analysis, it has been decided to extract the networks of Company 1 and 2, which means an exclusion of those employees who did not fill in the questionnaire, so that no missing values would exist in the social network. The benefit was moreover that a higher comparability of the networks has been achieved. In the centre of the analysis are, after the extraction, 32 actors (employees) of Company 1, 41 of Company 2 and 30 of Company 3.

In the following chapters the intra-organizational networks of all three companies in general and three specific relations in particular shall be presented and analysed.

### *5.2.1 Social Networks of Company 1*

The social networks of Company 1 have an overall high density and are well connected. An exception builds relation 5 and 6, private advice and private meetings, where the degree of connectedness drops on 0.28 and 0.45. The degree centralization of the aggregated network is with 17.2% low as well as the brokerage. In the aggregated network exist only 5% of “honest broker”, which are actors having ties to not connected alteri. Moreover is the average brokerage according to Fernandez and Gould’s brokerage positions 5.79 low.

In the following Relation 1 (professional talk), Relation 3 (professional advice) and Relation 7 (lending money) will be presented and discussed on the basis of their network graphs.

Figure 9 shows the social network graph of the first relation in Company 1, the relation of communication with colleagues about professional topics. This graph-theoretical layout of this network, as well as all following ones, was generated by spring embedding, an algorithm that uses iterative fitting to locate the points to each other according to their smallest geodesic distance (Trappmann et al., 2005). The colour of the nodes has been selected according to their department, which means that nodes with the same colour belong to the same department, which makes a graphical analysis of homophily between departments possible. Important is hereby, which is also valid for the other companies in the survey, that the management has black node colour. The node size has been chosen according to the betweenness value of an actor, which expresses information benefits.

The talking network of Company 1 consists of one component and shows a high density; almost 50% of all possible relations are realized. The average path length is 1.56, which means that it takes on average 1.5 steps to reach any other contact in the network, which can be considered as a positive value as this characteristic allows a good flow of information. Moreover there are no signs of homophily in this relational network as the homophily index E-1 index is 0.59, whereas on a scale from -1 to +1, -1 means homophily and +1 heterophily. A few actors are more central in the network and also inhibit higher betweenness values than others, though in general the centrality is balanced. Also one member of the management with the number 13 is central in the network, while the other two members of the management are more in the periphery and close to each other (7, 5).

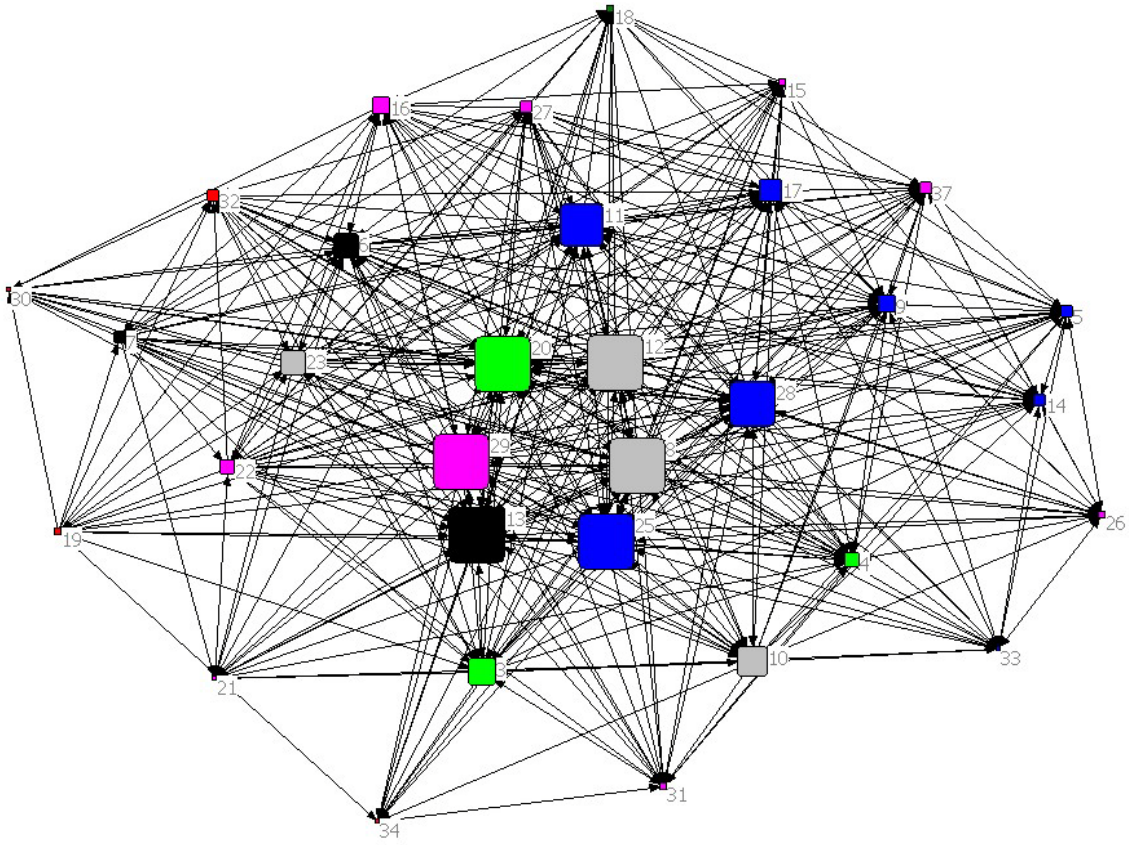

Figure 9: Relation 1 (Professional Talk) of Company 1
*Source: Author's own*

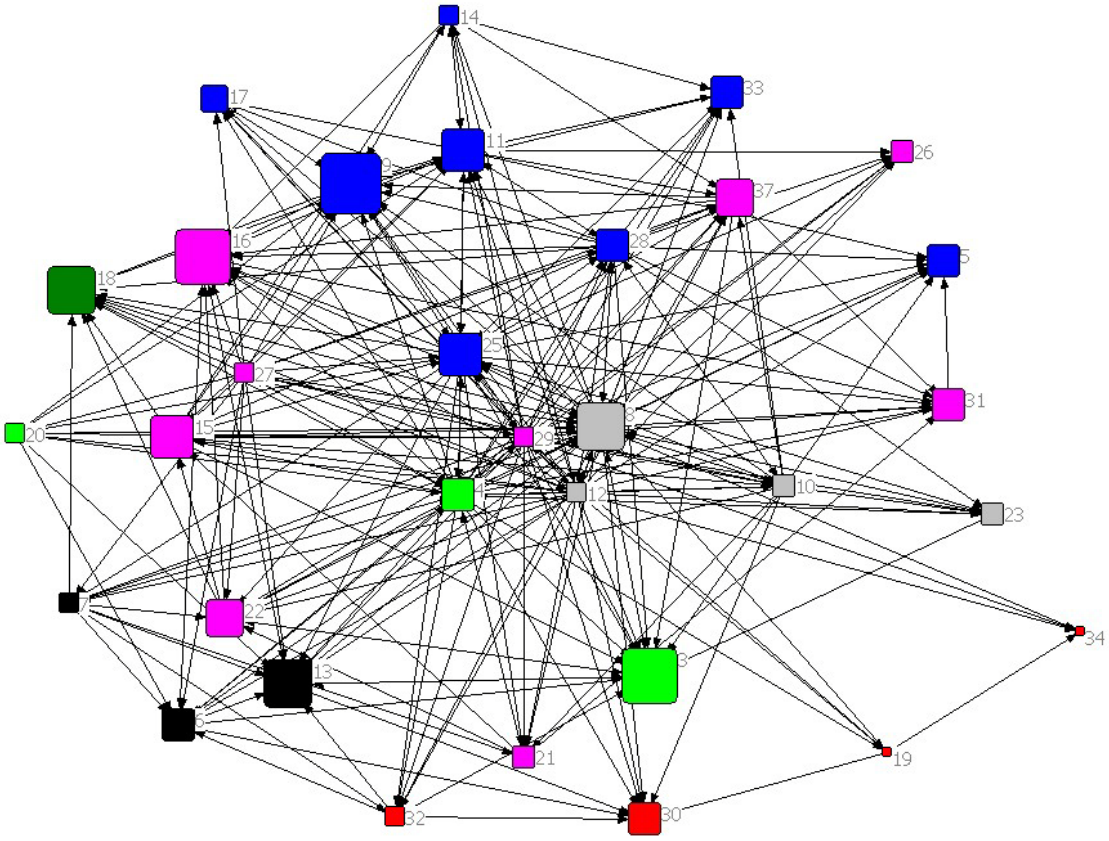

Figure 10: Relation 3 (Professional Advice) of Company 1
*Source: Author's own*

Figure 10 shows Relation 3 of Company 1, the network of professional advice seeking, which consists of one component and a degree centralization of 56%. The difference between Figure 10 and Figure 9, the talking relation, is big. This network has a smaller density of 28% and also the path length is higher, 1.79. In the network in Figure 10 the node size has been set according to the indegree value of the individual actor. A high indegree value means that many of their colleagues indicated that they would ask this actor for advice in professional matters. It can be observed that in the network of advice seeking a few (4-5) actors are in the centre of the network due to their outdegree, though relatively small in terms of indegree. The management of Company 1 (5, 7, 13) builds a triad at the left periphery of the network. That the management is not central in this network is not surprising as when people move higher in an organization, due to more administrative tasks, they get less accessible and less knowledgeable about the day to day work of their subordinates (Cross et al. 2001). Leading actors in terms of indegree are actor 9, 3 and 16.

Figure 11 shows the last relation, which was generated by asking "Whom would you lend an amount of 200€". This questions is testing the trust within a social network, as lending an amount of 200€ already requires a minimum of trust.

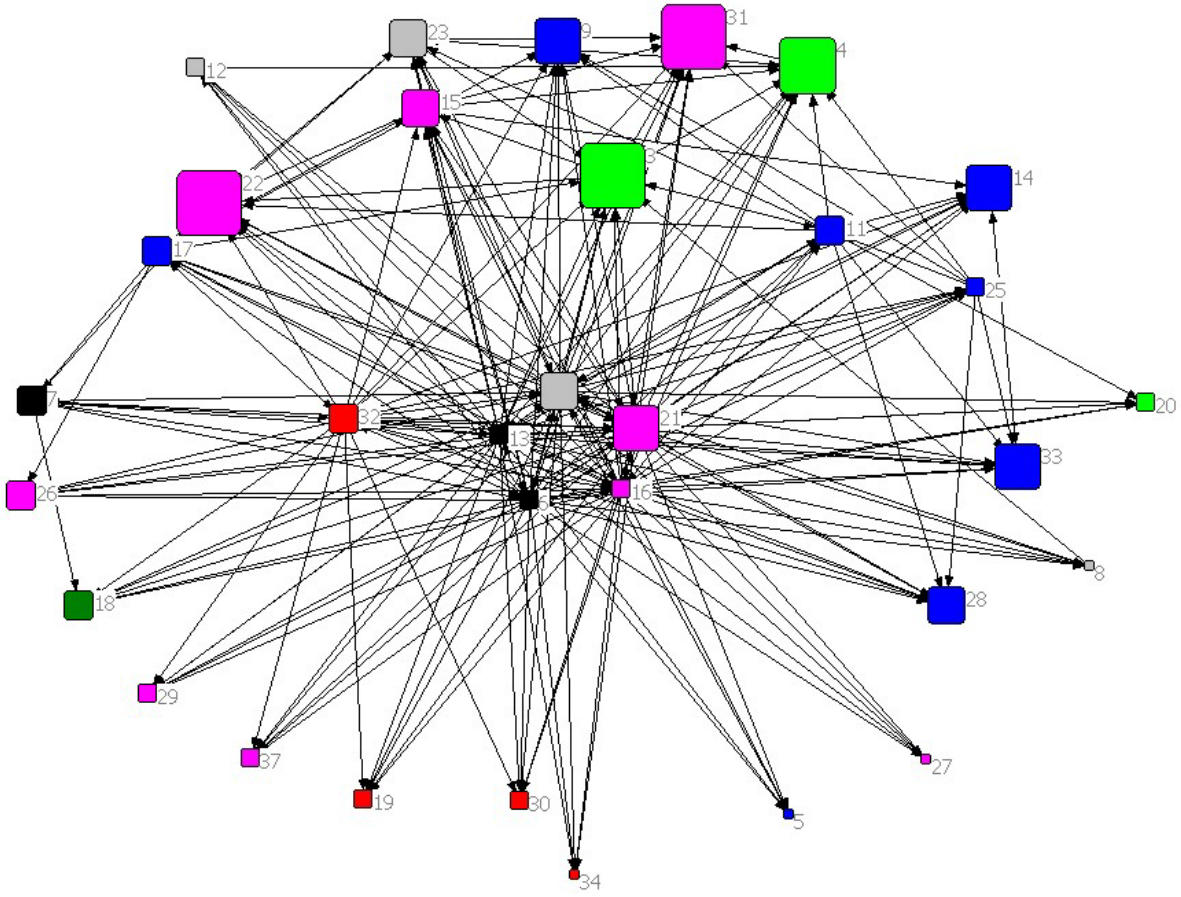


Figure 11: Relation 7 (Lending Money) of Company 1
*Source: Author's own*

Six actors are in the centre of the social network and build a clique by lending money to each other. Though, the node size, which has been set by the indegree of an actor, shows that those actors are not the most trusted ones in the network. Those actors, enjoying a high level of trust and have an indegree of 11 and are located at the upper periphery of the network with the numbers 3, 22 and 31. On the right side of the figure a group of actors of the same department can be found, lending money to each other. This shows that the level of trust in this particular department is high. The density of the network is 23% with an average path length of 1.6. This goes in line with the general trust evaluation, where 57.1% indicated that in general most people can be trusted. Just 28.6% answered that in general you cannot be too careful. The rest answered with “I don’t know” or gave another answer.

### *5.2.2 Social Networks of Company 2*

The social networks of Company 2 are in general of lower density. The density of the aggregated network is 47.87% and the average path distance 1.5. Beside Relations 1, 2 and 7 all networks consist of more components. The relations 5 and 6 are even composed of 27 components and have a density of 1%. The share of honest broker in the aggregated network is 9% and the average of total brokers on department level 12. The degree centralisation of the aggregated network is with over 21% high.

Figure 12 shows the professional communication network of Company 2. The 41 actors in the network form 785 communication links, which is a density of 44% and hereby slightly weaker than the network of Company 1. Moreover is a slight sign of department homophily visible as nodes with the colour are grouped by spring embedder next to each other. Though the general homophily index E-1 is positive, 0.78. This might result from the fact that not all departments are homophilous, but in particular the department with pink, yellow and turquoise colour. The average path length of this network is similar as in Company 1, 1.5. The node size in this network is set according to betweenness centrality. This makes it visible that those actors central in the network enjoy moreover information benefits due to their strategic position.

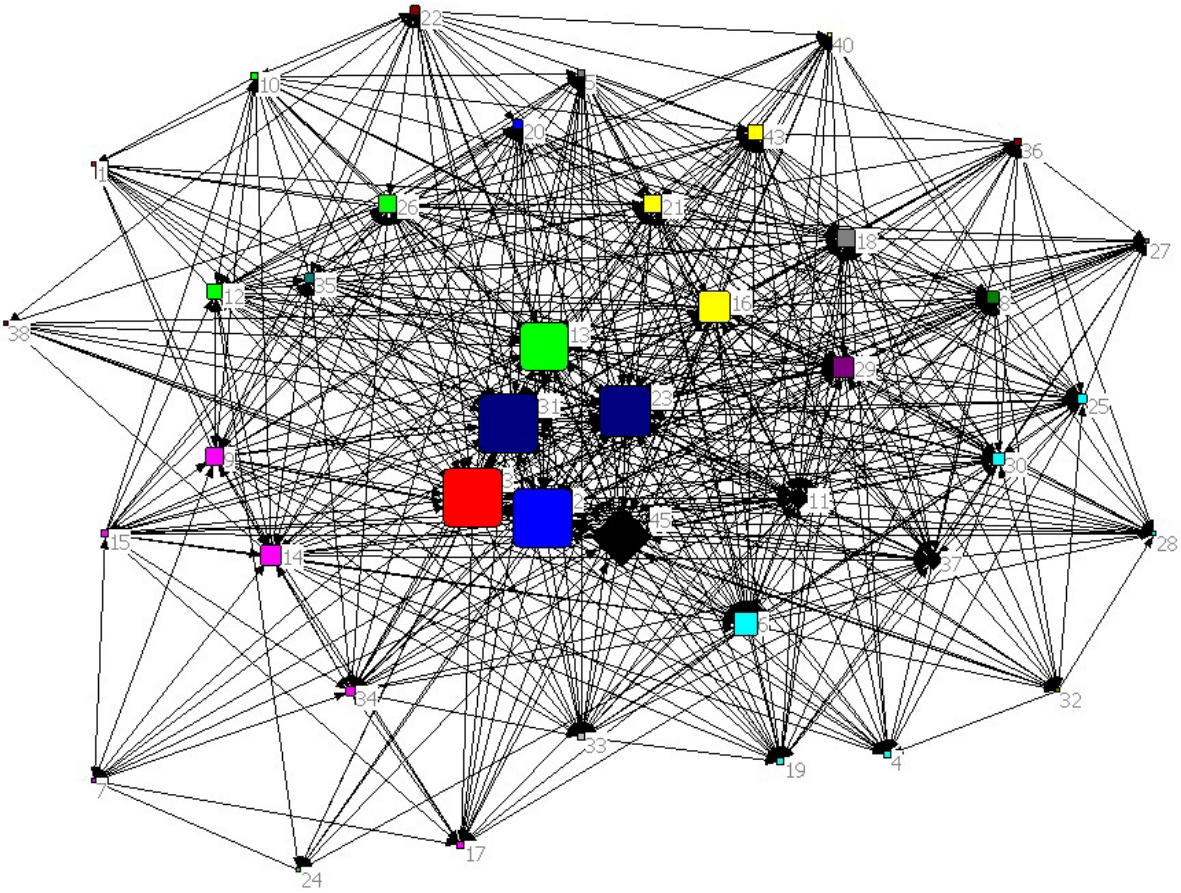


Figure 12: Relation 1 (Professional Talk) of Company 2
*Source: Author's own*

Figure 13 shows the professional advice network in Company 2 arranged by spring embedder and with node sizes according to the indegree of an actor. By that it can be observed that members of the management are being asked for advice by many employees. The centralization of this network is with 17% low, which can be observed also by the spread of bigger nodes in the graph.

The average path length in this network is quite high, 3.1, which is indicating a low information flow. Moreover is density of the network compared to the advice seeking network of Company 1 quite low, just 8% of all possible relations are realized. This network does not consist of only one component, as there are two isolates, number 25 and 36, which are not included in the advice seek. These facts confirm the cultural tendencies towards self-enhancement, where power plays a big role. Moreover the lack of clan culture is visible, which would create an atmosphere were asking for advice does not inhibit a threat.

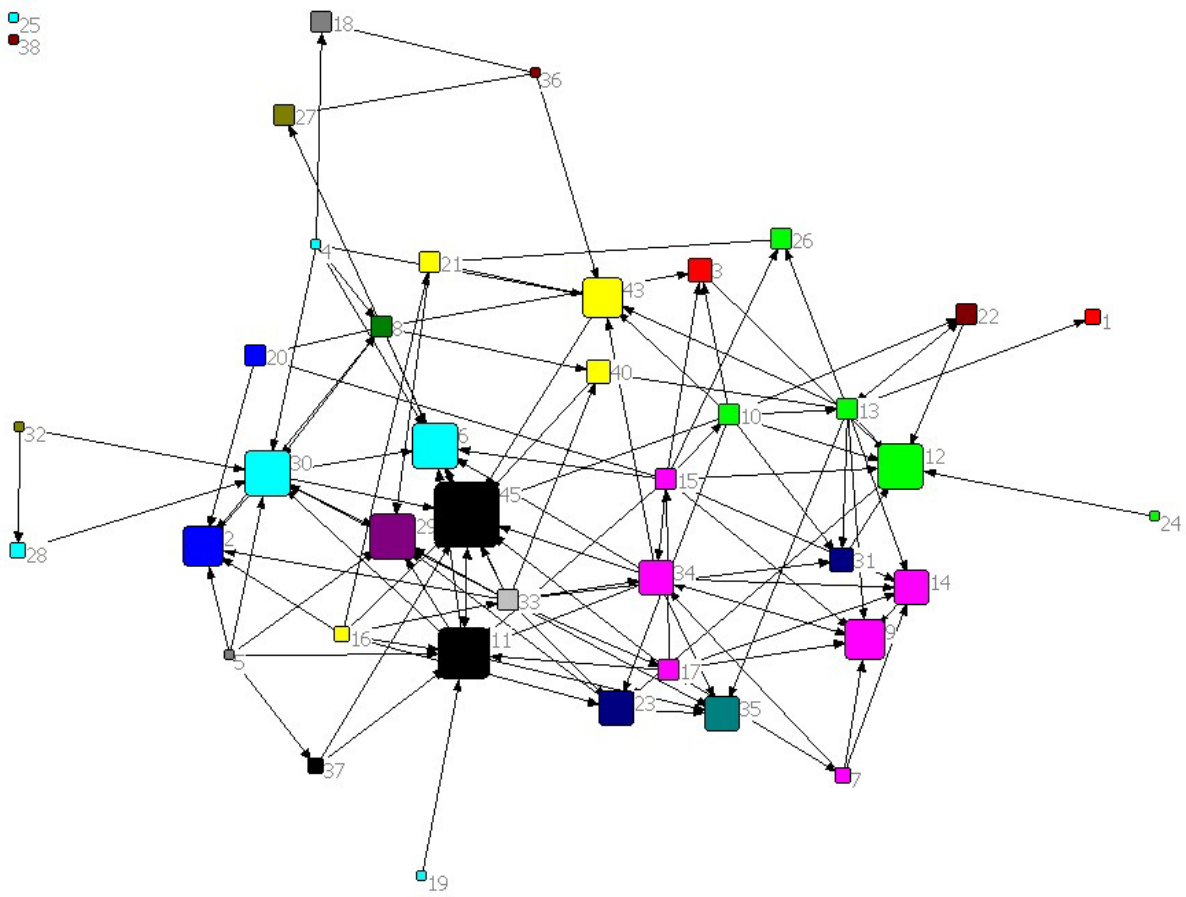


Figure 13: Relation 3 (Professional Advice) of Company 2
*Source: Author's own*

Figure 14 represents the social network of lending money in Company 2. This network consisting of one component has a high centralization (87%). Remarkable is the shape of the network, as due to the few central actors it has a star-shape. Number 45, a member of the management, is in the total centre of the network, not only because this actor would lend money to all of his employees, but moreover because nine actors would lend money to him. Though differently than for any other actor this is not merely a sign of trust, as power due to hierarchy can have a similar effect. Other actors with higher indegree (6), where it can be assumed those actors are trusted and respected within the company are the actors with the numbers 5, 11, 21, 23 and 43.

With an E-1 value of 0.6 there is no sign of homophily on department level. The low density of 8.7% shows moreover the existence of hierarchical power and the lower level of trust in this network, which was indicated also by the respondents in the questionnaire. Just 49% said that most people can be trusted, while all others indicated that one cannot be too careful or that they don't know.

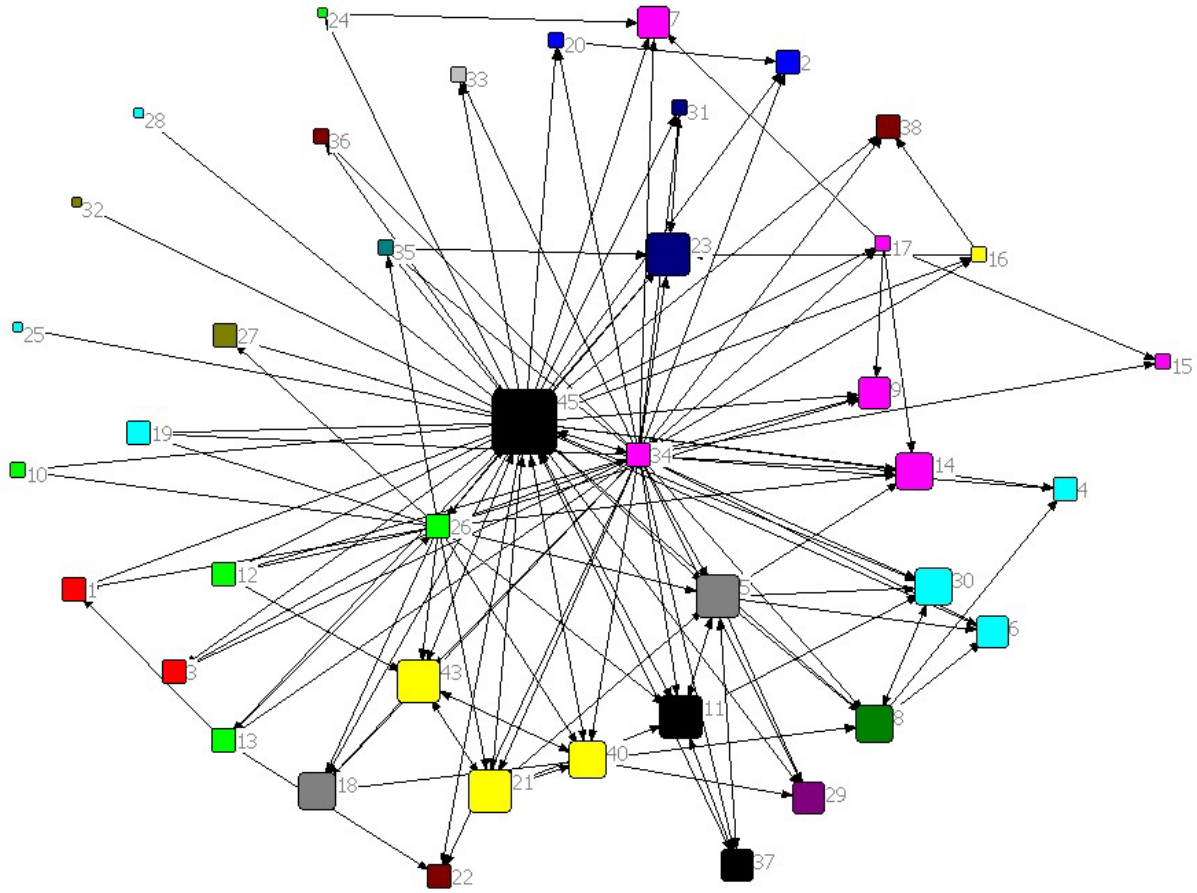


Figure 14: Relation 7 (Lending Money) of Company 2
*Source: Author's own*

### *5.2.3 Social Networks of Company 3*

The social networks of Company 3 are of high density. The aggregated network has a density of 65% and an average path length of 1.3. The overall degree centralization is with 20.6% quite high, though lower than of Company 2. Also the brokerage in Company 3 is with 8% honest brokers, smaller than in Company 2. Significantly smaller is the share of total brokers according to Fernandez and Gould, which is on average 6. Relation 3 exists of two components, Relation 5 of 13 and Relation 6 of 3 components. All other networks consist of only one component.

Figure 15 shows the first relation, professional talk, of Company 3. Due to the colour, which represents the department of an actor, it is visible that actors of the same department talk a lot with each other, but also with actors from other departments. Therefore is the E-1 Homophily index 0.7, indicating heterophily.

Compared to Company 1 and 2, this Company shows the highest density in Relation 1, which is 52% and the network consists of only one component. Moreover the average path length is 1.46, showing a good information flow between all actors of the network. The management with the numbers 2, 29 and 30 are central, though not directly in the centre of the network. The node size

according to betweenness centrality show moreover the information benefits of the management.

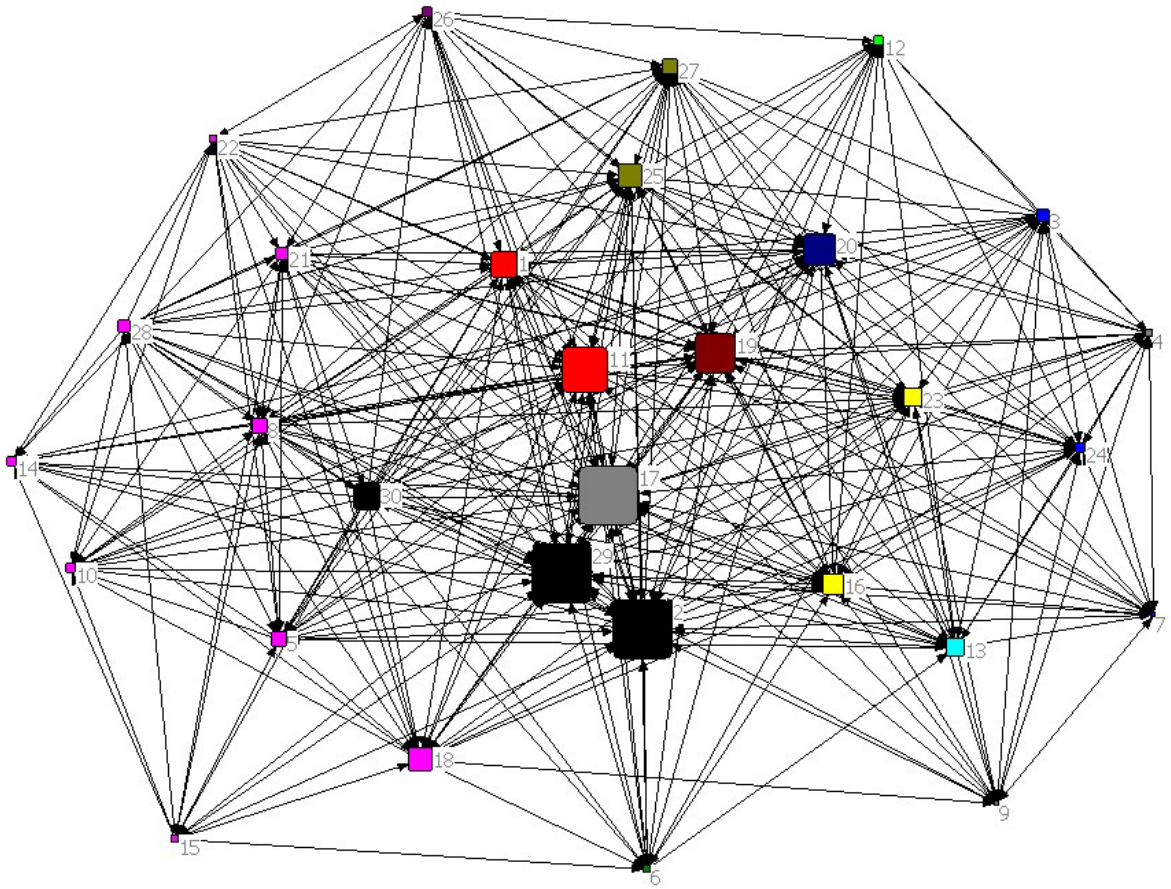


Figure 15: Relation 1 (Professional Talk) of Company 3
*Source: Author's own*

Figure 16 shows the professional advice network of Company 3. In this graph the node size is chosen according to the indegree of an actor and the nodes are arranged by spring embedder. This network consists of two components, as one actor number 30, is not included in the advice seek. It can be observed that there are several central actors, whereas two are members of the management. Again actor with the number 17 enjoys a high reputation, which can be observed by the node size, as many colleagues indicated that they would ask actor 17 for advice in professional matters.
The density of this relation is 22% and therefore smaller than of Company 1, but larger than the density of Company 2's advice seeking network. The average path length is 2, which means that it takes on average 2 steps from any actor to any other. In the information search, the horizon of an actor is limited as one can be informed about the knowledge of his direct contacts, but seldom further than to actors of 2nd degree. Therefore represents the average path length of 2 the least acceptable value (Granovetter, 1973). The E-1 Index is 0.6, larger than in the two other companies and showing heterophily. The density of this network

and the integration of the management in the search for advice is a sign of the clan culture, where trusting atmosphere exists and leaders are seen as mentors, whom one can ask for advice.

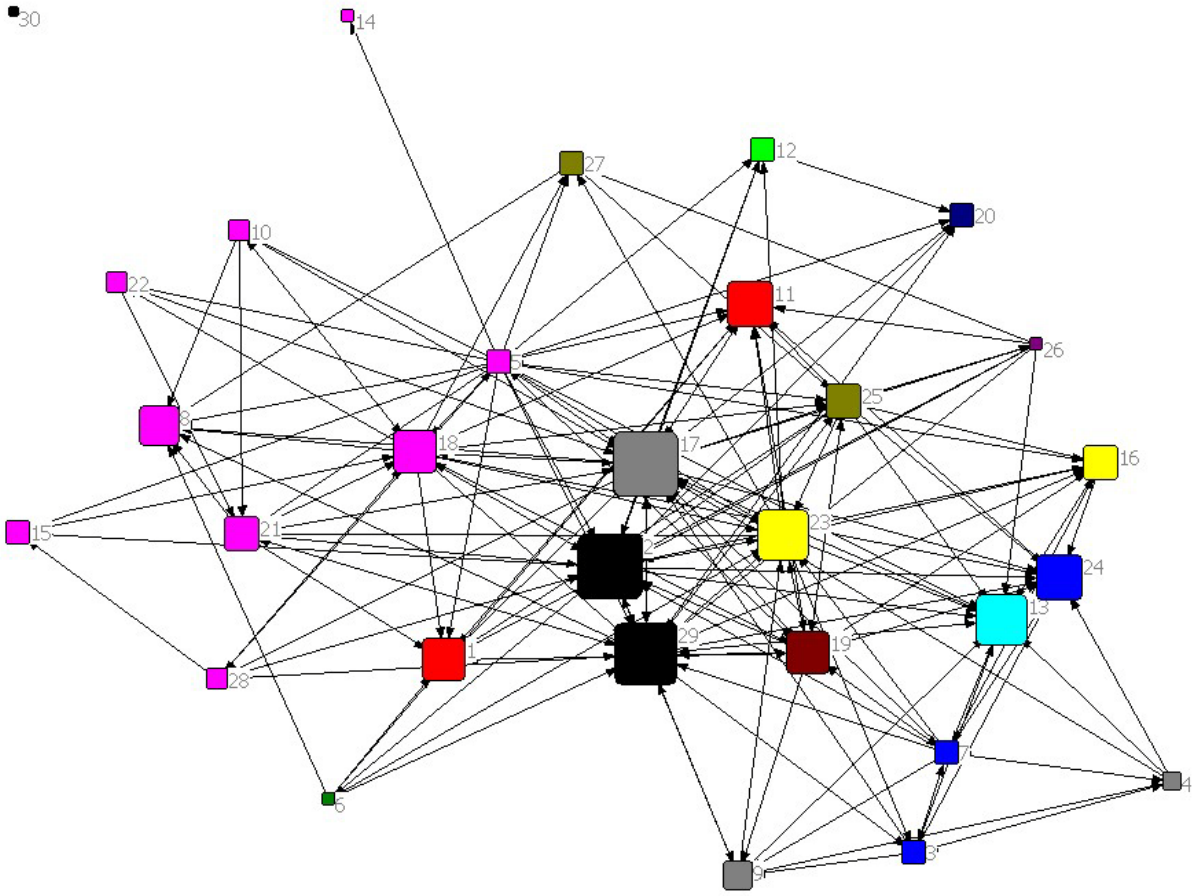


Figure 16: Relation 3 (Professional Advice) of Company 3
*Source: Author's own*

Figure 17 shows the relations of actors who are willing to lend an amount of 200€ to their colleagues in Company 3. The structure of this network is different to those of Company 1 and 2, which had a star shape with a few central actors and many actors in the periphery. Here the average degree is high with 44. The node size in figure 17 was set according to indegree and it can be observed that the majority of actors have a similar indegree. This leads to the conclusion that the general trust in the network is high, which goes in line with the clan culture being strong in this company.

The average path length in this network is 1.6 and the E-1 Index is 0.7, showing no sign of homophily between the departments. The density of this network is 26%, which is higher than the density of the "Lending-Money" Relations of Company 1 and 2. This means that more than one fourth of all combinations are realized by colleagues who are willing to lend another colleague 200€ in case they would ask. This is moreover a sign of the high level of trust in this firm, which is supported by the culture of the organization. The

answers from the questionnaire showed that 50% are the opinion that most people can bet trusted, which is slightly higher than in Company 2.

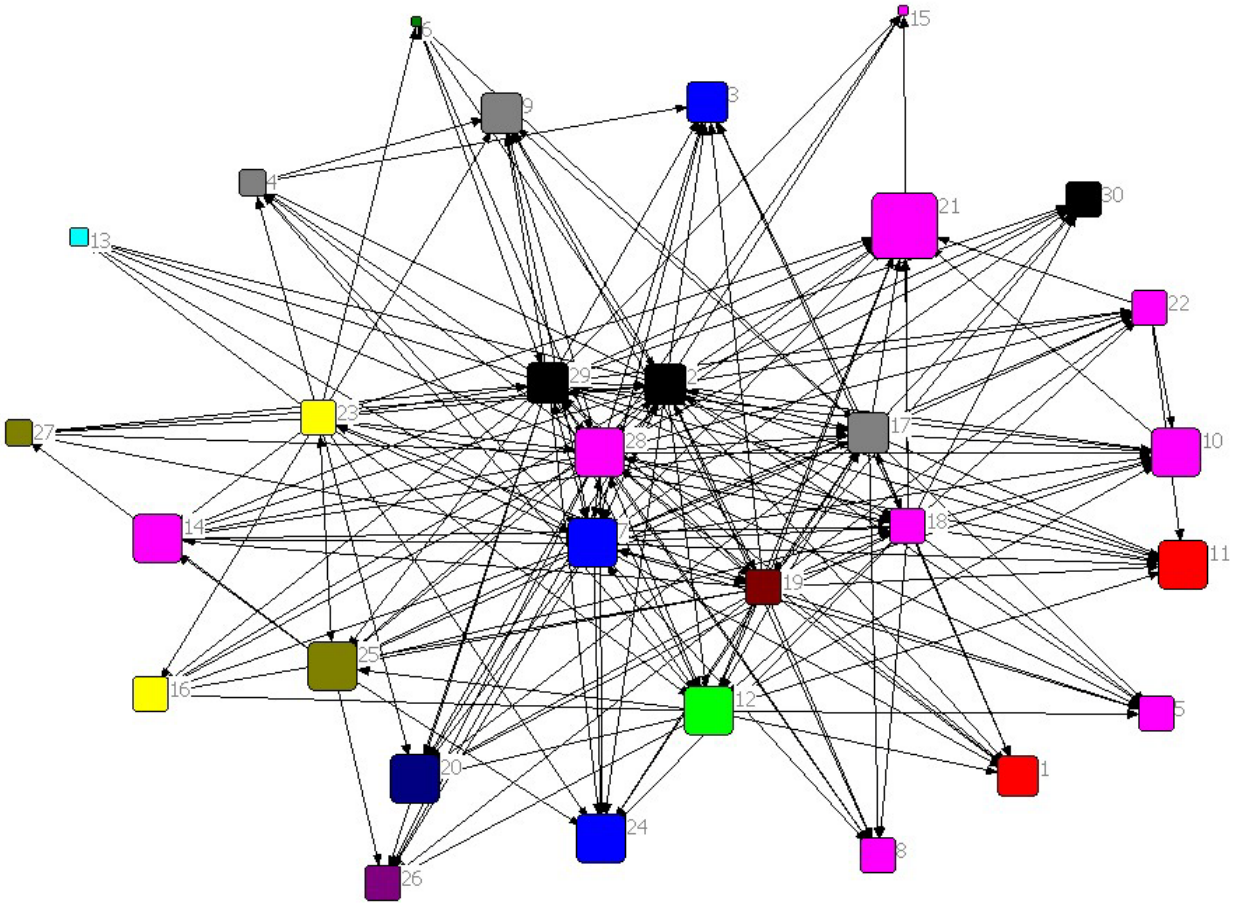


Figure 17: Relation 7 (Lending Money) of Company 3
*Source: Author's own*

### *5.2.4 Comparison of Network Measures*

After the analysis of three particular relations of all three companies, the general network measures of all relations in all three companies shall be compared. As the number of nodes in the extracted networks is not significantly different, a comparison of network measures is possible. Table 13 shows the number of nodes, ties and density measures of all three companies.

Table 13: Density Values for all Companies

| | **Company 1** | **Company 2** | **Company 3** |
|---|---|---|---|
| Nodes | 32 | 41 | 30 |
| Ties aggr. | 636 | 785 | 568 |
| Density aggr. | 64.11% | 47.87% | 65.29% |
| Relation 1 | 49.60% | 44.33% | 51.95% |
| Relation 2 | 23.29% | 7.87% | 29.66% |
| Relation 3 | 28.33% | 7.50% | 21.72% |
| Relation 4 | 19.86% | 10.61% | 29.31% |
| Relation 5 | 2.72% | 1.04% | 4.25% |
| Relation 6 | 4.33% | 1.22% | 6.21% |
| Relation 7 | 23.49% | 8.66% | 26.21% |

*Source: Author's own*

In the aggregated network, a compilation of all seven relations, as well as in all other relations Company 2 has the lowest density. Company 3 enjoys in all relations the highest density followed by Company 1. The density values go in line with the organizational culture, where Company 3 had the strongest Clan culture with 29.6 points, Company 2 had 23.3 points and Company 2 only 17.4 points (see Table 9). These findings confirm the findings of Eckenhofer and Ershova (2009, 2011), who claimed that Clan culture contributes to the density of a social network.

When comparing the multiplexity of the networks it is visible that not only the density is lower in Company 2, but moreover the muliplexity. While in Company 3 almost 68% of the relations go over more than one relational type (eg. Colleagues talk about professional and private topics) and in Company 1 almost 64% of the relations have more than one dimension, in Company 2 just 40% of the relations do so. This means that in Company 2 the majority of the relations are one-dimensional and therefore the overall network more fragile as a higher multiplexity contributes to the stability of relations. Figure 18 shows the multiplexity in the three companies throughout the number of relations. While the difference on one-dimensional relationships is big, the difference on two dimensional is not. Around 22% of the relationships are two-dimensional in all three companies. In Company 1 there are 23% relations three-dimensional, while in Company 2 only 11% are going over three-relational types. The

percentage of relations going over four and more relational types decreases with the increase of the dimensions in all three companies. Company 3 enjoys in total a higher multiplexity in its intra-organizational network as 3% of the ties go over 6 relationships and 2% even over 7 relations.

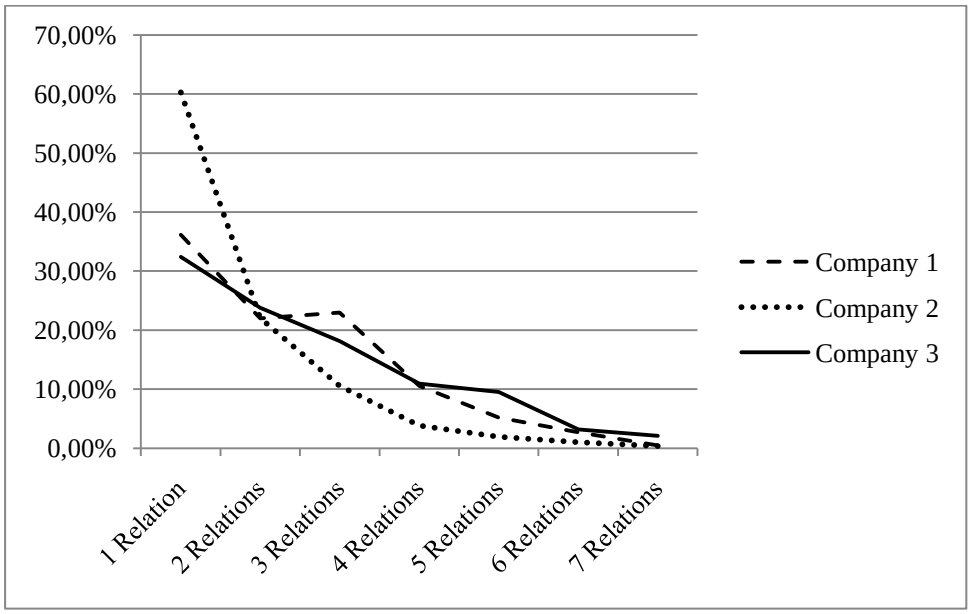


Figure 18: Multiplexity of Relations
*Source: Author's own*

Homophily has not only been calculated on department level, but also for sex, in order to see whether actors of the same sex prefer each other. In all three companies, for all relational types the E-1 Indices were negative indicating signs of homophily. On the aggregated network the strongest sign of homophily was found in Company 1, where the homophily index was -0.34. The strongest signs of homophily was found in all companies in Relation 5, asking for advice in private matters. This shows that in sensitive, private matters advice from a colleague of the same sex is preferred. In general the homophily signs are stronger in Company 1, where 78.8% of the employees are men and 21.2% women, and therefore homophily a natural effect of minority groups.

Homophily on the department level was only in Company 2 in the fifth relation of private meetings slightly negative -0.5. In all other companies and relations no signs of homophily were found, on the contrary heterophily exists between the departments and no department-egoism.

For evaluating the structure of the networks, Krackhard's graph theoretical measures have been calculated. Figure 19 shows a graph of the efficiency values of all three companies. It can be observed that beside Relation 6, meeting in private, Company 2 has the highest efficiency. As efficiency is a merely graph theoretical measure this does not allow conclusions on the social efficiency or even economic efficiency of the network (Krackhardt, 1994). Though it allows

saying that in Company 1 and 3, more links exist than only those necessary to maintain the network and reflects the cost of a dense network.

Concerning Least-upper-bound (LUB), a measure indicating the conflict-solving potential in a network, it has been found that in all three companies, the private advice relation R6 is under 1 degree of LUB and in Company 1 and 3 also the private meeting relation R5. Moreover is the LUB in Company 2 in the professional advice relation 0.75. In all other relational types the LUB has been measured as 1.

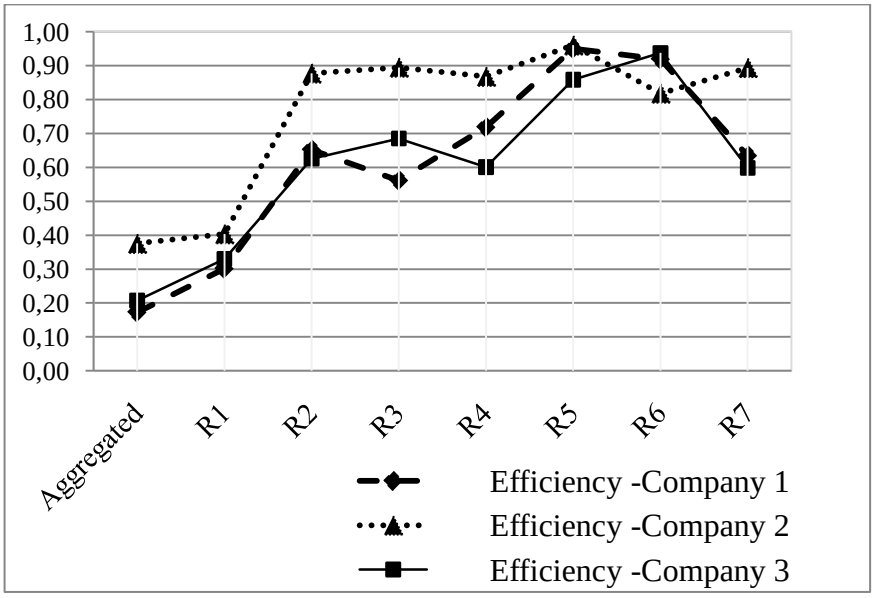


Figure 19: Efficiency Values
*Source: Author's own*

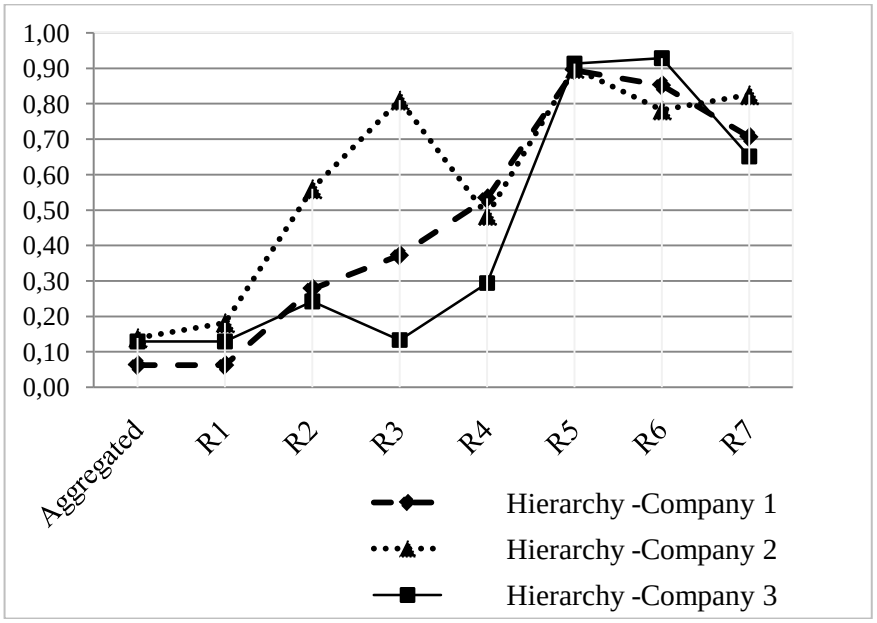


Figure 20: Hierarchy Values
*Source: Author's own*

Figure 20 shows the hierarchy values in all three companies. It can be observed that in the aggregated network as well as relations 1 till 3 and Relation 7 Company 2 has the highest hierarchy. Network hierarchy allows a conclusion on power due to advantageous positions in the network (Burt, 1995). Moreover has research proven that trust is more likely to evolve in egalitarian networks, whereas hierarchical networks are more likely to lead to a decrease of social trust and economic development (Halpern, 2005). The strong hierarchy shows that a few actors are central in the network and many in the periphery, which can moreover be confirmed by the centralization of the network. Calculation of the degree centralization showed that the overall centralization is the highest in Company 2 (21.16%), followed by Company 3 , which can be observed in Table 14. The small centralization in Relation 5 and 6, private advice and private meeting, results from the fact that the network consists of 27 components, which are not linked.

Table 14: Degree Centralization in all three Companies

| | **Company 1** (%) | **Company 2** (%) | **Company 3** (%) |
|---|---|---|---|
| Aggr. Network | 17.20 | 21.16 | 20.69 |
| Relation 1 | 30.11 | 40.38 | 33.00 |
| Relation 2 | 65.16 | 41.35 | 55.17 |
| Relation 3 | 56.13 | 17.18 | 45.07 |
| Relation 4 | 54.62 | 21.86 | 56.40 |
| Relation 5 | 22.58 | 8.59 | 14.78 |
| Relation 6 | 40.00 | 5.83 | 61.82 |
| Relation 7 | 63.44 | 86.73 | 59.85 |

*Source: Author's own*

## 5.3 Network Management and Performance

This chapter is focused on the network management and performance in the three companies on micro-level, which was collected by expert interviews with the management of the individual companies.

Network management in Company 1 is done partly adhoc, partly deliberately and planned. Though the network management is neither institutionalised nor fully intentionally. Company 1 has a target-orientation of 7; on a scale from 1 (not target oriented) till 10 (strongly target-oriented). Network Analysis is done in Company 1 seldom till sometimes.

In Company 2 the network management has a target orientation of 5 and the networks are sometimes analysed by simply talking and thinking about it.

In Company 3 the target orientation was indicated as 3, though the interview partner indicated that he and his father, owner and management of the firm, are almost doing networking on a full-time basis. In this case the network is seldom

analysed, though occasionally oral coordination is done in order to plan networking tasks and activities.

Table 15 shows an overview of the target-orientation of network management in each company as well as the frequency of network analysis. Below the number of intra-, inter-organizational network management activities and the total number of network management activities are summarized. It can be observed that Company 1 has the highest number on network management activities on all three levels. Companies 2 and 3 have the same amount of intra-organizational activities, while Company 3 performs more inter-organizational network activities and also in total Company 3 performs one activity more.

Table 15: Network Management in all three Companies

| | **Company 1** | **Company 2** | **Company 3** |
|---|---|---|---|
| Target-orientation | 7 | 5 | 3 |
| Network analysis | Seldom-Sometimes | Sometimes | Seldom |
| Intra-Activities | 24 | 17 | 17 |
| Inter-Activities | 14 | 8 | 12 |
| Total Activities[3] | 34 | 24 | 25 |

*Source: Author's own*

For aligning strategy, technology and organization within the organization Company 1 only newsletter are used, but a stronger focus is led on the facilitation of shared norms and visions. Therefore in addition to the Mission/Vision Statement a written codex exists and regular meetings and informal contacts are fostered. Emphasis is led in Company 1 on the fostering of social integration and regular events, meetings, company celebrations and even trainings and teambuilding seminars are organized. Also informal contacts have a broad opportunity to evolve as employees as well as the management usual have their lunch together in the office kitchenette, which is located in the centre of the building. The architecture of the office complex is modern, with a lot of glass fronts, windows and open stair ways. The office kitchenette is arranged like a modern café, including the firm's smoking area. Moreover have the employees the possibility to communicate on an informal basis at the annual firm's outing and Christmas party. Network governance is performed internally via databases and address directories. The management outlined moreover that informal communication plays a huge role in the network governance. The coordination of exchange is done over the CRM-System, drives, email and platforms and the company intranet. Also here communication makes a big contribution to the coordination of exchange. Figure 21 shows the network management activities of all three companies. Company 1 (dashed line) has beside of the category "Activities to align Strategy, Organization and

[3] The number of total activities is not the sum of intra- and inter-organizational acitivites as some activities are focused on both dimensions.

Technology" the highest number of activities. It can be observed that especially the categories "Informal Talking" and "Coordination of Exchange" are much larger than in the other two companies.

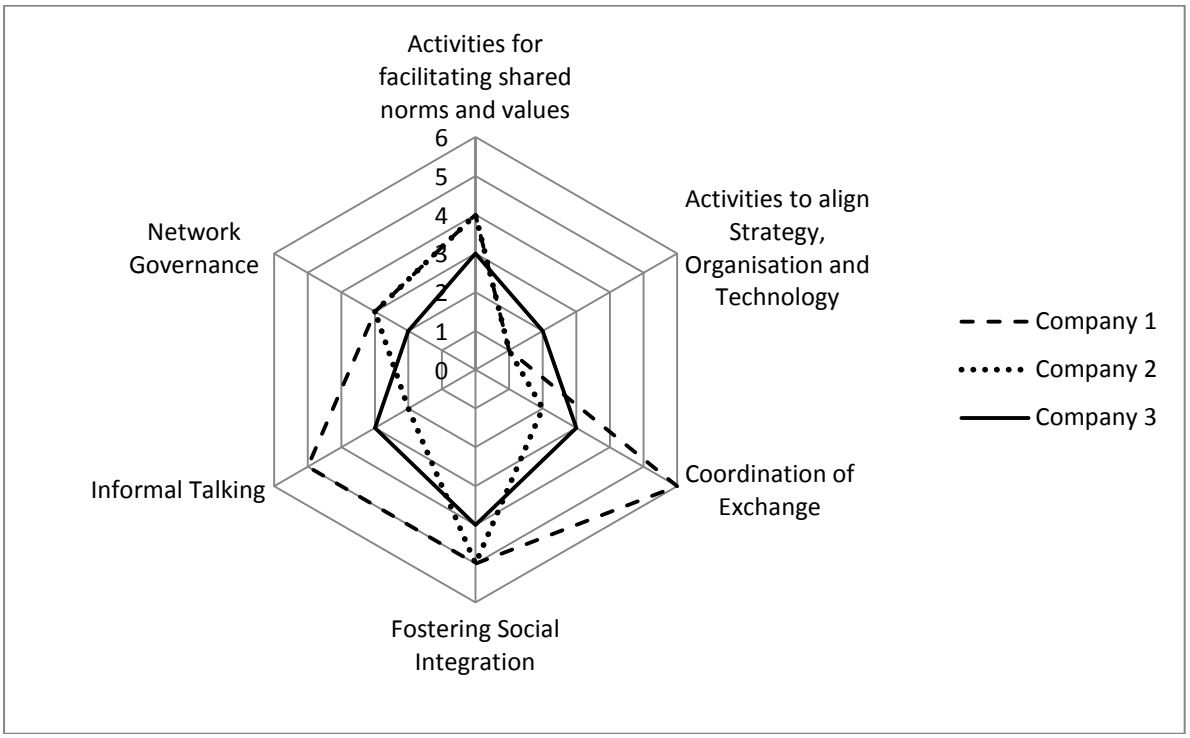


Figure 21: Management of Intra-organizational Networks
*Source: Author's own*

Company 2 (dotted line) also performs only one activity for aligning strategy, organization and technology within the firm. For this purpose serves the intranet of the firm, which is used a lot. To the facilitation of shared norms and vision contribute the mission/vision statement of the firm as well as a general open door-policy, trainings and regular meetings. Possibilities for fostering social integration provide events, meetings, company celebrations, trainings and in particular teambuilding seminars. Especially the attitude of "active listening" has been outlined by the management, which makes a contribution to the functioning of meetings. Company 2 also has an office kitchenette as well as a smoking area to their disposal, which serve as spaces for informal communication. The firm is allocated in a building complex, where manufacturing and administration are split. The administration of the firm is divided on three floors. Nevertheless informal communication is encouraged, so the managing director. The governance of the network is done via databases, address directories and informal communication. The coordination of exchange is done via platforms and intranet within the company. It can be observed in Figure 21 that Company 2 (dotted line) has activity peaks for fostering social integration, facilitating shared norms and visions and network governance, though little activities in other sectors.

Newsletter and Trainings contribute in Company 3 (solid line) to the alignment of strategy, organization and technology. Trainings are organized especially for the development of general principles and discussion of up-to-date topics. Training contributes moreover to the facilitating of shared norms and visions, together with the written codex and the mission/vision statement. In the building of Company 3 posters are spread about general principles, orientation and values of the firm. Regular meetings, of different scope and purpose, as well as numerous company celebrations, team building seminars and trainings are intended to foster social integration. Informal communication is enabled in Company 3 in the office kitchenette and the smoking area. Though it has been outline during the interview and confirmed by the online questionnaire that the general organizational culture enables an atmosphere of easy communication. The governance of the intra-organizational network is managed by address directories, databases and informal communication. As the access on databases is restricted according to the job and department of actors, communication enables to overcome barriers. The exchange of resources within Company 3 is organized by a defined syntax of data-names and folders on drives, so that updates of files are spread via email and not the whole document, so that the latest version of documents can always be found on the drives, which are backup-ed. Platforms are an additional exchange mode. The graph on figure 21 shows that the activities of Company 3 are well balanced, even though not high in numbers. For all aspects of network management Company 3 is ensuring a minimum level of activities.

Now the performance of the companies shall be presented and discussed in order to evaluate the assumptions set in chapter 4.1. Table 16 shows the financial and non-financial performance for all three companies on average for the last three years.

- *Employees*: In these categories Company 1 and 2 are ahead in terms of fluctuation as Company 3 has the largest percentage on fluctuation. Though the employees of Company 1, directly followed by Company 3 have the smallest number of days sick per employee. In those companies employees are on average 8 or 9 days sick per year, while employees of Company 2 are over 12 days sick per year.
- *Customer*: The average turnover from the last years is in Company 1 8.5 million Euro, in Company 2 45 million Euro and Company 3 has an average turnover of 7.2 million Euro. Company 1 has a market share of 71%, Company 2 of 25%, while this parameter is not measurable for Company 3 due to unlisted competitors which are building a grey market.
- *Financial Performance*: As the three companies are of different sizes, industry and scope they cannot be compared to each other in terms of financial parameters like turnover. Therefore the trend of each company’s ROA has been calculated. Company 1 shows an increasing

trend of 2%, Company 2 a decreasing trend of -2% and Company 3 has a decreasing ROA of almost 4%. Though the negative mean profit margins of Company 3 have to be outlined, this can be explained by the harsh raw material prices in 2008 and 2009. In terms of mean net assets Company 1 is ahead of Company 2 and 3. The performance of the companies has been compared to the industrial average for their sector (OeNB, 2011; MPO, 2010). This showed that in terms of net assets Company 1 and 3 are significantly ahead of the industrial standard, though in terms of turnover under the industrial average. Company 2 is better performing than the industrial average in terms of net assets, turnover as well as ROA. Company 1 is almost 9% better performing on average for the three years than the industrial average. Company 3 is -7% under the industrial average of the industry.

- *Strategy*: All three companies apply a kind of quality management. While Company 1 uses an own quality management, adapted to their needs, Company 2 and 3 are ISO certified.
- *Mission/Vision*: As already outlined in chapter 5.1 is the mission and vision of Company 1 purely focused on the customer and partly on the community, Company 2 is focused on customer as well as environment and Company 3 on customer, clients and employees.

Table 16: Financial and Non-financial Performance

| | **Company 1** | **Company 2** | **Company 3** |
|---|---|---|---|
| Fluctuation | 0% | 3% | 15% |
| Days Sick | 8.16 | 12.42 | 9.33 |
| Turnover- Change | 8,483 t€ | 45,475 t€ | 7,200 t€ |
| Market Share | 71.00% | 25.00% | - |
| Trend ROA | 2.01% | -2.31% | 3.88% |
| Mean net profit margin | 6.80% | 8.01% | -1.74% |
| Mean Equity-to-assets ratio | 57.13% | 44.59% | 37.91% |
| Industry divergence: net assets | 32.76% | 1.59% | 19.62% |
| Industry divergence: turnover | -0.51% | 1.34% | -6.70% |
| Industry divergence: ROA | 8.65% | 1.26% | -7.39% |
| Quality Management | Own | ISO | ISO |
| Mission/Vision | Customer Community | Customer, Environment | Customer, Client, Employees |

*Source: Author's own*

## 5.5 Summary and Coherence

The first part of chapter 5 introduced the three companies of the survey and presented their organizational culture. It was found that Company 1 and Company 2 have a predominant market culture and Company 3 a combination of clan and market culture. Concerning Schwartz' value dimensions Company 3 showed a balanced value combination, while Company 1 has a tendency towards Self-Transcendence and Company 2 toward Self-Transcendence and Self-Enhancement.

Communication has been evaluated by the employees in the online questionnaire. The results showed that the employees of Company 3 evaluate the communication best as 93% of the answers were spread on positive statements, while 86% in Company 1 and 85% in Company 2. In terms of average hours of communication per week Company 2 is ahead within the company as well as with stakeholders, whereas Company 3 has the second most communication hours and Company 1 the least.

Regarding their intra-organizational networks Company 3 and 1 showed on their aggregated networks as well as individual relations a higher density and lower centrality. Moreover has been found that the multiplexity in those two companies is higher than in Company 2, where only 39.8% of the relations are multiplex. Furthermore is the hierarchy larger and the efficiency of social relations lower in Company 2.

Concerning network management also Company 1 is leading, in terms of target-orientation as well as the number of total network management activities and specifically intra-organizational tasks. Company 3 performs the second most activities and even though indicating a low target-orientation it is also in terms of network density and multiplexity number two. The amount of intra-organizational network management activities is equal in Company 2 and 3.

In summary it can be stated that assumption A1 was partly supported by the data. Company 1 and 3, which showed the most aspects of Strategic Networking, had also denser and less central/hierarchical intra-organizational networks. Moreover was the multiplexity and the homophily index E-1in those two employee-networks higher, indicating a stable network with no signs of homophily. While the contribution to the financial performance has not been confirmed by the data, impact on the non-financial performance, regarding employees especially, has been found. Moreover are the employees of Company 1 and 3 on average less day sick per year.

Assumption A2 was true in this sample, as Company 2, which appears to be the best performing company of the sample regarding financial performance has employees who are per week spending more hours on networking within the company as well as to stakeholders.

Support for assumption A3, brought the calculation of hierarchy values as well as centralization, which showed that Company 1, which incorporates the most aspects of Strategic Networking, has a lower hierarchy and centralization.

Companies 2 and 3 who have the same amount of intra-organizational network activities have also comparable network centralization values in their aggregated networks.

The study of the organizational culture by Competing Value Framework as well as Schwartz' Value Dimensions showed that in fact certain cultural dimension support networking and lead to dense intra-organizational networks in a row. Especially Clan culture seems to be nurturing social networks, while there has been no support for adhocracy culture doing so, as has been expected by Eckenhofer and Ershova (2009). Moreover seems to be a balance of Schwartz' Value Dimension the key to network density, like shown by Company 3, the firm with the highest density in the study. These findings support assumption A4.

# 6. INTER-ORGANIZATIONAL NETWORKS

The collection and evaluation of inter-organizational networks and relations has tradition in business research already since the 90ies of the last century (Saxenian, 1991; Provan & Milward, 1995, 2001; Borgatti & Foster, 2003). Especially the collection of ego-centric networks is a popular approach towards research of organizational networks; although lately the analysis of whole networks became more fashionable, especially as it was strongly promoted by some scientists (Provan & Sydow, 2008). The choice of appropriate level of analysis and the definition of the relevant relation types was a problem ever since. In order to overcome this difficulty the stakeholder concept was taken as a background for the definition of the appropriate level of analysis. A stakeholder is defined as *"any group or individual who can affect or is affected by the achievement of the organization's objectives"* (Freeman, 1984, p.46) and stands in contrast to the Stockholder/Shareholder approach (Smith, 2003). The six main stakeholder groups, customers, partners and suppliers, competitors, public administration/government, public/media/NPO's and shareholder have been selected for collecting the informal (not institutionalized), inter-organizational network to them using the software VennMaker (Kronenwett & Schönhuth, 2011).

In a participative expert interview with the management of a firm, by name generator (Wolf, 2006; Hennig, 2008) contacts in each stakeholder-group have been collected and in a next step linked to the participating firm, which is in the centre of the network. Four relational types were available: formal, informal, trustful, and critical, whereby informal and formal, describes the communication type and not whether the relationship is institutionalized. The generated stakeholder-networks allowed an evaluation and assessment on their effectiveness and efficiency using Social Network Analysis. For the analysis the theoretical aspects of Rowley (1997), who proposed a classification model of stakeholder networks according to the network density and the centrality of the focal firm has been used (see chapter 2.2). In addition to that Krackhardt's graph theoretical dimensions have been calculated and analysed with Uzzi's (1997) paradox of embeddedness as a theoretical background.

In the following the eight companies participating in the survey, shall be presented and briefly described.[4] The description is followed by the mission-vision statement given by the management spontaneously during the interview.

**Company 1:** A supplier of software solutions with 48 employees, which is for 25 years in the market and located in lower Austria. The Mission statement of the company is: *"With us as a partner our clients can sleep better"*.

**Company 2:** A coating producer with 143 employees, which is on the market since 1937 and located in Vienna. The company stands for

[4] Company 1, 2 and 3 are the same companies, which also participated also on the micro-level of the survey.

*"Tradition, Quality and Innovation, while being focused on customer satisfaction"*.

**Company 3:** A firm specialized on polymer processing and mould making, has 100 employees, was founded in 1964 and is located in lower Austria. The goal of this company is: *"We make your life easier!"*

**Company 4:** A Public Relations and Public Affairs agency founded in 2001, is now part of a global holding, has 45 employees and is situated in Vienna. The mission statement of this company is: *"We are an expert pool with comfortable, caring ambience, where one can learn a lot and share his knowledge. We have the claim to be the best agency in terms of customer, employees, office and atmosphere."*

**Company 5:** A producer of energy related products and services located in Moravia (Czech Republic), employs 160 people and is on the market since 1917. The mission and vision of the company is *"Stability, growth, energy, partnership and money making"*

**Company 6:** An industry forging company with 260 employees, in the market since 1932 and located in Moravia. The mission and vision of this company is: *"We are working for our future (natural, employee, customer, suppliers, and our company). We aim to develop the company but not unfair, we would like to act like a family, for the future. We would like to preserve the future."*

**Company 7:** A translation-, graphics-, printing- and shipping-house specialized on manuals with 64 employees for 15 years in the market and located in Moravia. The mission of this company is *"Make profit and survive."*

**Company 8:** A producer of motor paragliding equipment and consultancy service, located in Moravia, with 30 employees and is on the market since 1999. The mission of this company is: *"Our Vision is to belong to the five biggest and technological best ones worldwide. We have 30 employees and orientate ourselves on competitions, records and do not only invest in advertisements in magazines, but also in attempts to set new records and charity projects. We continuously look for technology which is not used yet."*

## 6.1 Stakeholder Networks

Rowley (1997) proposed a classification of stakeholder networks according to high or low centrality of the focal organization and high or low density of the network (see table 1). Though not specified by him was the definition of high or low centrality of density. Therefore the harmonic mean has been calculated for the density and the betweenness-centrality of all eight inter-organizational networks. The resulting harmonic mean served as a marginal value between high and low centrality and density. Table 17 shows the betweenness centrality and density value of each stakeholder network and the resulting classification

according to Rowley. It can be observed that in total two stakeholder networks can be classified as commander networks (Company 1 and 4), three companies are compromiser in their network (Company 3, 5 and 8) and the remaining three companies are subordinates in their networks (Company 2, 6 and 7). None of the companies showed a low centrality as well as low network density, which would lead to a position as a solitarian.

Table 17: Classification of Stakeholder Networks

| | **Betweenness** | **Density** | **Rowley** |
|---|---|---|---|
| Company 1 | 0.967 | 0.051 | Commander |
| Company 2 | 0.631 | 0.207 | Subordinate |
| Company 3 | 0.789 | 0.110 | Compromiser |
| Company 4 | 0.877 | 0.092 | Commander |
| Company 5 | 0.895 | 0.112 | Compromiser |
| Company 6 | 0.684 | 0.267 | Subordinate |
| Company 7 | 0.652 | 0.281 | Subordinate |
| Company 8 | 0.858 | 0.102 | Compromiser |
| Harmonic Mean | 0.8 | 0.1 | |

*Source: Author's own*

Rowley outlined that the structure of an inter-organizational network has impact on the power a focal firm has, on the communication flow and the efficiency in raw, which is supported by the calculation of Krackhardt's graph theoretical measure 'efficiency'.

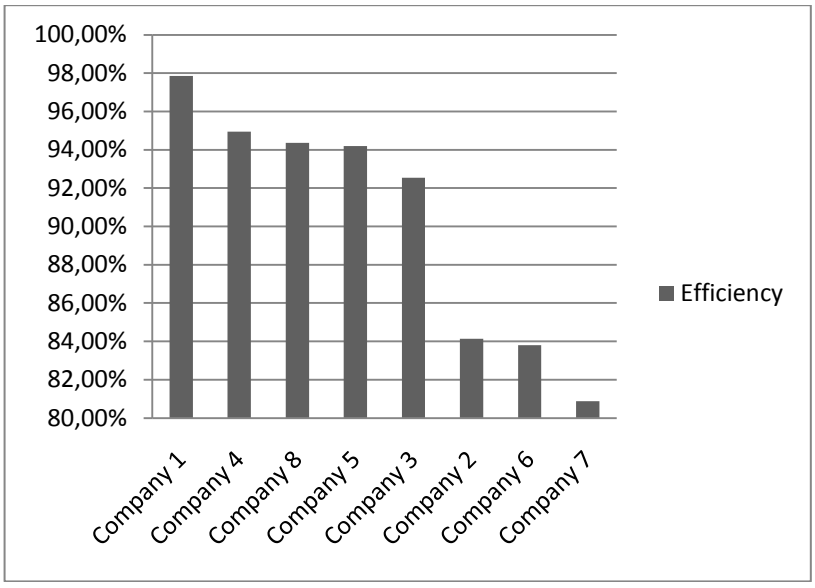


Figure 22: Efficiency of Stakeholder Networks.
*Source: Author's own*

It can be observed that those companies (1 and 4) classified as a commander in their network have also the highest efficiency values. Company 8, 5 and 3 are following with efficiency values of 94%-92%. The companies assigned to the classification subordinate follow a distance of 10 points and have 84% till 81% efficiency. The other graph theoretical measures were the same in each firm (hierarchy 0; LUB and connectedness 1)

In the following the inter-organizational networks grouped according to the classification by Rowley (1997) shall be presented and analysed. An overview of the stakeholder networks and their measures can be found in Appendix C.

### *6.1.1 Inter-organizational Networks of Commander*

Both stakeholder networks, which have been classified according to Rowley as commander networks, show high betweenness values, low density and high efficiency. Due to this network structure the focal organization is a commander in his network and can by that resist stakeholder pressures while having influence on the information flow (Rowley, 1997).

The stakeholder network of Company 1 is displayed in Figure 23, how the management arranged it during the interview. In the centre of the network is the focal organization (Company 1) and around it are arranged in separated sectors its stakeholder. The each separated sector represents one stakeholder group, indicated by different colours. The concentric circles describes the proximity of the relation, the closer an actor is to the centre the stronger is the relation and the farer away a contact is the weaker is the relation. The different lines symbolize the different relational types: critical (red), trustful (bold), informal (simple) and formal (dashed).

In total Company 1 has 66 actors in its network. 25 are in the closest circle, 23 in the medium one and to 18 actors Company 1 has a weak relationship. The most actors can be found in the sector partners and supplier (21), followed by 18 in the sector customer. As the least number of actors can be found in the sector public/media/NPO, it can be concluded that Company 1 has a weak focus on Public Relations (PR).

The overall density is low; with ego only 5% of all possible relations are realized. Without ego, only 2% are realized between the alteri. Here it has to be outlined that an ego-centred perspective of network analyses only collects and analyses the relations as perceived and known by ego (Diaz-Bone, 1997). Therefore it can be that more relations between the alteri exist in reality than ego is informed about, though usually it can be expected that till the second degree ego is aware of alteri knowing each other or not (Granovetter, 1973).

Ego’s centrality in the network is with the betweenness value of 0.967 compared to the other companies in the highest. Concerning the relationship types 40% of the relations of Company 1 are trustful. 29% are informal, 12% formal and 19% critical. Most of the critical relations are to competitors of the firm, though also to one partner and one customer. The critical relations between

the partners and suppliers lead to an advantageous position of ego as a *'tertius gaudens'*, the laughing third (Burt, 1995). The balanced relational mix concerning relational types as well as proximity provides Company 1 advantages of neither being under-embedded nor over-embedded in their network (Uzzi, 1997).

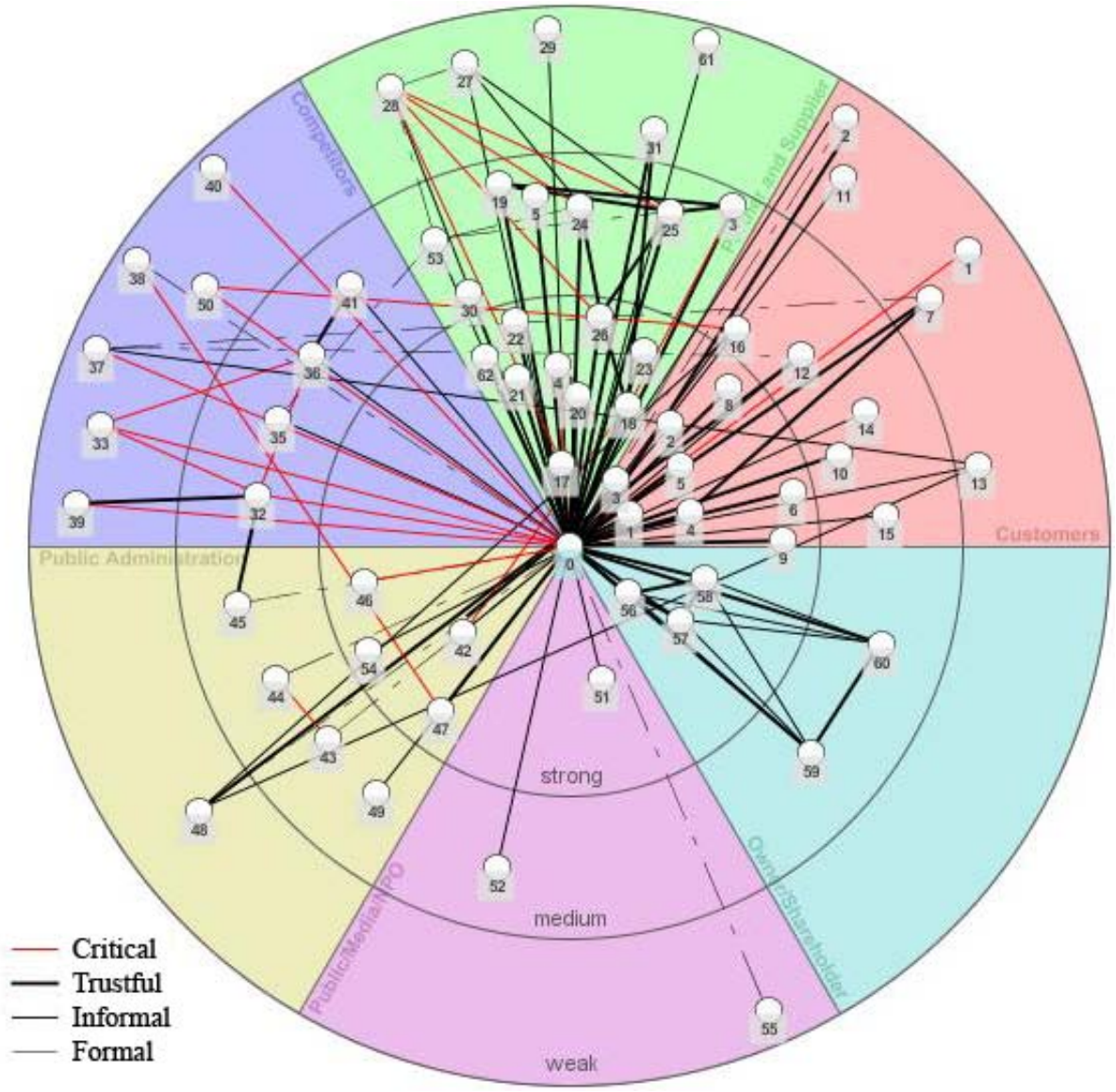


Figure 23: Stakeholder Network of Company 1
*Source: Author's own*

The other commander network of Company 4 in Figure 24 shows similar characteristics. The density of Company 4's stakeholder network is 9% including ego and 5% without ego, which is slightly higher than of Company 1, though the overall number of actors in the network is smaller. From the 45 total actors, most can be found in the sector customers (15) and partner and suppliers (14). Only one actor can be found in the sector public administration. Most

actors (23) can be found on the medium circle, 15 in the closest circle and 7 in the outside circle.

Almost 69% of the relations are informal indicating a good communication level with informal characteristics. 26% of the ties are even trustful relations, which allow exchange of confidential information. 4% of the relations are formal, while only 1% is critical. It can be observed that there are many links between the customer of Company 4 and the Public/Media/NPO sector as well as between the competitors and the media, which derives from the market sector of the firm, which is PR and Public Affairs. Interesting is moreover that, while the Partners and Suppliers of Company 1 are strongly connected, the partners and suppliers of Company 4 are not.

Due to the high share of trustful and informal ties, this stakeholder network bears a risk of over-embeddedness in the first order and can result to lack of flexibility.

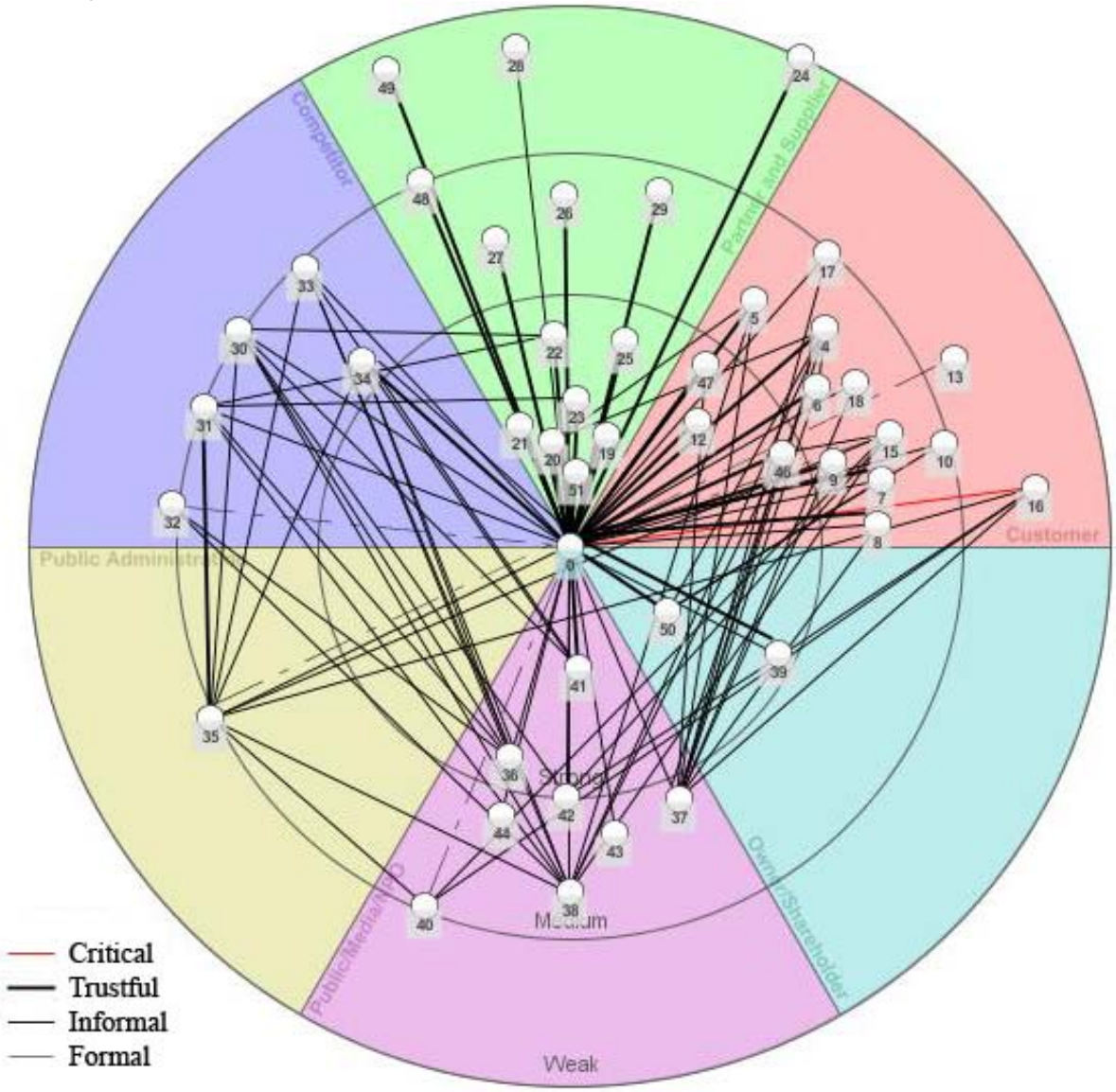


Figure 24: Stakeholder Network of Company 4
*Source: Author's own*

### *6.1.2 Inter-organizational Networks of Compromiser*

The stakeholder networks of the compromisers are different from the Commander networks. Due to a combination of high density and high betweenness, the focal firm is in a weak position (Rowley, 1997). Even though the network is adequate for efficient communication the focal firm is not able to influence the information exchanged from its peripheral position.

The stakeholder network of Company 3 (Figure 25) consists of 52 actors and over 300 ties, which makes a density of 11% with ego and 7% without ego. Most of the actors can be found in the sector competitors (14) and Public/Media/NPO (11). In the inner circle are located 9 actors, 28 in the medium one and 15 in the outside circle. Most of Company 3's relations are formal (81%), while only 13% are informal, 5% are trustful and 1% critical. According to Uzzi (1997) this leads to the assumption of an under-embedded network as the share of weak ties is predominant in the network.

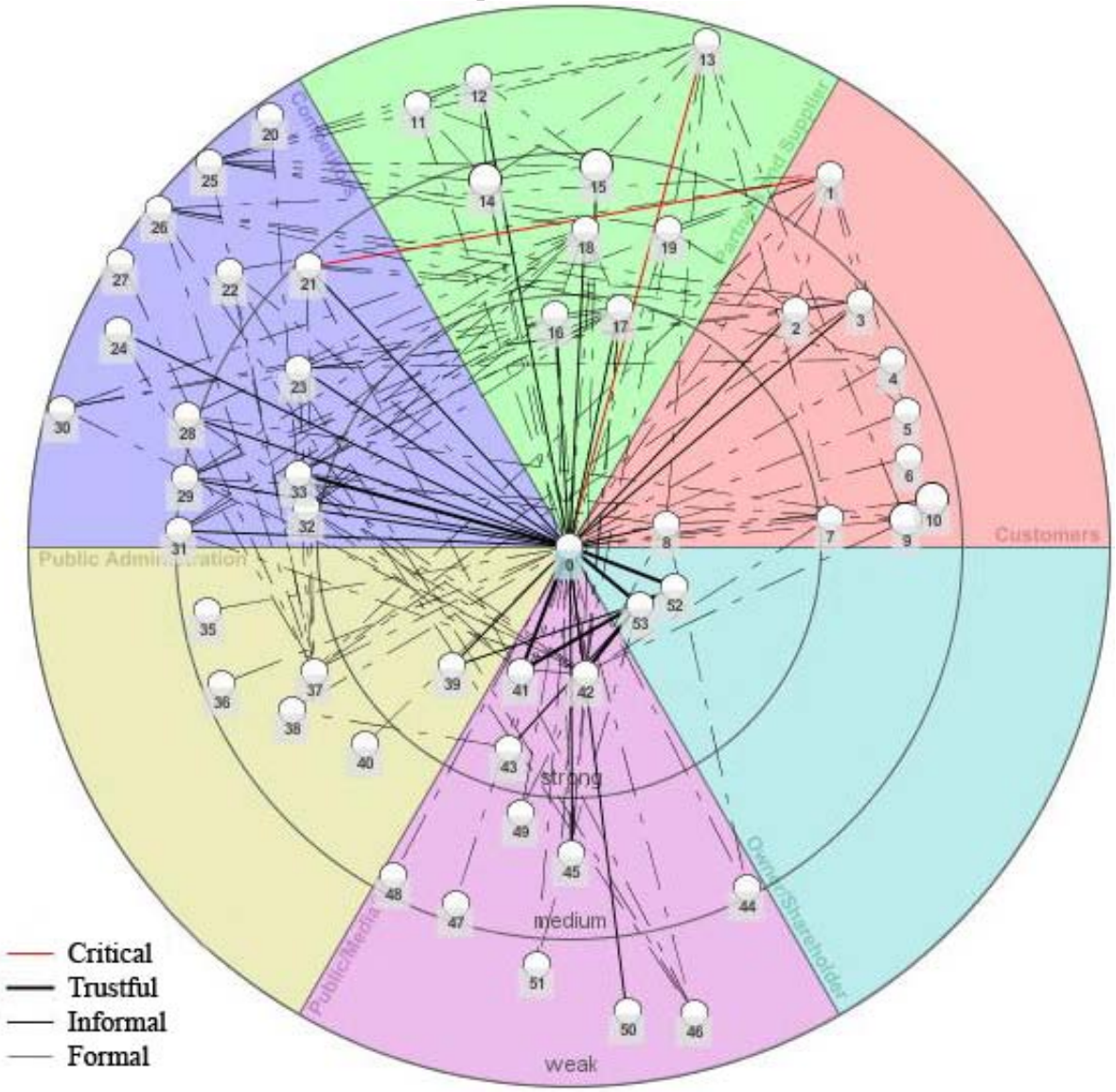


Figure 25: Stakeholder Network of Company 3
*Source: Author's own*

The stakeholder network of Company 5 (Figure 26) shows fewer actors, than in previous networks. The 31 total actors form a network with a density of 11% with ego and 5% without ego. The betweenness of the focal firm in the network with 0.895 is high. Different than in Figure 25 (Stakeholder Network of Company 3) are in the network of Company 5 most actors (25) in the inner circle, which indicates a strong proximity with the actors. Only five actors are in the medium circle and four in the outer circle. Most actors are customer (8), partner and supplier (7) or from the public/media/NPO sector (6).

Similar as in Company 3 are most of the relations of Company 5 formal (77%). While there are only 3% informal relations, 20% of the relations are trustful and none critical. Due to the combination of weak and strong ties in this stakeholder network is Company 5 according to Uzzi (1997) well integrated, which means neither under-, nor over-embedded.

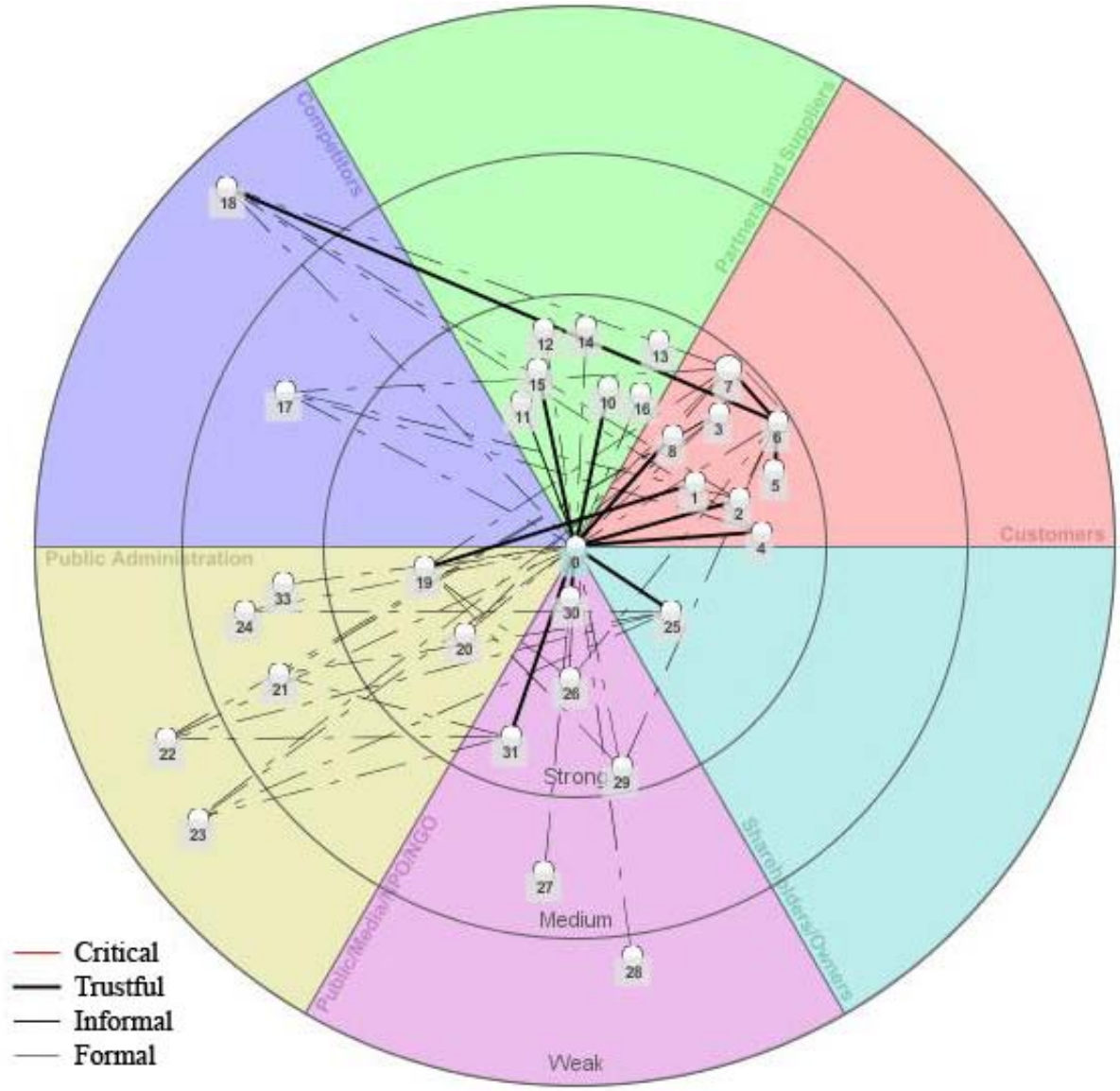


Figure 26: Stakeholder Network of Company 5
*Source: Author's own*

The stakeholder network in Figure 27 shows the inter-organizational relations of Company 8. The network consists of 40 actors: 9 customers, 9 partner and suppliers, 8 competitors, 8 actors in the sector public/media/NPO and 6 from the public administration. Most actors (16) can be found in the outer circle of low proximity, 13 actors are in the medium circle and 11 in the inner circle.

The overall network density with Ego is 10% and without ego 5%. From the total 168 ties are 76% formal, 14% informal, 7% trustful and 2% critical. These critical relations are embraced with competitors in the outer circle. The betweenness of ego is 0.858.

It can be observed that the network even though incorporating many informal ties is well balanced. There are several actors in every sector and circle. Moreover exists in each sector at least one trustful or informal tie, which ensures embeddedness.

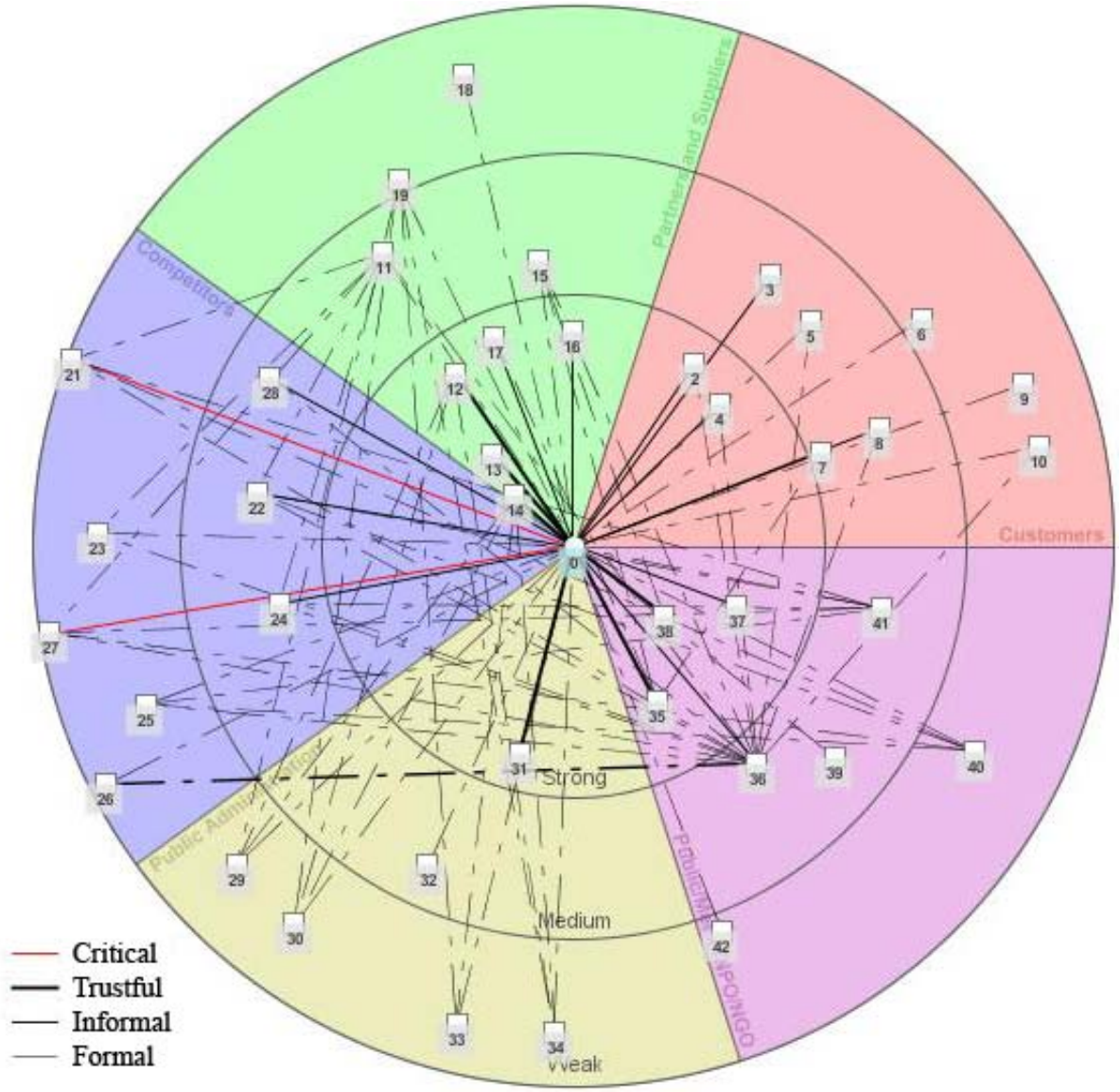


Figure 27: Stakeholder Network of Company 8
*Source: Author's own*

### *6.1.3 Inter-organizational Networks of Subordinates*

While the network of Company 2 (Figure 28) is not that different from those of Company 3, 5 and 8, the networks of Company 6 and 7 (Figures 29 and 30) are. The three subordinate networks have in common low centrality and high density, which leads to the effect that the focal company is a vulnerable position. The network structure allows efficient communication, despite the focal organization is not able to manipulate it because of occupying a weak position, in the periphery of the network (Rowley, 1997). The stakeholder network of Company 2 (Figure 28) consists of 34 actors linked by 246 ties. Most of the actors are partners and supplier (7), from the sector public/media/NPO (7) and shareholder (7). 85% of the relations are formal, 8% informal and 7% trustful. The company did not indicate any critical relationships. While the trustful relations are anchored in the sector owners/shareholder, the critical relations are with competitors of the firm. 14 actors are located in the inner circle of the network, 12 in the medium and 8 in the outer circle. It can be observed that many relations are between the public/media/NPO sector and the competitors as well as between the competitors and the partners and suppliers. According to Uzzi (1997) this network lacks of strong ties and therefore, embeddedness.

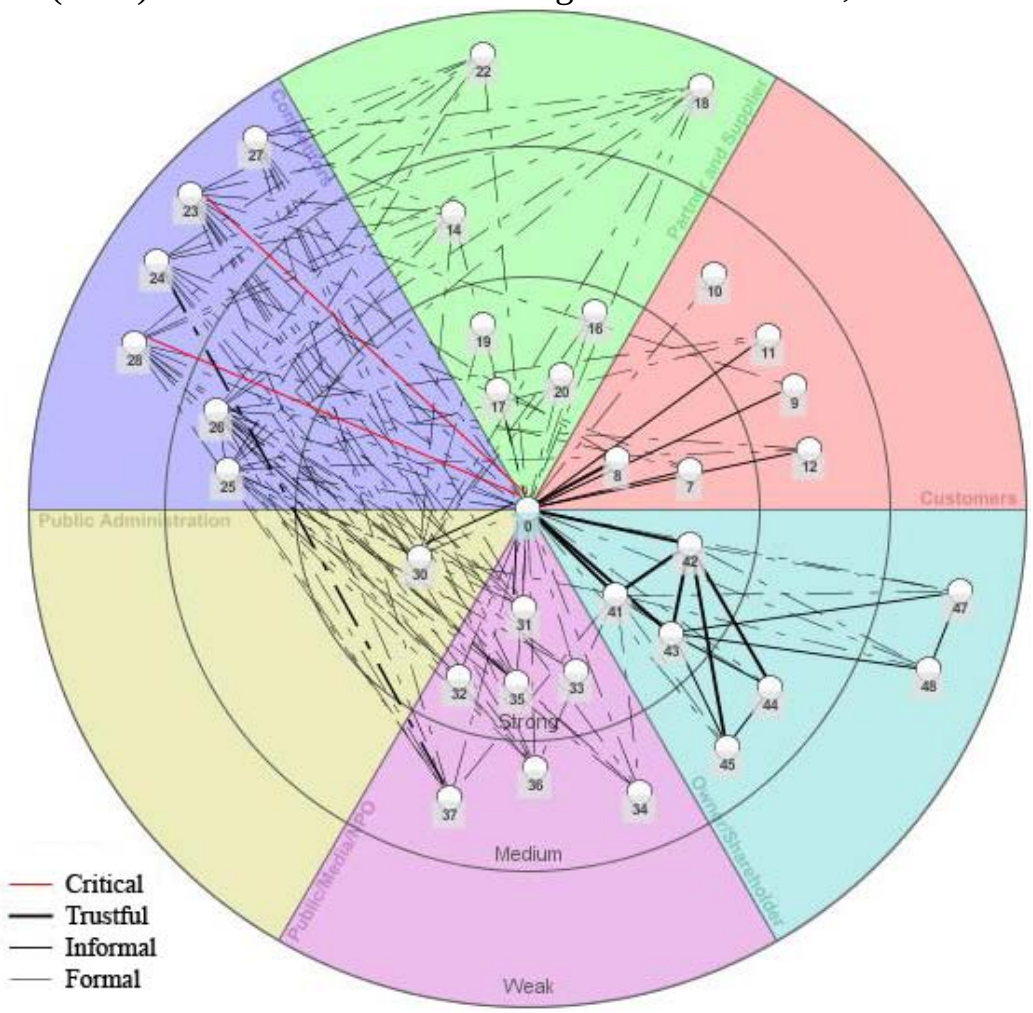


Figure 28: Stakeholder Network of Company 2
*Source: Author's own*

The stakeholder network of Company 6 consists of only 15 actors and 64 relations. The density of the network is in total including ego 27% and without ego 16%. Most actors are customer (5), while 3 are located in the sector partners and supplier, 2 in the sector competitors, public/media/NPO and shareholder. The focal firm indicated just one contact in the sector public administration. The embeddedness of this firm is high, as 41% of the relations are trustful and 28% informal. The rest 31% are formal relations. The low betweenness of 0.684 provides the focal form low possibilities for influence, moreover as the sector of competitors and public/media/NPO are linked by strong and trustful ties.

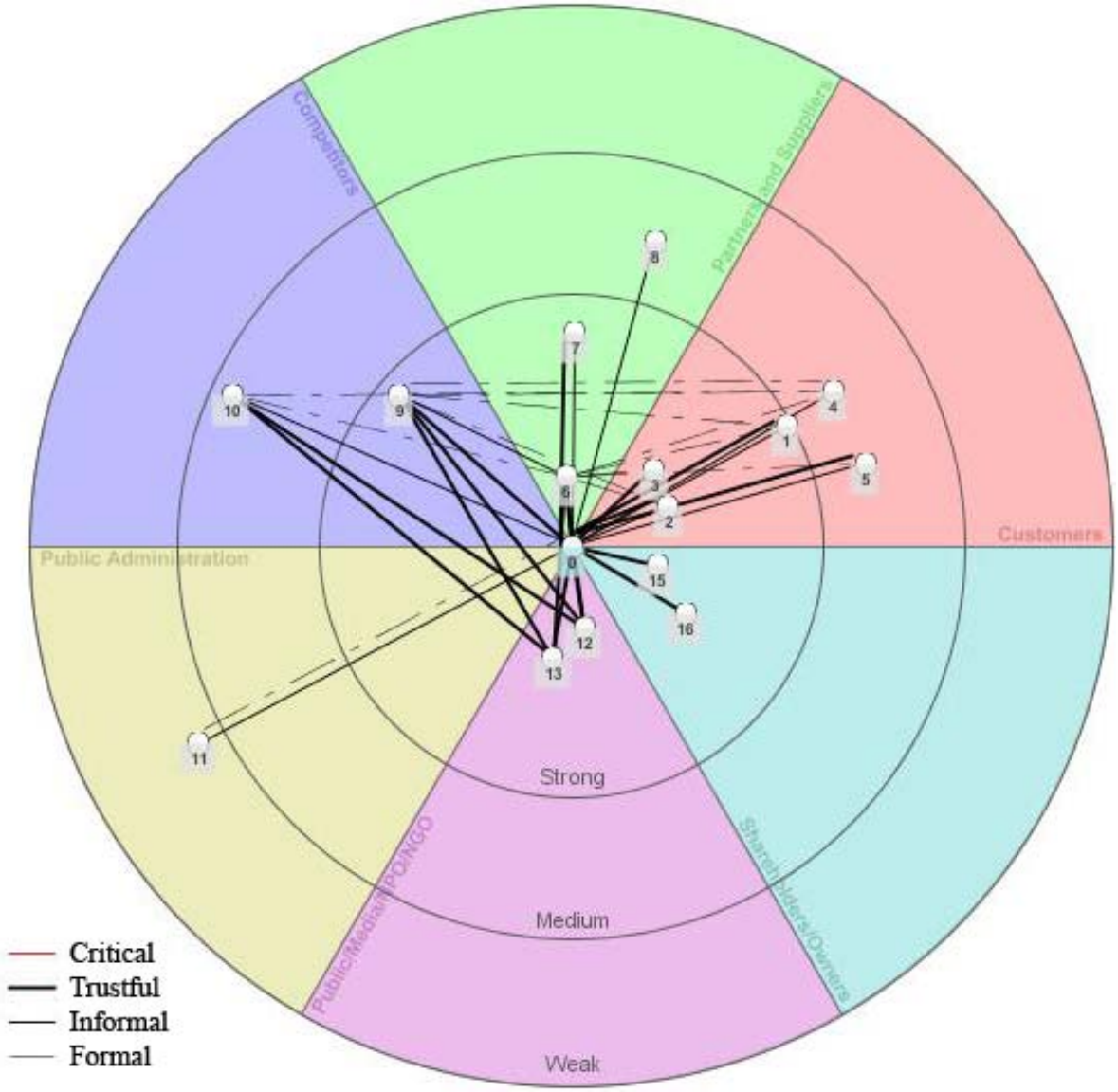


Figure 29: Stakeholder Network of Company 6
*Source: Author's own*

The stakeholder network of Company 7 (Figure 30) is unique compared to all other networks in the sample. The network consists of 17 actors linked by 86 ties. Remarkable is that this firm has no relations, or even knowledge, about any

competitor in the market. In the interview the management indicated that they are unique in the Czech Republic in terms of their products and services and that other companies, which provide only printing, or only translations, are too numerous to be informed about. Most actors can be found in the sector customers (8). There are four actors in the sector partners and suppliers as well as public administration. As the company is owned by only one man who was the interview partner the sector shareholders/owners has been left blank.

All partners and suppliers as well as actors in the public administration are arranged in the inner circle, while most of the customers, beside one, are in the circle of medium proximity. The actor 17, in the sector public/media/NPO is weak and linked by a formal relation. According to Uzzi (1997) this stakeholder network is an example of under-embeddedness.

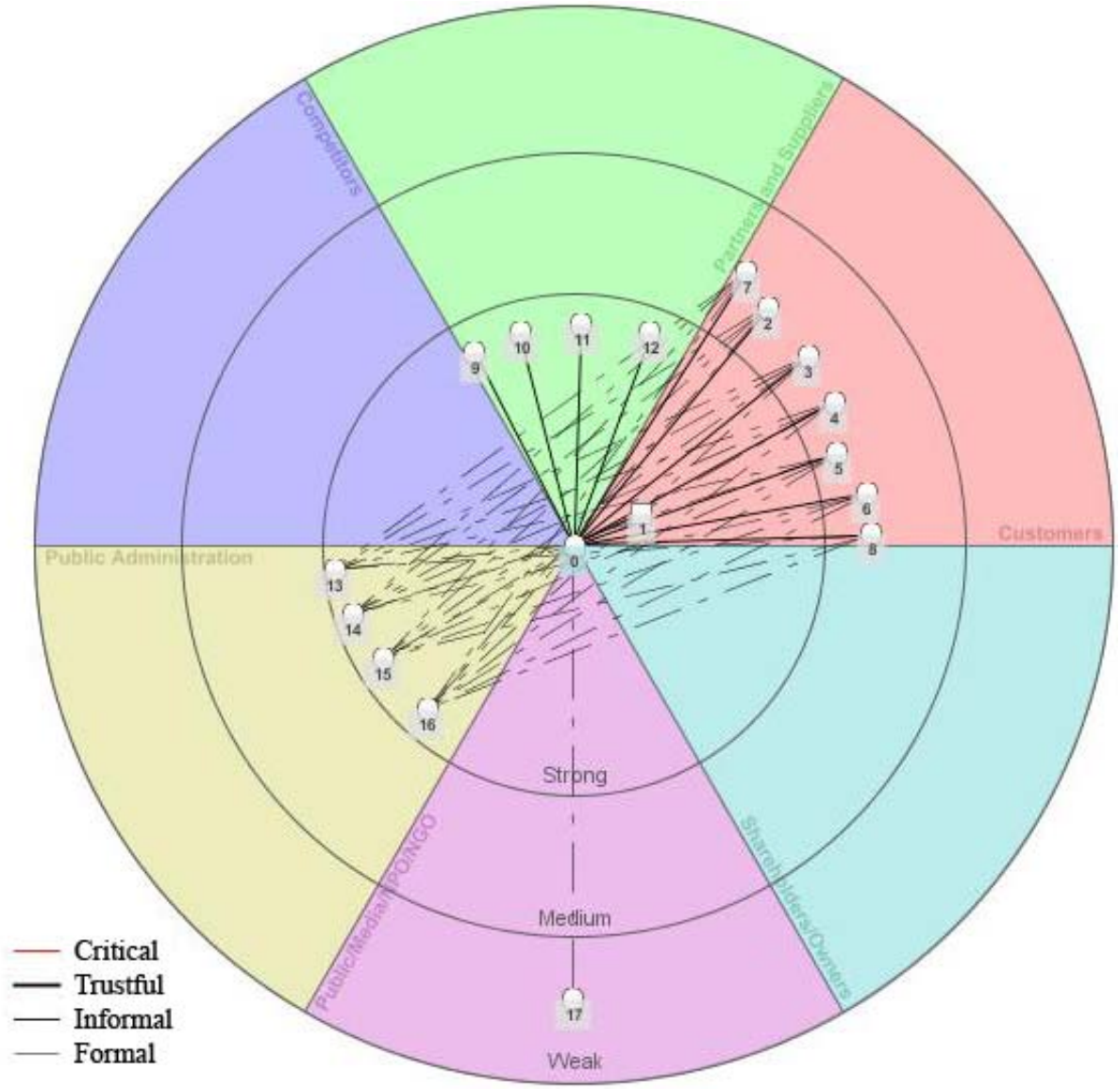


Figure 30: Stakeholder Network of Company 7
*Source: Author's own*

## 6.2 Network Management and Individual Estimation

The difference in the overall appearance of the stakeholder networks is remarkable; especially the number of actors, the proximity and variation of relations differs strongly in the commander, compromiser and subordinates networks. In the next step of analysis the network management performed in each company is compared. Oriented on the Strategic Network model the management was asked in every firm, how target-oriented they perform network management, whether they analyse their network and how many activities they carry out for fostering social integration, coordination of exchange, aligning strategy, organization and technology, network development, facilitating shared visions and values, enabling informal talking and supporting network governance. In line with qualitative content analysis a transcript of every interview has been done, the findings coded and quantified. Table 18 shows the summary of aspects of strategic networking in each firm, which is compiled of the network analysis, target-orientation, inter-organizational and intra-organizational activities and the total sum of activities. As certain activities are aimed on the intra- as well as inter-organizational network management, they have been counted for both, which leads to the fact that the total sum of activities is not the sum of inter- and intra-organizational activities.

Table 18: Aspects of Strategic Networking

| **Activities** | **C 1** | **C 2** | **C 3** | **C 4** | **C 5** | **C 6** | **C 7** | **C 8** |
|---|---|---|---|---|---|---|---|---|
| Network Analysis | Sometimes | Sometimes | Seldom | Sometimes | Regularly | Sometimes | Sometimes | Regularly |
| Target-orientation | 7 | 5 | 3 | 5 | 8 | 7,5 | 10 | 8 |
| Total Sum of Activities | 34 | 24 | 25 | 37 | 29 | 24 | 16 | 22 |
| Inter- Activities | 14 | 8 | 12 | 17 | 9 | 9 | 6 | 11 |
| Intra-Activities | 24 | 17 | 17 | 27 | 25 | 18 | 12 | 18 |

*Source: Author's own*

It can be observed in table 18 that only Company 5 and 8 analyse regularly their networks, while the companies 1, 2, 4, 6, 7 answered with sometimes and Company 3 with seldom. The target-orientation of the companies varies between 3 and 10, and shows no relation to the number of activities. Company 7, the company with the least amount total network management activities of activities on each level, indicated the highest target orientation. Company 3 indicated the lowest target-orientation of 3.

Concerning the overall network management activities companies 4 and 1 show the highest number as well as in the section inter-organizational network

management activities. Different is the situation in the number of intra-organizational activities. Here the highest number of activities showed Company 4 and 5.

The total number of activities derives from several categories: Network governance, possibilities for informal talking between the employees, fostering of social integration, coordination of exchange, activities to align strategy, organization and technology, activities on network development and activities for facilitating shared visions and values. Hereby the activities oriented intra-organizationally as well as inter-organizationally are counted.

The graph in Figure 31 shows the share of activities in each category for each company as well as its aggregation to the total number of activities. It can be observed that Company 4 and 1, categorized as commander in their inter-organizational network, are ahead in the number of network management activities, followed by the three compromiser networks and the three subordinates at the end.

Every firm, but Company 5, performs activities in each category. Company 5 is the only company having no activities on network development, though is still on place 3 concerning the overall number of network management activities. Company 3, one of the compromisers, ranks on number 4 in the total amount of network management activities, while Company 8, the third compromiser has only 22 activities. The only company performing less than 20 activities is Company 7 that indicated only 16 activities, though at least one in each category. The other two subordinates Company 2 and 6 perform both equally 24 activities.

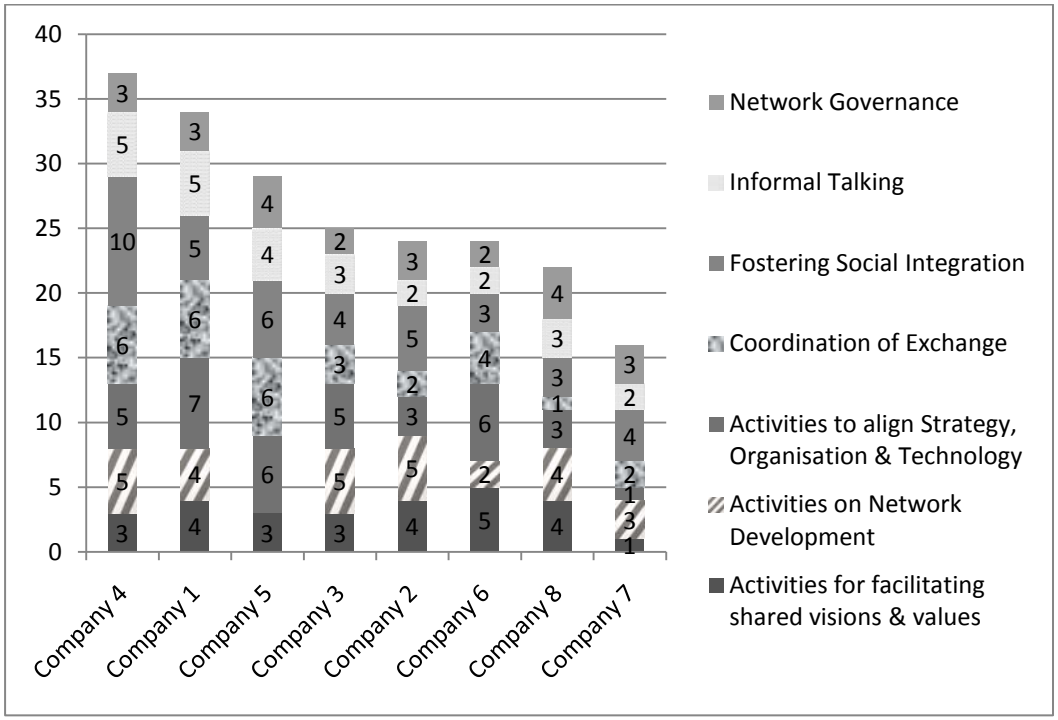


Figure 31: Total Network Management Activities
*Source: Author's own*

For inter-organizational network management the categories are reduced to fostering of social integration with stakeholders, the coordination of exchange, the activities to align strategy, organization and technology within the inter-organizational network, activities on network development and facilitating share visions and values. Figure 32 shows the share of activities in the specific categories for each company.

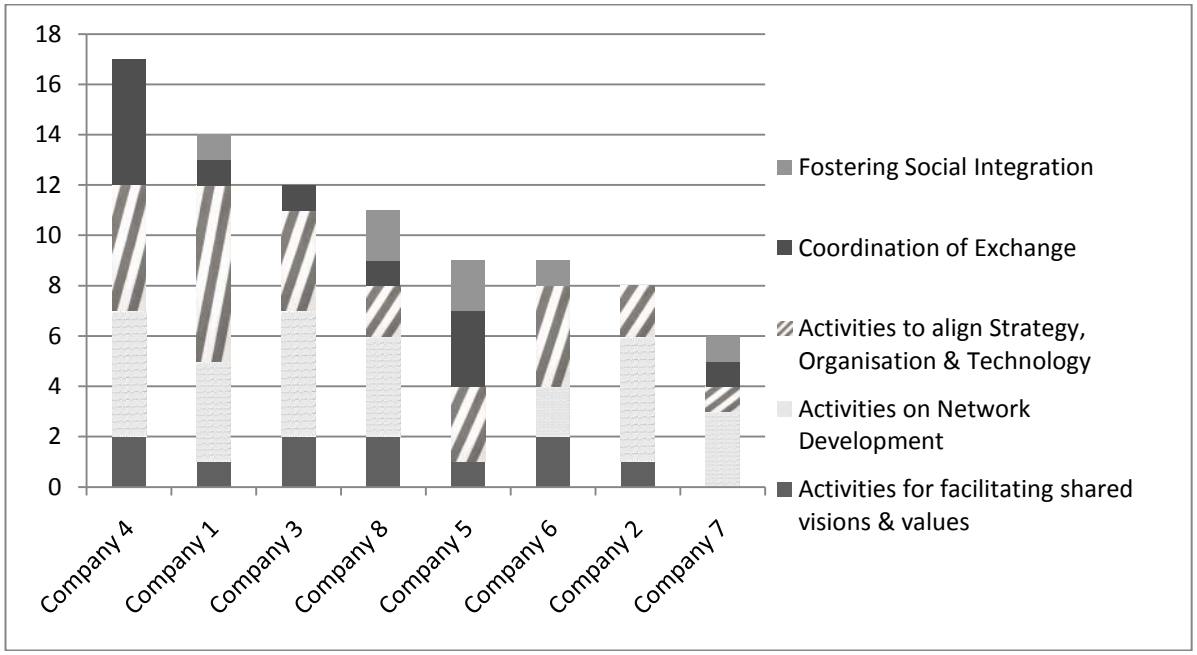


Figure 32: Inter-organizational Network Management Activities
*Source: Author's own*

It can be observed, that the commander companies 4 and 1 are ahead in inter-organizational network management, followed by the compromiser companies 3, 8, 5. The subordinates companies 6, 2 and 7 have the lowest number of inter-organizational network management activities. The graph shows moreover that not all categories are fulfilled in each company. Company 1, 3 and 2 do not foster social integration with the stakeholder, while companies 6 and 2 do not coordinate the exchange of information. Company 7 applies no activities for facilitating shared visions and values among the stakeholders and Company 5 does not perform activities on network development.

The network-management activities which were named the most are meetings and trainings. The respondents indicated 12-times that meetings are an appropriate network management activity and 10-times training. For aligning strategy, organization and technology, facilitating shared norms and values as well as for fostering social integration meetings are used. Trainings are mainly used for fostering social integration, only Company 2 and 3 used it also for facilitating shared norms and visions. Network governance is mainly done by address directories and databases, which are used beside Company 3, in all companies for network governance. All companies have an office kitchenette.

For aligning strategy, organization and technology newsletter are used in all companies, but 6 and 7. Fostering social integration is mainly done by company celebrations and special events like birthday celebrations. Email and platforms play a huge role in the coordination of exchange in all companies.

Most companies apply direct as well as indirect network development. In addition fairs and conferences build a platform for network development in all companies, but Company 5, which is not developing its network actively.

For individual evaluation of their own network the interview partners were asked to imagine a specific situation and to estimate how the network could be helpful in this situation. The first situation was formulated as follows: *"You are planning to generate a new project/a new customer. From your experience you know that it is really difficult to win this customer/project. Can your network be helpful? How would you use your network for winning this project/customer? How far can you use your existing network? Where it is necessary to develop your network?"* The reply of companies 1 till 5 was positive. All answered that the network can help in this situation; especially existing customer, media and competitor contacts can be used. Company 5 indicated problems with the mother company that are hindering the realisation of new projects, while the generation is not the problem. Companies 6 till 8 evaluated the situation negative, while Company 6 indicated that there is no possibility, Company 7 and 8 indicated that they would try at least.

The second case situation was the following: *"You have been informed through your network that a new legislative adjustment will be adopted, which would have negative consequences for your company. How are you proceeding to avoid this legislative adjustment? Which steps are you planning to be informed earlier about such legislative changes?"* The answer to this situation was negative in Company 5, who answered that they have no possibilities for intervention in this case. Companies 2, 3, 6 and 8 have established contacts with industry associations and social partnerships that can be activated and used in such a situation. Company 8 specified that the association can only support within the Czech Republic, though not worldwide. In Company 1 lobbying-attempts would be initiated directly at the ministry, at the municipalities or decision maker in charge. Company 4 indicated that they have established lobbying contacts, which can be activated in such a situation. In Company 7 the accounting and quality department is in charge of monitoring and solving those situations.

## 6.3 Benchmarking and Statistical Analysis

For answering the research questions and evaluating the assumptions set in chapter 4.1 the financial and non-financial performance of the eight companies shall be evaluated in the categories inter-organizational network (ION) characteristics, employees, customer, financial performance, strategy and mission/vision. Benchmark analysis is applied in order to identify the best and poorest performing company in the sample. Linear regression analysis built the next step in the analysis for evaluating the effect of network management on the inter-organizational networks of companies and their performance. A problem for the analysis has been that Company 4 could not provide information about their performance, as this company is part of a worldwide corporate group, having the strict rule of only providing overall performance information, not country-specific ones.

- *ION Characteristics:* In the category of the inter-organizational networks, Company 4 has the highest amount of inter-organizational, intra-organizational activities as well as total amount of activities. In the total activities as well as inter-organizational activities, Company 1 is on the second place, while regarding intra-organizational activities Company 5 is on the second place. The company with the smallest amount of activities is Company 7. Concerning the centrality measures power and betweenness, Company 1 has the highest measure and concerning density the lowest measure of 5%, which is considered as a contribution to freedom of action and power. Company 3 has the smallest power and Company 2 the smallest betweenness. Company 1 has also the highest number of actors in the network and Company 6 the smallest number. In terms of the graph-theoretical measure efficiency again Company 1 is ahead of all other companies, while Company 7 has only an efficiency of 81% Company 1 has an efficiency of 98%.
- *Employees*: For the category employees, data about the fluctuation and the average days sick have been collected. The fluctuation in Company 1 is zero for the last three years and on average the employees are in Company 1 per year 8.2 days sick. The highest fluctuation has been measured in Company 8 (which is also the smallest company in the sample) and the most days per year sick are the employees of Company 7, who are missing on average almost 32 days per year.
- *Customer*: In the category of customer the change in turnover was measured and the market-share asked from the companies. The highest rise in turnover has Company 6, whose turnover was rising in the last year about 22%. The most negative trend had Company 7, whose turnover was decreasing about -27%. Unfortunately not all companies could provide information about their market share. Company 8 is the only provider of paragliding equipment in the Czech Republic and has therefore a market share of 100%. In its field has Company 1 a market share of 71%.

- *Financial Performance*: For the financial performance, several measures have been collected for the last three years in all companies, in order to overcome market turbulences. As all companies are, even though being small and medium-sized companies, from different size, business fields and maturity, not only the mean of every ratio has been calculated, but moreover the individual performance trend for each firm. In addition to that the financial performance of each firm has been compared in every year to its industrial average and the average from all years taken for comparison. The best trend of Return on Assets (ROA) showed Company 3, which was suffering in 2008 and 2009 from high raw material prices, though managed to increase the performance in 2010. The poorest trend had Company 7, which had positive financial performance in 2008, but not in later years. Concerning Trend of Return on Equity (ROE) Company 2 showed the highest increase and again Company 7 the highest decrease. The same situation shows the net profit margin trend, where Company 2 has the best performance increase and Company 7 the worst. Even though bearing the limited comparability in mind, it has to be outlined that Company 1 has the highest mean ROA, Company 2 the highest mean ROE and Company 5 the highest mean net profit margin. Hereby the worst performance shows Company 3, due to explanations given above. Compared to the industry average Company 1 has the best equity-to-assets ratio as well as ROA and Company 5 the best net profit margin. Compared to its industry average Company 8 has the lowest equity-to-assets ratio and Company 3 concerning net profit margin and ROA.
- *Strategy*: For evaluating the processes of companies, it has been asked in the interview whether a kind of quality management is applied in the firm. It was observed that all companies do have some kind of quality management. While companies 2, 3, 5, 6, 7 are ISO (International Organization for Standardization) certified, Company 1 has its own type of quality management adapted to their purposes. Company 4 is CMS (Consultancy Management Standard) certified by the International Communications Consultancy Organisation (ICCO). Company 8 has certificates of the LAA CR (Light Aircraft Association of the Czech Republic) and DULV (Deutscher Ultraleichtflug Verband).
- *Mission/Vision*: The mission and vision has already been introduced at the beginning of the chapter. Here shall be outline ones more the focus of the Mission/Vision of each company. Company 1 has a clear customer focus, while Company 2 is focused on tradition, quality and innovation. Company 3 and 2 on the customer/clients and employees. Company 5 on the partners and shareholder, similar as in Company 7, where the focus is on profit and survive. Company 6 outlined a focus on all stakeholder groups, while Company 8 is focused on expansion.

Table 19: ION Characteristics and Performance Measures

| **Company Nr.** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** |
|---|---|---|---|---|---|---|---|---|
| **ION Characteristics:** | | | | | | | | |
| Total Activities | **34** | 24 | 25 | **37** | 29 | 24 | 16 | 22 |
| Inter-Activities | **14** | 8 | 12 | **17** | 9 | 9 | 6 | 11 |
| Intra-Activities | 24 | 17 | 17 | **27** | **25** | 18 | 13 | 18 |
| Power | **44.0** | 16.1 | 2.8 | 26.9 | 19.6 | 7.9 | 8.6 | 23.9 |
| Betweenness | **1.0** | 0.6 | 0.8 | 0.9 | 0.9 | 0.7 | 0.7 | 0.9 |
| Density in % | **5.1** | 20.7 | 11.0 | 9.2 | 11.2 | 26.7 | 28.1 | 10.2 |
| Total Actors | **66** | 34 | 52 | 45 | 31 | 15 | 17 | 40 |
| Efficiency in % | **97.9** | 84.1 | 92.5 | 94.9 | 94.2 | 83.8 | 80.9 | 94.4 |
| **Performance:** | | | | | | | | |
| Fluctuation in % | **0.0** | 3.0 | 15.0 | - | 25.8 | 19.0 | 15.0 | 28.0 |
| Days Sick (days per P.) | **8.2** | 12.4 | 9.3 | - | - | 17.1 | 31.8 | 9.0 |
| Change in turnover in % | 3.3 | 7.0 | 3.6 | - | 0.7 | **21.8** | -26.9 | 20.1 |
| Market-Share % | 71.0 | 25.0 | - | - | 3.0 | 7.5 | - | **100.0** |
| Trend ROA in % | 2.0 | -2.3 | **3.9** | - | -0.5 | 3.4 | -21.9 | 0.7 |
| Trend ROE in % | -1.5 | **40.9** | 11.5 | - | -0.3 | 5.7 | -30.1 | 2.0 |
| Trend net profit margin in % | -0.2 | **3.5** | 3.0 | - | -1.0 | 3.3 | -7.4 | 0.0 |
| Mean ROA in % | **10.4** | 10.0 | -2.8 | - | 4.9 | 5.6 | 5.4 | 4.9 |
| Mean ROE in % | 18.3 | **22.0** | -7.3 | - | 17.0 | 12.0 | 9.0 | 17.2 |
| Mean Net Profit Margin in % | 6.8 | 8.0 | -1.7 | - | **11.2** | 4.2 | 1.9 | 2.3 |
| **Industry divergence in %:** | | | | | | | | |
| equity-to-assets ratio | **32.8** | 1.6 | 19.6 | - | -18.5 | 1.0 | 16.1 | -23.0 |
| Net Profit Margin | -0.5 | 1.3 | -6.7 | - | **6.8** | -3.6 | -4.0 | -1.8 |
| ROA | **8.7** | 1.3 | -7.4 | - | -5.1 | -2.4 | -1.9 | -4.2 |
| **Process-MM** | own | ISO | ISO | CMS | ISO | ISO | ISO | Certificates |
| **Mission/Vision** | Customer | Tradition, Quality, Innovation | Customer, Client, Employees | Customer, Employees | Partners, Shareholder | All stakeholder | Profit, survive | expansion |

*Source: Author's own*

In summary it can be said, that the benchmarking showed that Company 1 is the best performing firm in the sample, not in all criteria, but most. This is visualised in Table 19 by bold font and grey background for best performance. In most criteria poor performing has been Company 7, which did not only show a small amount of network management activities, but moreover high density and poor efficiency. Also in terms of financial performance Company 7 was especially in terms of trend poor. Company 5 has to be outlines as well, as it showed the highest amount of intra-organizational activities, the highest mean net profit margin and the best industrial divergence of turnover. Unfortunately not so much can be said about Company 4, which had the most network management activities, though could not provide information about their performance.

In order to find out more about the relation between the network management activities and the network characteristics as well as performance of a company, linear regression analysis has been done. The author is aware of the small sample size, which does not allow by any means to draw general assumptions or generalizations, but has thoughtful and deliberately chosen this kind of analysis in order to outline and describe the relations in this specific set of data. Moreover has to be kept in mind, while analysing social matters statistically, that social networks and the outcome of those can never depend on only one factor of influence, therefore only general tendencies can be described. Linear regressions have been done between the inter-organizational activities as a dependent variable and the network characteristics and performance measures as independent variables. Table 20 show the results of the linear regression analysis.

Between the inter-organizational activities as the dependent variable and the total number of actors as the independent variable a relations of high statistically significance (F p-value) has been found, disregarding the intercept. The slope of the relation is positive with 3.5. Moreover the coefficient of determination $R^2$ of 93% highly supports the model. Of low statistical significance (F p-value 7%) is the positive relation between the inter-organizational activities and the ROA-trend. Here the $R^2$ shows that only 52% of the variability is explained by the model, which is low though it has to be considered that the trend business trend of a company depends on far more factors, than only its network management. A higher significance of the F-test under 5%, though similar $R^2$ of 52% has been identified the relation between the inter-organizational activities and the betweenness of the focal firm, which tells that more network management activities led to higher centralities in the firms of this sample. A negative slope has been found between the inter-organizational activities and the density of stakeholder networks. This model has a $R^2$ of 60% and the p-value of 2% (F-test) outlines its significance. Positive influences have the inter-organizational activities on the network efficiency, where the linear regression model has a significance of 2% (F-test) and $R^2$ of 61%.

Significant linear regressions have been found between the total network activities as the dependent variable and the betweenness, density, efficiency and days of sickness. With a significance of 4% (F-test), the linear model explains 53% of the effect of total activities on the betweenness. With a significance of 4% (F-test), the density is decreasing when total activities are increasing; hereby the model explains 53%. With the rising of total activities also the efficiency of the stakeholder network rises in our sample with an accuracy of 56% and an F-test significance of 3%. With lower significance of 8% the average number of days sick is decreasing while the network activities increase. This model has a $R^2$ of 56%. Better significance and higher explanatory power has the model of the intra-organizational network management activities and the average days of sickness. With an F-test significance of 7% and $R^2$ of 60%, the average days of sickness are decreasing while the number of intra-organizational network activities increases.

Table 20: Results of Linear Regression Analysis

| **Dependent Variable: Inter-organizational Activities** | | | | |
|---|---|---|---|---|
| **Independent Variable:** | Intercept | Slope | Multiple $R^2$ | F p-value |
| Total actors | | 3.4990 | 0.9305 | 2.654e-05 |
| t p-value | | 2.65e-05 | | |
| Trend ROA | -0.25899 | 0.02416 | 0.5159 | 0.06906 |
| t p-value | 0.059 | 0.069 | | |
| Betweenness | 0.52025 | 0.02548 | 0.5164 | 0.04459 |
| t p-value | 0.00371 | 0.04459 | | |
| Density | 0.357089 | -0.019009 | 0.6016 | 0.0237 |
| t p-value | 0.00239 | 0.0237 | | |
| Efficiency | 0.751482 | 0.014132 | 0.615 | 0.02123 |
| t p-value | 3.38E-06 | 0.0212 | | |
| **Dependent Variable: total Activities** | | | | |
| **Independent Variable:** | Intercept | Slope | Multiple $R^2$ | F p-value |
| Betweenness | 0.436128 | 0.013573 | 0.5325 | 0.03988 |
| t p-value | 0.0212 | 0.0399 | | |
| Density | 0.39987 | -0.00937 | 0.531 | 0.04032 |
| t p-value | 0.00635 | 0.04032 | | |
| Efficiency | 0.717401 | 0.007052 | 0.5564 | 0.0336 |
| t p-value | 4.92E-05 | 0.0336 | | |
| Days Sick | 42.6437 | -1.1595 | 0.5581 | 0.08788 |
| t p-value | 0.0288 | 0.0879 | | |
| **Dependent Variable: intra-organizational Activities** | | | | |
| **Independent Variable:** | Intercept | Slope | Multiple $R^2$ | F p-value |
| Days Sick | 46.9409 | -1.8293 | 0.6034 | 0.06918 |
| t p-value | 0.0246 | 0.692 | | |

*Source: Author's own*

In summary it can be stated, having the limitations of sample size and low coefficient of determinations $R^2$ in mind, that intra-organizational, inter-organizational and the total amount of network management activities showed positive influence on the number of total actors, network characteristics and even though with low significance on performance of companies.

The linear regression models with the highest coefficient of determinations $R^2$ are ones more represented graphical in a scatter plot. Figure 33 shows on the left side the relation between the inter-organizational activities and the efficiency for each company and on the right side the relation between the inter-organizational activities a company is performing and the network density it has.

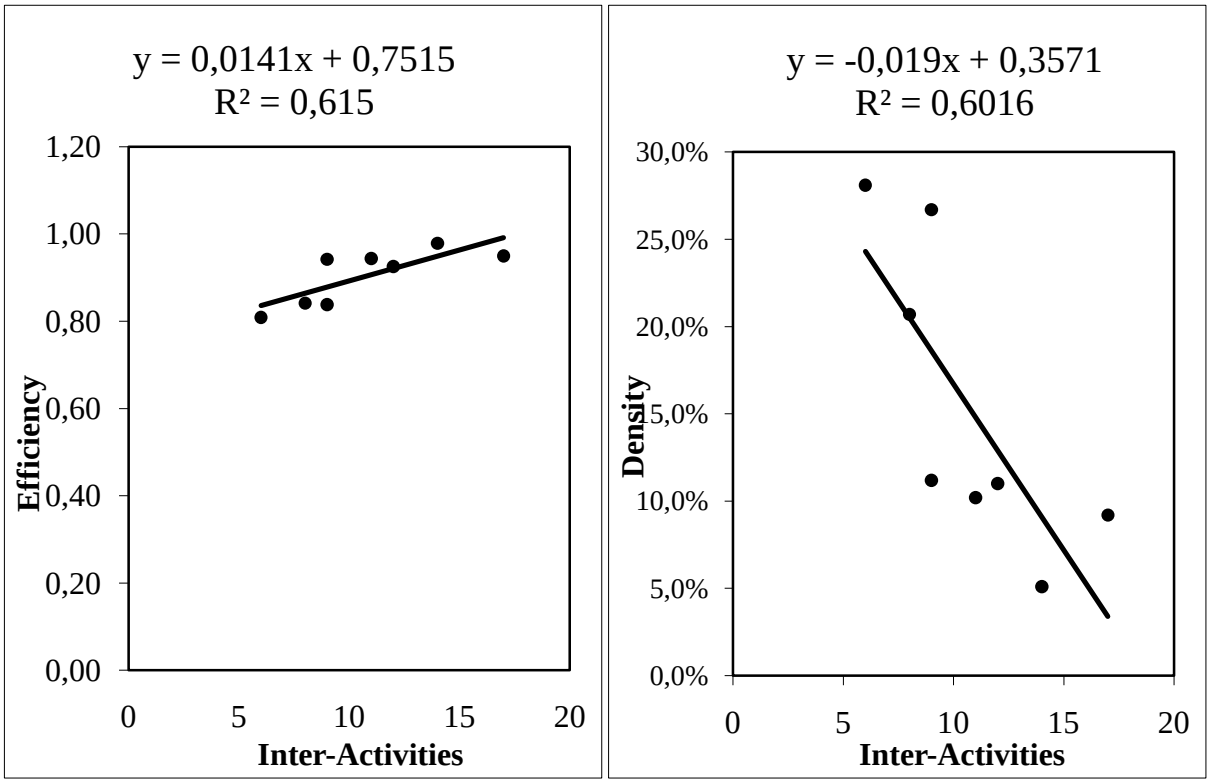


Figure 33: Scatter-Plot of ION-Activities and Efficiency / Density
*Source: Author's own*

It can be observed that the regression model on the left side describes well the relation between the network efficiency and the inter-organizational network activities, as all observations are grouped around the trend-line. Companies, which are performing more network management activities focused on their inter-organizational network, do have at the same time stakeholder networks of a high graph-theoretical efficiency, which allows a good information flow with the stakeholders.

Moreover shows the scatter plot on the right side that a small amount of inter-organizational network management activities goes in line with high network density in this sample and that a lot of network management activities focused on the inter-organizational network appear together with low density. Low

density in the stakeholder network, even though lowering the information flow, gives power due to structural holes (Burt, 2004) and therefore control over the stakeholders to the focal organization. The lower fit of the regression model can be observed not only be the lower p-value and $R^2$, but moreover as not all observations do follow strictly the regression model. Again it has to be outlined, that the general trend in the data set was aim and conclusion of the regression analysis, neither assumptions nor generalizations.

## 6.4 Summary and Coherence

Chapter 6 presented the findings of the survey on the meso level, focused on inter-organizational networks, which have been collected from ego-centred perspective using VennMaker. In the data set were the inter-organizational networks of eight firms, four Austrian companies and four Czech ones. In a first step the stakeholder networks were classified according to Rowley (1997) into commander, compromiser and subordinate networks and subsequently their network graphs were analysed. Moreover have the centrality, density and graph theoretical measures been calculated and compared. Benchmarking showed that Company 1 is the best performing company in the sample concerning, network management, characteristics of the stakeholder network and partly also concerning performance. Poor performance showed Company 7, which had the lowest amount of network management activities as well as poor performance ratios. Linear regression analysis helped to identify several significant relations in the data between the network management and the network characteristics as well as performance.

Assumption 5 has been found valid in the data collected, as Company 1 and 4, both classified as commander networks, due to their low density and high centrality, perform the most network management activities. Company 4 named in total 37 activities and 34 for Company 1. Inter-organizationally they apply 17 and 14 activities. For comparison it can be outlined that the companies identified to have a subordinate network, Company 2, 6 and 7, perform in total 24 (Company 2 and 6) and 16 (Company 7) activities. Inter-organizationally they named 9 (Company 6), 8 (Company 2) and 6 (Company 7) activities.

Support has been found for Assumption 6, even though with low statistically significance. The linear regression models between the inter-organizational activities and the trend of ROA, which had a p-value of 7% and a multiple $R^2$ of 52%, which shows the general tendency of the data set. Another relation supporting the assumption of positive effects of network management on performance was the linear regression with a p-value of 7% and $R^2$ of 60% between the total sum of network management activities in general and intra-organizational activities in particular and the average days of sickness. The negative slope of the relation shows that in companies where more network management activities focused on the intra-organizational network are performed, employees are on average less days per year sick. This effect has

already been identified by other scholars (Halpern, 2005) and can be drawn back on the one hand to the positive effect of social capital on health in general and on the other hand to the enforcement of common norms, values and correct behaviour in dense social networks (Krackhardt & Brass, 1994).

The data showed a significant positive relationship between the network management activities and the efficiency of the resulting network, which allows the conclusion that Assumption 7 is true. The significant positive linear regression of F p-value 2% and a multiple $R^2$ of 62% between the inter-organizational activities and the network efficiency strongly support this assumption. With lower significance it was found that not only the inter-organizational network management tools have a positive effect on the network efficiency, but moreover the network management activities in total (F p-value 3%, $R^2$ 56%).

# 7. REGIONAL NETWORKS - CLUSTER

Clusters became a modern way of cooperation of both profit and non-profit organizations, building islands of local cooperation among competitors in a world of global economy (Porter, 1998, 2008). Successful clusters enhance the efficiency of individual companies, and increase the economic growth on a regional as well as national level by promoting innovation. While the European Commission (2008, p.2) defines clusters broadly as *"a group of firms, related economic actors, and institutions that are located near each other and have reached a sufficient scale to develop specialised expertise, services, resources, suppliers and skills,"* the most cited definition on the scientific side comes from Michel E. Porter (2008, p.215). He defines clusters as a *"geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities,"* which outlines two things known in social network science as crucial for the building of dense networks: the linkages and their proximity.

Successful clusters, which are predominantly a market-driven phenomenon that evolve spontaneously, offer to the participating companies many concrete benefits in the form of economies of scale, reduced costs, increased speed of information and technology transfer, as well as enhanced innovation potential. Cluster policies are formulated on European, national and even regional level cluster aiming to create an environment suitable for the emerging of clusters (European Commission, 2008; OECD, 2007). Even so-called cluster initiatives are started, which represent *"organized efforts focused on the increase of growth and competitiveness of clusters within a region, involving cluster firms, government and/or the research community"* (Sövell et al., 2003, p.15).

Little agreement has been found on the management of clusters and the evaluation of their impact (Knápková et al., 2010). The informal European cluster alliance CLOE (Clusters linked over Europe, 2006) published a Cluster Management Guide that points out five fields of action in the management of cluster initiatives: Information and Communication, Training and Qualification, Co-operations, Marketing and PR as well as Internationalisation. This management model describes a clear and practical tutorial of necessary management tasks in clusters, a fact that distinguishes it clearly from the Strategic Networking model that implies superior tasks for the development and fostering of network structures.

By applying desktop survey, data about clusters in Austria and the Czech Republic has been collected; hereby the definition of clusters has been narrowed to institutionalized clusters, which are consciously managed and organized. A database of those clusters and their members has been created for each country and can be found in Appendix D and E. In a next step two-mode network analysis has been applied and the member companies linked to the clusters by their membership in order to see whether double membership and the integration

of local cluster agencies lead to indirect relations between clusters. Following the analysis of both national cluster networks, in each country two clusters have been chosen to analyse their network management in a case study. In each country one cluster was chosen, which appeared to have a prominent position in the network, not only due to the number of members, but moreover, due to its closeness value, which considers also indirect links. The other cluster was chosen because of having a less prominent position in the network, even without having a not significantly smaller number of member companies. In an interview with the management of the clusters, the network management activities applied in each cluster have been surveyed using the Strategic Networking model as a framework. The questionnaire used for the evaluation of the network management of firms has been adapted to this purpose of cluster analysis, though the basic structure and questions stayed the same and can be found in Appendix B (Part II: Network Management).

## 7.1 Clusters in the Czech Republic

The evolvement of clusters in the Czech Republic has a relatively young history. The first activities directed towards clusters started in 2003. The development of the cluster landscape in the Czech Republic is linked in particular to the existence of governmental support of clustering in the form of a subsidy program of the Operational Programme Industry and Enterprise (OPIE) 'Clusters' (2004-2006) and 'Cooperation' (2007-2013). The main document of the national cluster strategy for the years 2005-2008 was elaborated in 2004 and contained the main principles, measures and aims for the application of a successful economic model of a cluster.

Deriving from the structural funds of the European Union, the Czech Republic established several support programmes. Within these funds the Operational Program Industry and Enterprise (OPIE) (Operační program Průmysl a podnikání - OPPP) and in particular the programme Clusters (Klastry) was realized, which are wielded by the Investment and Business Development Agency – CzechInvest under the Ministry of Industry and Trade. At the moment and until 2013 the OPIE 'Cooperation' (Operační program Podnikání an inovace – OPPI, Spolupráce) focuses on the support of the formation and development of cooperation groups, clusters and technological platforms. Between 2006 and 2011 the existence of 64 cluster initiatives (projects) was reported, whereas in 50 cases the cluster organization (structure) was established, and in 14 cases the project finished with the mapping of the potential for the establishment of a cluster in a given sector and region. Today out of these 50 cluster organizations only two-thirds are still operating (Eckenhofer & Jirčíková, 2011).

30 Czech clusters, their members and the universities they cooperate with were involved in the survey. Appendix D shows the list of all clusters involved in the survey, the region they operate in and the year of their foundation. The members of the clusters built the second mode of the analysis and allowed an

affiliation of members and clusters. The third mode in the network built the universities cooperating with clusters. An affiliation of all three modes led to a total network of 793 nodes and 16784 edges. This makes a density of 0.27%, by an average degree of 4.4 and a clustering coefficient of 0. The path length of the network is 5.394, which is quite high and indicates a loose network with lack of cross links. The total network consists of two components. One big component and one isolate that is a cluster neither having cooperation activities with universities, other clusters nor member companies that are also members of another cluster. Figure 32 shows the total network of clusters in the Czech Republic. The network graph has been arranged by spring embedder.algorithm and it can be observed that several links exist between clusters, which are displayed by a bigger node of red or blue colour. The clusters indicated with blue nodes, Cluster Omnipack and Plastic Cluster, are those clusters which were chosen for an interview.

- *The Plastics-Cluster Zlín* was established by 18 founding companies in 2006 with the objective to create an environment that supports communication, expansion, research, development and training. The aim of the cluster moreover is that Zlín Region becomes the centre of innovative manufacturing of plastic products in the Czech Republic. The establishing of the cluster was co-financed by the Zlín Regional Government and supported by a grant from the OPIE (TIC, 2007; Plastikářský klastr, 2010).
- *The Omnipack Cluster* was established by two founding companies in 2006 with the objective to foster cooperation and to increase the competitiveness and innovativeness of its member companies in order to enable them to enter new markets, create new job opportunities and new companies. The aim of the cluster is to establish in the regions of Královehradecký, Pardubický and Vysočina a first-rate centre for the development of the packaging industry in the Czech Republic. Funding was provided by the Operational Programme for Industry and Enterprise, and the ERDF structural funds programme managed by the Ministry of Industry and Trade (Všetečková, 2007; Czechinvest, 2007; Klastr Omnipack, 2011).

It can be observed on the network graph in Figure 34 that even though the number of members is not dramatically different, Plastic Cluster having 28 and Omnipack 59 members, they impose different centrality in the network, which, as already stated was arranged by spring embedding. The node size was chosen in terms of the centrality measure closeness, which measures not only the direct relations, but also the indirect ones and provides therefore more information about the overall centrality in the network due to indirect relations. While the Plastic Cluster is located at the periphery of the network with a small blue node, the cluster Omnipack is more in the centre of the network enjoying a higher centrality. Plastic Cluster Zlín has less access to exchange with other clusters and research institutions such as universities. Moreover, cluster Omnipack is

located in a region, where five clusters are established, while there are only two clusters in Zlín region.

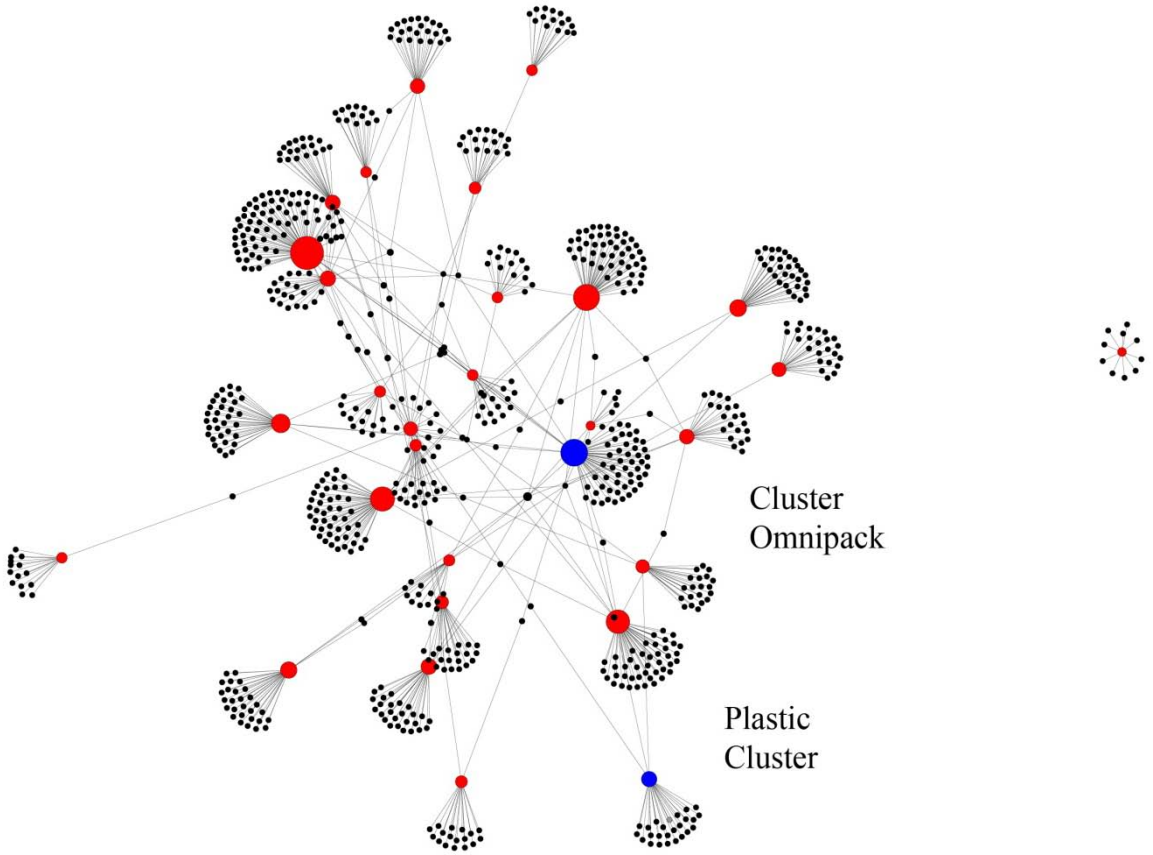


Figure 34: Cluster Network in the Czech Republic
*Source: Author's own*

Regarding network management the managers of the cluster Omnipack indicated in total 25 management activities, while the management of Plastic Cluster named 19 activities. The cluster Omnipack has a strong target-orientation of 9-10 and also has contacts with companies and organizations that are not members of the cluster, e.g. banks, insurance companies, chamber of commerce, research institutions, universities and even non-member companies in the same field. The reason is that cluster is open for everyone and every company is invited to collaborate and to learn about the advantages of the cluster so that they will eventually become future members. Further adding the cluster Omnipack has contacts to other clusters and administrative contacts to the key player of the town and region. Plastic Cluster Zlín indicated a target-orientation between 7 and 8 and has also contacts to non-members such as plastic firms, regional authorities (Kraj Zlín, Innovation Centre, State technological Centre), Tomas Bata University and also other clusters (Moravian-Silesian Clusters, Omnipack, zapadni-slovensky Cluster, French and Italian Cluster), and the chemical Science Institution. In the cluster Omnipack strategy, organization and technology is aligned by the help of the intranet and internet, an information system, conferences, fairs, and within projects, by ad-hoc emails.

In plastic cluster the same task is fulfilled by the website, email, leaflets and fairs. Cluster Omnipack facilitates shared visions and values by the mission and vision statement, the strategy plan and the general annual meeting. The plastic cluster also has a strategy plan and uses the applications for programs to facilitate shared visions and values. In cluster Omnipack events, meetings trainings, workshops, but also individual meetings between members companies are organised for fostering social integration. Plastic cluster Zlín is planning trainings for the same purpose, but already organises general meetings, technology as well as special workshops and a biannual plastic conference. Moreover, plastic cluster Zlín uses the website for fostering social integration. Network development is done in the cluster Omnipack bottom-up. The management outlined that firms spread the advantages of the cluster and by that attract new member firms, which are contacting the cluster directly. The website of the cluster moreover, is supporting this process. Plastic cluster Zlín is visiting plastic firms directly in order to inform them about benefits from the cluster, but it was also mentioned that member companies bring new members to the cluster. Both clusters hire a cluster manager for network governance. While plastic cluster Zlín saw most of the network governance activities in the board of members, cluster Omnipack defined databases, address-directories and a library-knowledgebase as the tools for the governance of their network. Coordination of exchange is done in the cluster Omnipack through the intranet, databases and a planned information system suitable for that purpose. Plastic cluster Zlín outlined that the coordination of exchange is mainly anchored in the individual projects which form platforms of exchange.

In summary it can be said that in all but the category of fostering social integration plastic cluster Zlín has a smaller amount of network management activities than the cluster Omnipack.

## 7.2 Austrian Clusters

Craft guilds and consortia have a tradition in Austria since centuries, therefore modern concepts of clusters spread easily in the 1990s (Clement, 2010). Actually already in the 1950s the first steps towards cluster development started in Austria at a Biopharma-consortium in Tirol (ABA, 2008). In the 1980s the AOEM (Austrian Original Equipment Manufacturers), a cluster-like consortium in the automobile industry was established. In 1990 a consortium of the woodworking industry called “ProHolz” was started, which has been the basis for wood clusters in several federal states. Nowadays the cluster landscape in Austria is flourishing with more than 50 clusters established and builds an important economic factor in Austria as for instance only in Lower Austria clusters were involved in one third of the total added value of the federal state Lower Austria (Clement & Welbich-Macek, 2007).

Cluster politics and policies are a complex and multilayered system, which is deriving from the EU-Programs Structural Funds, Framework Program 6 and 7

and the Competitiveness and Innovation Framework Program. Numerous programs exist on a national level deriving from the national strategy framework 'strat.at 2007-2013' provided by the promotion agencies Forschungsförderungsgesellschaft (FFG) und Austria Wirtschaftsservice (AWS). The national cluster policies are supplemented by regional cluster policies and programmes in the federal states (Clement, 2010).

2008 a national cluster platform was established by the Federal Ministry for Economic Affairs and Labour, which is one of the key initiators of the "Clusterplattform Österreich". This platform provides information about the clusters in Austria and, moreover, information for the clusters themselves about cluster funds, regional, national and European cluster policies and includes four working groups to the topics: Austrian Cluster Politics; Cluster, Science and Innovation; European Integration of the Austrian Cluster Policies; Cluster & Internationalization (Clusterplattform Österreich, 2011), which has been supported by the Austrian Council for Research and Technology Development (RFTE, 2009). The Council for Research and Technology Development outlined, moreover, in its recommendation to the Austrian cluster initiatives that a tighter connexion of the Austrian cluster policies to the European cluster policies is needed as well as a stronger focus on national cluster programmes. Even though having one of the most developed cluster landscapes in Europe, the cluster potential does not seem to be fully reached yet, so the Austrian Council for Research and Technology Development (RFTE, 2009).

Starting from a list of 49 clusters, which included also several cluster like networks like a consortium, a database of all clusters and their member companies has been generated and affiliated by two-mode network analysis to a whole network. The list of clusters, their year of foundation, the region they operate in as well as the number of member companies is provided in Appendix E. The affiliation of cluster organizations and member companies resulted in a network of 4825 nodes and 5966 edges, which makes a density of 0,026% and a clustering coefficient of 0.005, and is displayed in Figure 35. The average degree of the network is 2.89, which is much lower than in the whole cluster network of the Czech Republic. The average path length is 1.374, showing the connectedness and integration of clusters in Austria. The red and blue bold nodes in the network graph in Figure 35 indicate the cluster organizations. The high number of clusters as well as the numerous amount of cross links between the clusters can be observed. Two clusters are isolates in the network as they do not have any member companies. The network analysis helped to identify two clusters which were not listed before, the "Ökocluster", which operates in Styria and the "Verein NETZWERK Arbeit Gesellschaft", which is operating in Lower Austria, Upper Austria and Salzburg. Both clusters were added to the cluster list in the Appendix E with the numbers 50 and 51.

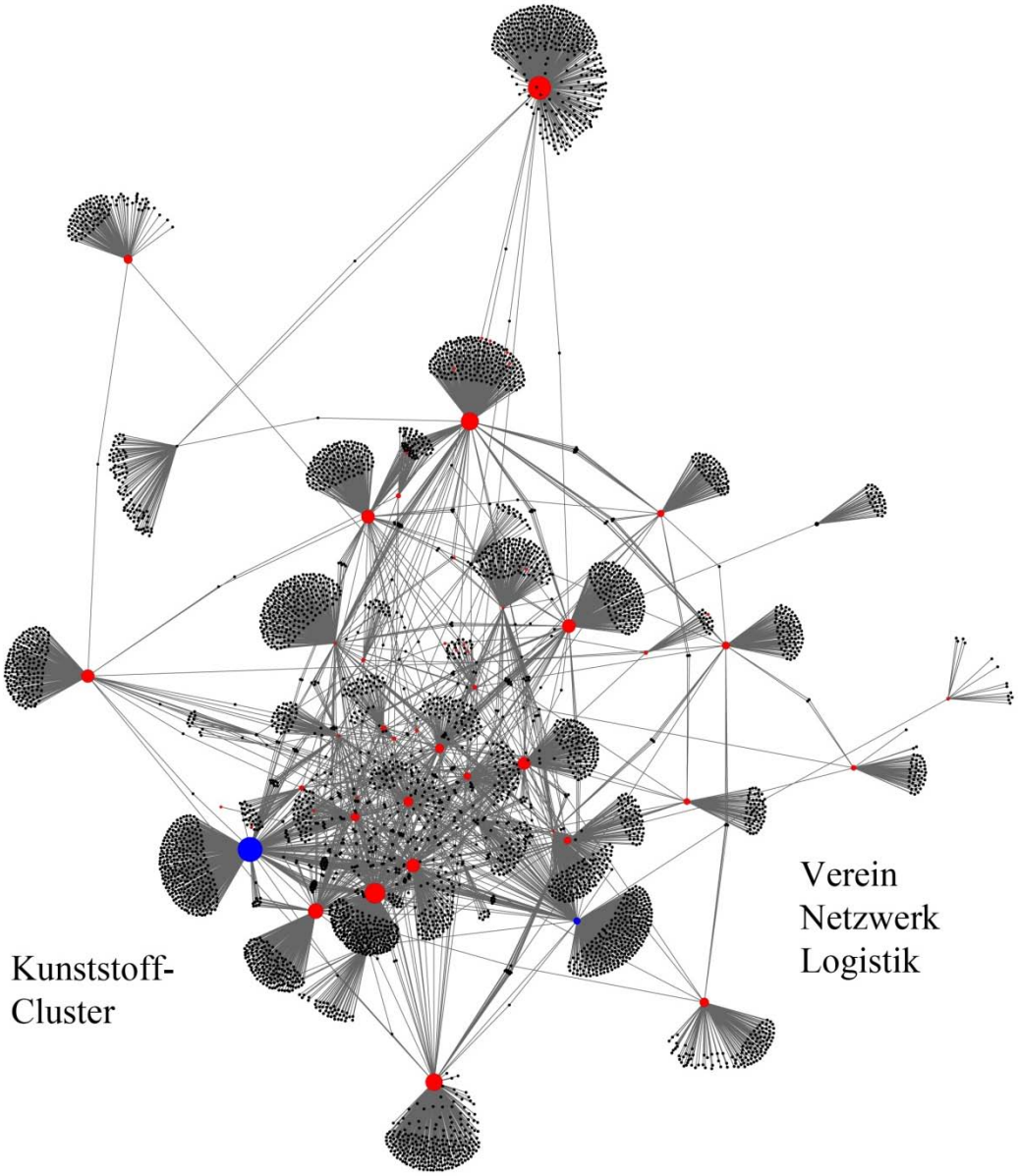


Figure 35: Cluster Network of Austria
*Source: Author's own*

Analysis of the centrality in terms of degree and closeness revealed two clusters which are interesting in terms of their structural position Kunststoff-Cluster and Verein Netzwerk Logistik. These clusters were enquired for an interview and their network management has been evaluated using the Strategic Networking Model as a benchmark.

- *The Plastics-Cluster (Kunststoff-Cluster, KC)* is an association of over 400 companies of the plastic sector, which operate in the areas of plastics processing, plastics machinery, mould and tooling manufacture, raw/recycled material production and trading, technical services to the plastics industry as well as institutes and R&D transfer centres. The cluster has been supporting, initiating and coordinating inter-company teamwork in the plastics sector since 1999 and is an initiative of the countries Upper

Austria, Lower Austria and Salzburg. The aim of the cluster is to concentrate the potential and competences in order to increase the innovative capacity and international competitiveness of the partners. Special attention is paid to the needs of small and medium-sized companies (SMEs) (KC, 2011).

- *The "Verein Netzwerk Logistik" - "VNL" (Association for Network Logistics)* has been a cross-sector platform for producing companies, industry and trade, education and research facilities, service providers in the logistics sector, transport-transhipment-storage-logistic service providers, logistics technology suppliers and integrated logistics service providers since 1996. The aim of the network is to strengthen logistic competences in a sustainable way, to offer a platform for logistic knowledge and to promote a uniform understanding in logistics. The over 300 member companies are classified into logistics experts and logistics costumers. The network is supported by the federal state of Upper Austria, the region 13 funds and the European funds for regional development (EFRE) (VNL, 2011).

The Plastics-Cluster (KC) performs in total 28 network management activities and the Association for Network Logistics (VNL) 20. Both clusters also have contacts with non-members such as in the case of KC firms participating on projects, though not yet members, but also other international clusters and European Cluster Associations such as Cluster Plastr initiated by the federal state of Upper Austria. Other contacts of the Plastics-cluster are research institutions, regional, national and international agencies providing support-funds, industry media and journalists. The Association for Network Logistics also maintains contacts to companies, which are not members yet, as their aim is to provide opportunities for everybody in the branch. Plastics-Cluster has a strong target-orientation using the Balanced-Scorecard aiming to trigger cooperation and to improve the market conditions. The target-orientation of VNL depends on the topic and target group. Both clusters analyse their network regularly. The Plastics-Cluster performs eight activities for aligning Strategy, organization and technology within the cluster and to non-members, while the association for network logistics has three. The activities of the plastics-cluster include newsletters, journals, an annual catalogue, an internet platform, trainings, fairs, conferences and projects. VNL uses newsletters, journals and the intranet. KC has three activities for facilitating shared visions and values, being the mission and vision statement, the board meeting and workshops. VNL has only a mission and vision statement for this purpose. For fostering social integration KC is organizing events, meetings, trainings, as well as team-building seminars. VNL has lead, regional and best practice events, where the focus is on the topic as well as the social networking. In KC network development is done by the projects strictly bottom-up, while VNL is contacting potentially new members directly, as well as approaching them on events and through associations. Network governance is done similarly in both clusters by databases, hired cluster managers, address directories and in the case of the

Plastics-Cluster, additionally through analysis of the homepage-tracking in order to find out what is used the most by the members. For coordination of exchange special platforms and the intranet are used by both clusters. KC sees projects as another centre of information exchange and VNL is organizing biweekly web-conferences.

## 7.3 Summary and Coherence

The interview with the cluster managers in Austria and the Czech Republic showed that the network management tool Strategic Networking is applicable to clusters as well, which supports assumption 8. The dimensions of Strategic Networking seemed odd to the practical oriented cluster managers at the first glance, though the discussions showed that the network management performed in the clusters fits into the categories of Strategic Networking. Figure 36 gives an overview over the network management activities in the clusters Plastic Cluster Zlín, Omnipack Cluster, Plastics-Cluster (KC) and Association for Network Logistics (VNL).

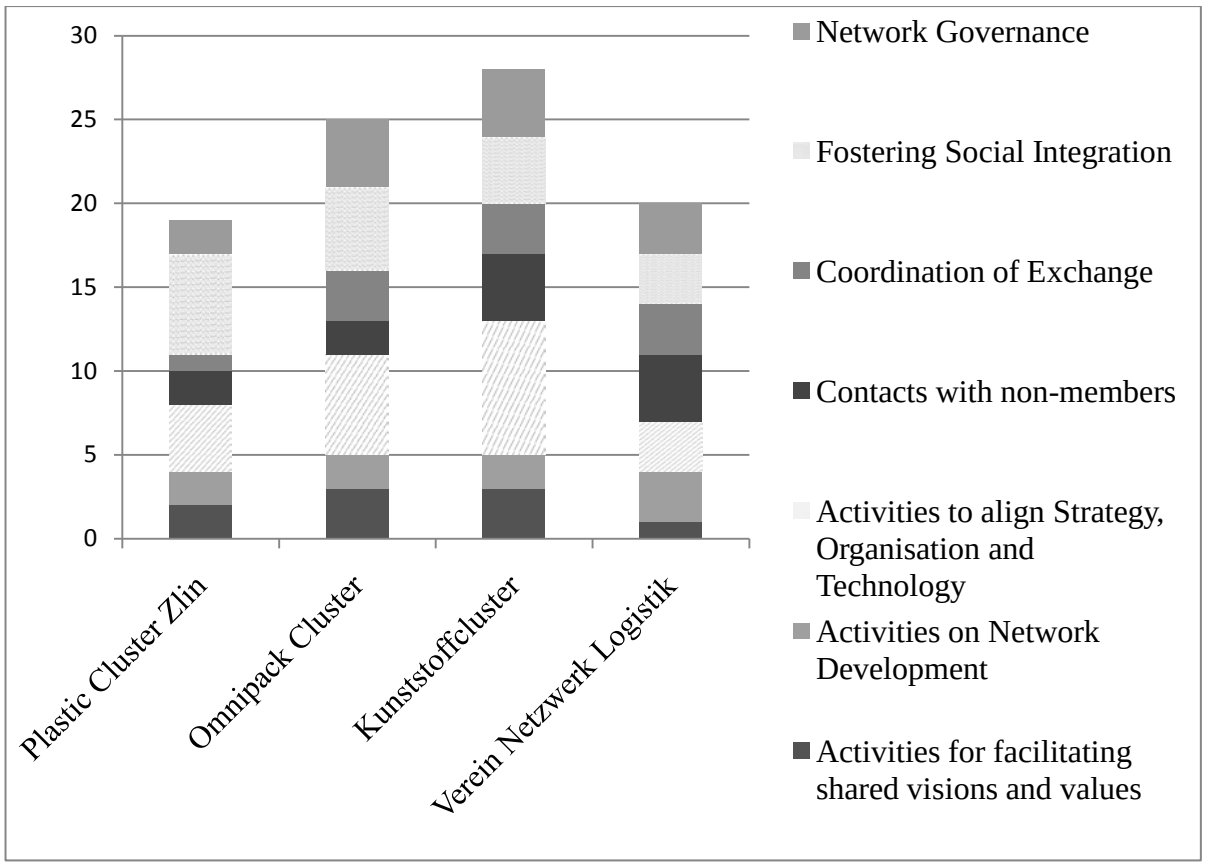


Figure 36: Network Management of Clusters
*Source: Author's own*

Figure 36 shows that all categories of Strategic Networking are realized by all the clusters, even though to a different extent. Plastic Cluster Zlín has the least amount of network management activities, followed by Association for Network

Logistics (VNL). Omnipack Cluster has 25 activities and Plastics-Cluster (KC) the most with 28.

The comparison of the four clusters in the sample (Table 21) shows that both Czech clusters are of smaller size than the two Austrian clusters, which have more than 300 and 400 members. The Austrian clusters, moreover are "older"; VNL was actually founded in 1996, while the Czech clusters are only 5 years old. The closeness values have been calculated standardized on a scale between 0 and 1. In both cases the clusters with less network management activities have a smaller closeness centrality, which supports Assumption 9, that network management contributes not only to the degree of a cluster, but moreover to its closeness centrality.

Table 21: Comparison of Clusters

| | Plastic Cluster Zlín | Omnipack Cluster | Kunststoff-cluster | Verein Netzwerk Logistik |
|---|---|---|---|---|
| Founded in | 2006 | 2006 | 1999 | 1996 |
| Network Management Activities | 19 | 25 | 28 | 20 |
| Weighted Degree | 56 | 120 | 494 | 547 |
| Out-Degree / Members[5] | 28 | 59 | 418 | 349 |
| Closeness | 0.226 | 0.258 | 0.998 | 0.748 |

*Source: Author's own*

The overall tendency shows that Czech clusters have smaller closeness measures than the Austrian clusters, as resulting from the overall network differences. The whole network of clusters in the Czech Republic was with 793 nodes much smaller than the Austrian cluster network that had 4825 nodes. The Austrian clusters have an average of 147 members, while the Czech clusters have 28 members, which is natural as clusters in Austria have a tradition of more than 20 years, while clusters in the Czech Republic started to develop 10 years ago. Regarding density the difference between the two countries were remarkable, as the ratio between realized to possible relations was 0.3% in the Czech cluster network and 0.03% in the Austria cluster network. The density dissimilarities and the differences of the number of actors support assumption 10, stating that when the number of actors in a network increases over time, the general density decreases.

[5] February, 2011

# 8. DISCUSSION AND CONCLUSION

The main goal of this study was to evaluate the network management tool Strategic Networking in practice and prove its contribution to the performance of a network. Hereby three different levels of networks have been analysed in order to reach the target and answer the set research questions in an academically sufficient manner. In the following section the three research questions will be answered in order to evaluate Strategic Networking. The impact of the findings will be outlined in the latter, especially the impact of the results for practice and science is crucial. Finally the limitations of the study will be outlined and needs for further research named.

## 8.1 Evaluation of Strategic Networking

*Research Question 1: How are organizational networks (intra-, inter- and regional) managed in practice?*

The survey showed that in practice numerous networking activities are applied, which can be fitted into the Strategic Networking model. The activities are partly simple though have a great effect on the intra- as well as inter-organizational networks though. The most frequent activities are meetings and trainings. Communication plays a great role in practice, in particular informal communication within companies. Concerning network development the survey showed that direct network development is more frequently used than indirect development. Also visits and participation at fairs and conferences are used for network development. Surprisingly clusters are rarely used for the management of inter-organizational networks. Only two Austrian companies mentioned use cluster for network development. Network governance is theoretically analysed and discussed by scholars in complicated manners (Provan & Kenis, 2005, 2008), while in practice databases and address-directories are applied for those purposes. During the interview, especially with Czech companies, confusion partly occurred due to the term network, as some Czech companies did not see their contacts to stakeholders as a network. The situation was differently in Austria, where companies seem to be acquainted with this term. Cultural differences were also visible when the case questions were asked. Czech companies were not so optimistic that they would have a chance to avoid legal changes (using their network) that would have negative consequences for their company, while Austrian companies were more likely to apply lobbying activities and use their contacts with local or national authorities.

Also concerning network management slight differences between Austrian and Czech companies were visible. Austrian companies tend to have stronger focus on network development, alignment strategy, organization and technology, coordination of exchange, fostering social integration as well as informal talking, while the Czech companies showed a stronger target-orientation, more frequent network development as well as network governance

activities. Company 5 is an exception, which has a strong target-orientation and fosters social integration, while having strong focus on coordination of exchange. An explanation could be that Company 5 is owned by a Swiss corporation since 2005.

Not only between the two countries of origin, were the differences in the network management visible, but moreover between the stakeholder-network-types according to Rowley. Linear regression analysis showed that the inter-organizational network activities do have a significant impact on the total number of actors a company has in its stakeholder network. Moreover the network characteristics betweenness, density and efficiency are significantly influenced by the total network management activities as well as inter-organizational network management activities.

Also for the regional networks (clusters), the network management model Strategic Networking was applicable, even though the activities were slightly different for clusters than for organizational networks. While only a few companies analyse their networks, all clusters analyse their networks regularly. While the top network management activities in firms have been meetings and training, in clusters the most applied activities are projects and the use of the intranet. Projects serve, according to the cluster managers, as a platform for communication and cooperation, where the companies get to know each other better. Also the cluster manager and address directories play an important role in the network management of the clusters in our sample. General meetings of clusters play an important role in the facilitation of shared visions and values for as well as social integration. Network development of clusters works to a big extent bottom-up, due to recommendations of cluster members to other companies of the same industry.

The strategic networking plots of the two clusters, which enrol a central and prominent position in their local network of clusters, show a similar shape as can be seen in figure 37. Both, Plastics-Cluster (KC) and Omnipack Cluster, apply the same amount of activities for facilitating shared visions and values, network development as well as network governance. Regarding activities to align strategy, organization and technology Plastics-Cluster (KC) has more activities than Omnipack Cluster, while concerning fostering of social integration Omnipack Cluster is more active.

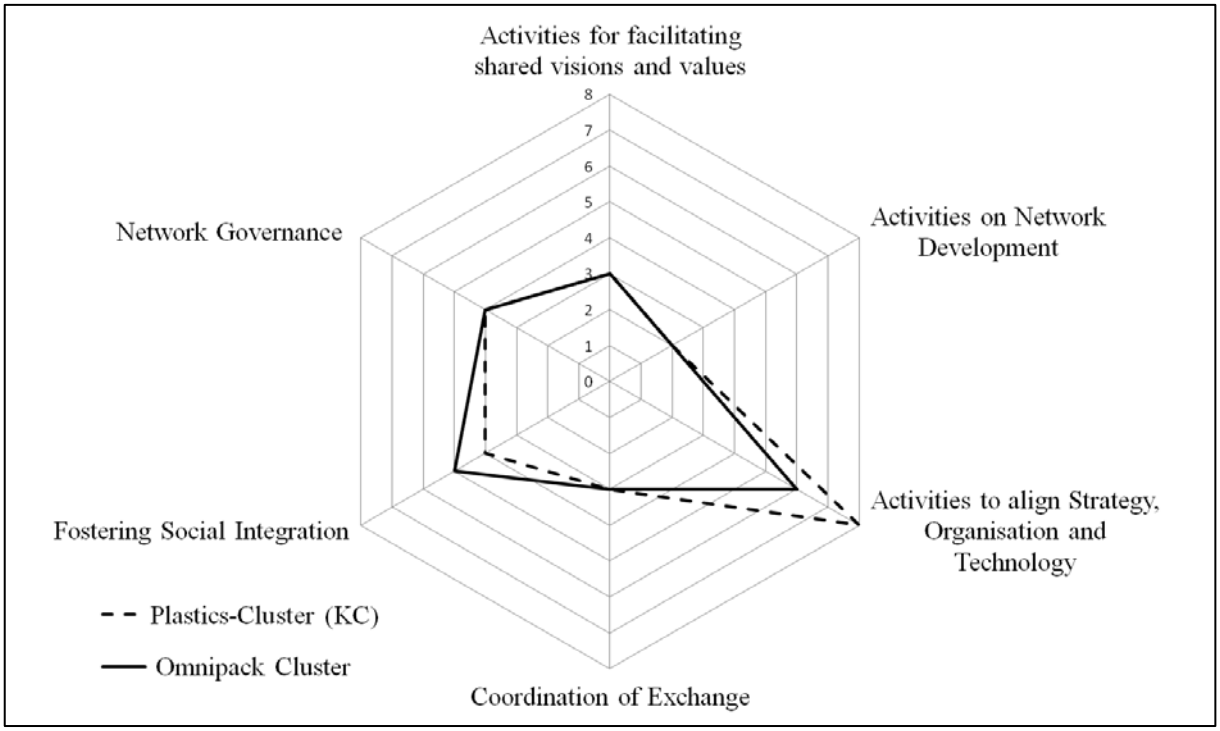


Figure 37: Strategic Networking Plot of Central Clusters
*Source: Author's own*

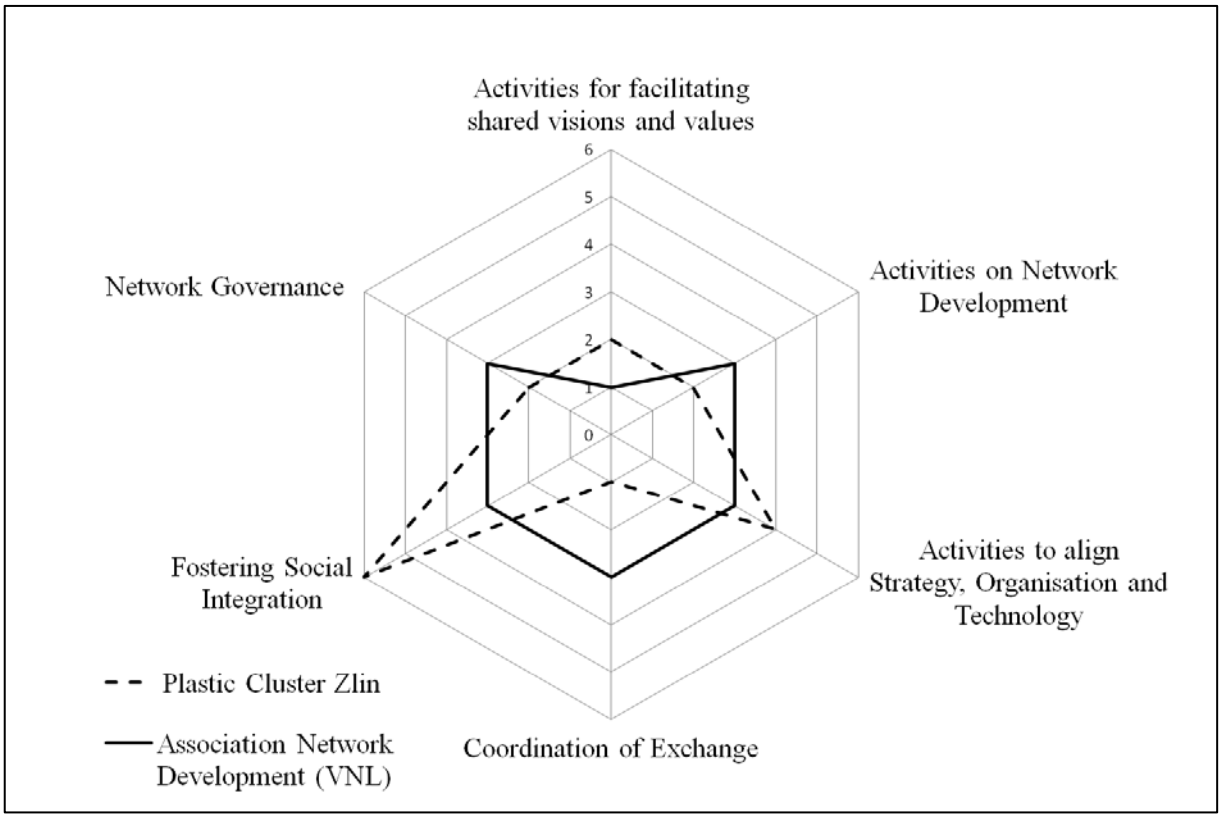


Figure 38: Strategic Networking Plot of Peripheral Clusters
*Source: Author's own*

Figure 38 shows the network management of the two less central clusters, Plastic Cluster Zlín and the Association for Network Logistics (VNL). Here it is interesting to see that VNL has a quite balanced network management, only in the category activities for facilitating shared visions and values is the figure lower. The Plastic Cluster Zlín is different, it has a strong peak towards fostering social integration, also several activities towards alignment of strategy, organization and technology, though little activities for the coordination of exchange, network development and facilitating shared visions and values.

In summary it can be stated that the Strategic Networking model is applicable for network management in practice as a compendium as well as a benchmark for organizational and regional networks.

*RQ2: What does an intra- , inter-organizational and regional network managed by Strategic Networking look like?*

On the micro-level this survey dealt with informal intra-organizational networks between employees of three companies. Besides the network management activities applied by the management of a company, another important factor of influence has been taken into account: the organizational culture. Hereby it has been found that market culture is a density supporting element. Concerning Schwartz' value dimensions it seems that a balance of values is beneficial, such as lived by Company 3. Self-enhancement values seem to be a trust hindering element.

Furthermore, the amount of communication, as well as the evaluation of the latter have been in the focus of the study, though neither has found a link to the characteristics of the social networks nor to the network management applied. The network management has been found to influence the hierarchy, density as well as multiplexity of intra-organizational networks. A negative influence seems to have affected the network efficiency, which does not automatically mean lower work efficiency, though the existence of more than necessary ties in order to ensure network connectedness. This finding goes is in line with the existence of multiplexity and provides stability to the intra-organizational networks, which leads to lower fluctuation (Krackhardt & Brass, 1994) and average sick days. These findings have been proved by linear regression analysis as a significant impact of intra-organizational network management activities.

On the meso-level, eight stakeholder networks have been analysed from ego-centric perspective using VennMaker. Here the theoretical classification of Rowley (1997) has been applied in practice and it was found that those companies more active in terms of network management are classified as commander networks, the most favourable position in ones stakeholder network. Those companies applying less network management activities enrol a compromiser position and those companies in the sample applying the least amount of network management activities have also a lower centrality in a dense inter-organizational network, so that they are classified as sub-ordinates with

low influential possibilities. Also the efficiency of the stakeholder network is in line with the number of network management activities in this survey, so that fewer network management activities can be associated with lower network efficiency and the other way round, which has been supported by linear regression analysis with significant F p-values under 5%. Not only the structural characteristics of stakeholder networks is better due to the number of network management activities applied, but moreover the stakeholder network is significantly larger. With every network management activity a company carries, its stakeholder network is about 3.5 actors larger, as shown by the linear regression of the companies in our sample. In summary it can be stated that in this sample the stakeholder networks of companies applying more aspects of Strategic Networking are larger, more efficient, less dense and the focal organization enjoys high centrality.

On the macro-level the network management of four regional networks (clusters) has been analysed, whereas two clusters are from the Czech Republic and two from Austria. As the network in which the clusters are incorporated has here been analysed and not the intra-cluster network itself, no conclusions of the effects of network management on the intra-cluster structure can be done. Concerning the position of the clusters in the whole network of the clusters in the specific country it can be said that in both countries those clusters applying more network management activities are those, which enjoy a more central position in the network in terms of degree as well as closeness. The degree is a centrality measure calculating the direct ties, while closeness is also considering the indirect ties into the centrality calculation. Therefore those clusters not only have more members, but also members that have access to other clusters, and therefore build gateways of communication. The fact that clusters which apply less network management activities, both in the Czech Republic as well as in Austria, are located at the periphery of the whole network, as it has been a case study does not allow generalisations, but builds an interesting starting point for further research on clusters and cluster management.

*RQ3: Is a network that is managed by Strategic Networking more successful in terms of financial or non-financial measures?*

Success derives from the Latin word *successus / succedere* and stands for a favourable or desired outcome, the attainment of wealth, favour or eminence (Encyclopædia Britannica, 2011). While the shareholder theory says that the outcome of a firm is dedicated solely to the shareholder of a firm, the stakeholder theory claims that a firm’s goal has to be beneficial for all its stakeholders (Smith, 2003). A broader range of financial and non-financial performance ratios has been chosen and oriented on the perspectives of the Balanced Scorecard in order to fit to the stakeholder approach that has been chosen for the inter-organizational networks. A problem though has been found, besides the small size of the sample the different industries, scope and maturity

of the firms do not allow them to be compared to each other. The author tried has tried to overcome this problem, on one hand by comparing each firm's performance to its industry average and on the other hand by calculating the performance trend of each firm over the last 3 years.

On the micro-level of intra-organizational networks the result has been that the company whose employees communicate the most hours per week has also the best financial performance and that the employees of the companies with dense intra-organizational networks have fewer sick days per year. This finding has also been supported by the data collected on the meso-level, where also the average sick days per employee and year have been recorded. Here a linear regression showed a negative slope of the average sick days per employee by an increase of intra-organizational activities. All other contributions to success deriving from network management may result from the beneficial network characteristics.

On the meso-level the inter-organizational network management-activities have been found to have a positive influence on the ROA-trend of a firm. The total network management activities as well as the intra-organizational activities decrease the average number of sick days of employees in the companies in this sample. Benchmarking showed that the company with the most network management activities and best inter-organizational network according to network measures has also the highest mean return on assets compared to other firms in the sample and the highest equity-to-assets ratio and return on assets compared to its industry. The same firm also has the lowest fluctuation and its employees have the least sick days per year, compared to the other companies in the survey.

On the macro-level only a few assumptions about the success of clusters due to Strategic Networking can be done, as the measurement of cluster performances is a research topic itself and highly discussed in scientific literature (Knápková et al., 2010). Though two points shall be outlined: First the most crucial element for the success of a cluster is the dense cooperation of member companies and second, the interest of many companies on the clusters work. Concerning the number of members from the four analysed clusters in the sample, those two clusters being the most active in network management, have also more members on one hand and more projects on the other hand as their online presentation showed. The leading Czech cluster Omnipack has 59 members and is working on 65 projects and the Austrian pendent Plastics-Cluster has 418 members and 99 completed, 3 ongoing, 3 international and 4 national projects and cooperation-projects. Plastic Cluster Zlín has 28 members and only 5 projects and the Austrian Association for Network Logistics (VNL) has 349 members, 10 projects, 2 studies and 12 cooperation-projects. (Klastr Omnipack, 2011; KC, 2011; VNL, 2011; Plastikářský klastr, 2010)

## 8.2 Limitations and Need for Further Research

The present study is aimed at contributing to a scientific field that is not fully researched yet. The findings clearly show a step in the right direction, though only a small step. Several limitations have to be considered that leave space and need for further research. The first and probably the biggest limitation is the small sample size. Even though it already represents quite a big sample size in the specific field of organizational network analysis, for general assumptions and generalizations in the sense of inductive studies the sample size is still far too small. Access to organizational network data and to intra-organizational network data in particular is highly difficult. Managers are afraid of cooperation on such research projects due to the high sensitivity of the data and potential loss of time. Another limitation is the fact that the participating companies, even though being limited to small and medium-sized firms, are of different size, maturity and industry, which makes comparison, outside the network measures difficult, partly even impossible. Also the statistical analysis presented in the survey has to be treated with caution. Even though only linear regressions under a minimum significance have been considered, an underlying problem is still the small sample size and threat of "bad" leverage points (Sheather, 2009). Therefore it must be outlined once more that the presented linear regressions merely intended to analyse the interrelationships in the collected data set and to demonstrate that there is a need for further analysis of these findings with a bigger sample size on all three levels.

On the macro-level of analysis a limitation is that formal relations have been studied by running an affiliation of the membership in clusters towards a 2-mode network of clusters of a specific country. Hereby the data might be completed by informal relations and cooperation agreements, conducted directly from the clusters. Nevertheless it has to be outlined that this might result in an extensive amount of data especially in countries such as Austria, where more than 50 clusters exist with an average of 147 member firms. Already by collecting "only" the formal membership relations a network with a size of 4825 actors and 5966 relations, has been reached.

The problem of unknown actors is also known by the method of ego-centric data collection, where ego is not necessarily informed about all relations between its alteri, even though it is very likely. Besides this limitation the methodology proved to be highly useful for data collection as well as analysis and is proposed for application in further research, with broader samples, from different or same industries.

For better understanding of the functioning and effectiveness of the network management model Strategic Networking an accompanying study is proposed for further research.

## 8.3 Gains for Science and Praxis

The presented survey provided insights into fields important for science as well as practice and brought answers to open research questions by elaborating topics until now not fully researched. Those are the evaluation of the effects of network management on the intra-, inter-organizational and regional networks. Till now only a small number of surveys have observed intra- and inter-organizational networks simultaneously. Hereby the data collection of the intra-organizational network via online questionnaire using a socio-centric perspective has been found constructive and valuable, as the data collection mode gives the participants a feeling of anonymity and the data-collected is available in a suitable electronic format for further data processing. Further insights to the theoretical model of Eckenhofer & Ershova (2009) about the influence of certain organizational culture on solid social networks have been provided. The Competing Value Framework as well as Schwartz's value dimension has been used for diagnosing and classifying the organizational culture of a firm. The tools have been found useful and practical, not only for the scientific purposes, but may also be used for consulting practices. The findings that clan culture and values classified under self-transcendence support the evolvement of dense social networks within organizations are important for practice. They give a guideline of values and cultural types supporting or hindering the evolvement of dense social networks and a climate of knowledge sharing and good information flow. Further testing and analysis by scientific surveys is proposed by the author in order to have a better certainty and accuracy in the recommendations.

Another gain for science and practice is that confirmation of the suitability of a network management model for intra-, inter-organizational and regional networks has been provided, which was needed in science as well as praxis, as network management models are rare in general and suitable ones for application in practice in particular. The network management model Strategic Networking works as a compendium for network management within companies, as well as outside to stakeholders. Even for regional networks, such as clusters, it can be applied in order to fulfil all necessary criteria for the development of social networks, as well as collaborating within them. The benefits of Strategic Networking have been clearly identified on all three levels. On the intra-organizational level as the improvement of the network characteristics by supporting higher density, lower hierarchy and higher multiplexity. On the inter-organizational level Strategic Networking helps to increase the overall number of actors in the network, the efficiency of the stakeholder network, by supporting an establishment of a central position within a network of low density, which provides power due to structural holes. On the level of regional networks such as clusters, it has been found that Strategic Networking might help to attract a higher number of members and to choose the

members in order to have a strategic position within the national network of cluster organizations subsequently.

## 8.4 Conclusion

In summary it can be said that with the tools, measures and means available for this study, networks applying Strategic Networking have been found to be successful. This does not apply strictly in financial terms, and has to be outlined as a need for further research to analyse this on a broader scope, with a bigger sample, over a longer period of time.

The main target of this thesis was to evaluate the network management tool 'Strategic Networking' in practice and to prove that it contributes to the performance of a network. This goal has been reached; the network management tool is applicable for use in practice, even though the target-orientation seems not to be taken literally and network analysis is applied only rarely in practice, which goes in line with the findings from the expert survey presented in chapter 3.3, which said that target-orientation is accompanied by 'having an open eye' for opportunity. Moreover it has been found that some firms, spend a lot of efforts on networking and network management, but do not characterize their networking as highly target-oriented, even though the intentions are focused on the benefits of the firm. This might not be negative, on the contrary natural, as social interaction is needed to develop trust and social capital in a row (Tsai & Ghoshal, 1998), which allows mutual benefits from a relationship. Target-orientation and focus on one's own benefits, which is too strong, might hinder this process. Therefore awareness of the target and goal seem to be the key, though not networking strictly for target achievement solely.

The study showed that while in clusters the networks are analysed regularly, using performance measures and sometimes even the Balanced Scorecard, within companies the management simply talks about their networks. Here a need for development of practical tools exists, which would allow managers to analyse their networks in simple and fast manners. The perspective of the stakeholder-network and the use of the software VennMaker has been highly applicable and useful during the study. The method was comprehensive even to actors not familiar with the network term and the circular distances of relations have been understood intuitively by participants. This approach can be recommended for use in practice, as an awareness and overview of the network helps to identify structural holes and needs for network development.

The contribution of Strategic Networking to the characteristic of a network has been clearly shown in the study on all three levels analysed. The contribution to the success of a network in financial means only partially, though may be deduced from other scholars' findings on the impact of certain social network characteristics (Burt, 1992; Granovetter, 1983, 2005; Uzzi, 1997; Rosen, 2000; Krackhardt & Brass, 1994; Lechner & Dowling, 2003, Rowley, 1997), which have been identified to be provoked by Strategic Networking.

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# CURRICULUM VITAE

*Personal Data:*

Eva Maria Eckenhofer
Date of Birth: 29 November 1985, Vienna, Austria
Austrian Citizen

*Education & Study:*

- 1996-2004: Sport High School in Vienna, graduated with honours.
- 2004-2008: Studies in Media-Management at the University of Applied Sciences in St.Pölten, graduated with success.
- February through June 2006:
  Semester abroad at the Tomas Bata University in Zlín, Czech Republic.
- Since October 2008:
  Doctoral Studies at Tomas Bata University Zlín, Czech Republic, Faculty of Management and Economics; Centre of Applied Economic Research.

*Further Qualifications:*

- Trainer (alpine skiing) since 2009
- Ski-Instructor (alpine skiing) since 2005
- Driving Licence (B) since 2003

*Practical Experiences:*

- July 2002: Municipality of Klosterneuburg.
- July 2004: Editorial Department of the local Newspaper:
  Niederösterreichische Nachrichten (NÖN) in St. Pölten and in Tulln.
- August 2004: Federal Economic Chamber of Vienna (Marketing).
- July-August 2006:
  Press Department for the provincial government of Lower Austria.
- Since 2001:
  Ski instructor at the Ski School ‘Altenberger’ in Leogang (Salzburg) and Ski School ‘Active’ in Hinterglemm (Salzburg).
- October 2004 - January 2006: Journalist for the Newspaper NÖN in Tulln.
- Since September 2004:
  Public Relations for the Trainer-Department Ski Alpine in Lower Austria.

- October 2006 to October 2007:
  Communications and Sales Manager in the Cross-Media Agency IllesCrossMedia (Klosterneuburg/London).
- October till December 2007:
  Trimedia Public Affairs GmbH (Lobbying Agency, Vienna).
- January till February 2008:
  Trimedia Communications Austria (Public Relations Agency, Vienna).
- Since October 2008:
  The Public Affairs Agency (Lobbying and Public Affairs, Vienna).
- Since October 2010:
  External Project Manager - Centre of Applied Economic Research at the Faculty of Management and Economics (Tomas Bata University in Zlín).

*Research Projects:*

- 2010: IGA/62/FaME/10/D of the Internal Grant Agency of Tomas Bata University "Social Network Analysis in Performance Measurement and Network Visualisation"
- 2011: IGA/49/FaME/11/D of the Internal Grant Agency of Tomas Bata University "Social Network Analysis in Performance Measurement and Network Visualisation"
- Participation on research projects:
  - "Model for measurement and disclosure/reporting of intellectual capital (intangibles) within social science faculties from Czech public universities" project No. 402/09/1964 from Czech Science Foundation
  - "The Development and Evaluation of the Performance of Cluster Policies, of Clusters and their Members with the Usage of the Principles of Benchmarking" No. IGA/61/FaME/10/A Internal Grant Agency of Tomas Bata University in Zlín.
  - "CreaClust- A Cross-border Cluster Initiative for the Development of Creative Industry" – project nr. 22410420020 co-financed by the European Union and the European Regional Development.

*Languages:*

German: mother tongue,
English: proficient,
Czech: good,
French: basic skills.

*Hobbies and Interests:*

Travelling, Skiing, Reading, Jogging, Mountain biking, Tennis, Hiking, Concerts, Theatre, Opera.

# APPENDIX A

## Questionnaire:
## Informal Communication and Relations in a firm

**Role in the company:**

- Since when have you been employed in this company?
- Are you with your colleagues on a formal or informal communication basis?
- Are you working in a position with a lot of Stakeholder contacts (to customer, supplier, media...)?
- What kind of position do you enroll?
  - Self-dependent employee
  - Employee bound by instructions
  - Executive manager
  - Assistants
  - Other position
- Which department do you belong to?

**Communication in the Organisation:**

- How do you evaluate the communication within this organization, please tick all statements which are true according to your opinion.
  - Free and open communication is possible
  - Problems can be addressed directly
  - In general we talk a lot
  - Free communication is just possible on the same hierarchical level
  - The official communication channels have to be kept
  - Communication between employees in encouraged
  - Informal communication between the employees is NOT encouraged
  - Other answers
- How many hours per week do you communicate on average with your colleagues/contacts about professional (business)/private topics?
- How would you phrase a corporate mission for this company?

**Organizational Culture:**

- Which statements apply to this organization according to your experience?
  - authority, change, communication, community, creativity, diversity, environmental protection, equality, esteem, family orientation, financial gain, helpfulness, independence, innovation, joie de vivre, loyalty, moderate, obedience, pleasure, power, precision, proper behavior, recognition, respect, security, success, tolerance, tradition.

- Please spread in total 100 points on the following statements about the predominant characteristic of this organization:

  - The organization is like a big family.
  - The organization is a dynamic place.
  - The organization is oriented on results.
  - The organization is a controlled and structured place.

- Please spread in total 100 points on the following statements about the leadership-style in this organization:
  - The leadership-style is predominantly mentoring.
  - The leadership-style is characterized by entrepreneurship and readiness to assume risk.
  - The leadership-style is oriented on results.
  - The leadership-style is characterized by coordination and organization.

- Please spread in total 100 points on the following statements about the management-style in this organization:
  - The management-style is characterized by teamwork and cooperation.
  - The management-style is characterized by innovation and uniqueness.
  - The management-style is characterized by competitive ability, demand and performance.
  - The management-style is characterized by security and stability.

- Please spread in total 100 points on the following statements about the coherence in this organization:
  - Loyalty and trust holds this organization together.
  - Innovation and development holds this organization together.
  - Success and target-achievement holds this organization together.
  - Norms and rules hold this organization together.

- Please spread in total 100 points on the following statements about the strategy of this organization:
  - Human resource development is important in this organization.
  - New resources and tasks are central.
  - Performance and market share are in the centre.
  - Stability and efficiency are important in this organization.

- Please spread in total 100 points on the following statements about the definition of success in this organization:
  - Success is defined on the basis of human resource development, teamwork and commitment.
  - Success is defined on the basis of new products and innovation.
  - Success is defined on the basis of market share and market-leadership.
  - Success is defined on the basis of efficiency and cost reduction.

**Relations in the organization:**

- Please tick all colleagues in the list, with whom you share the specific relation. Per person several relational types are possible.
    - Relation 1: With this person I talk regularly about professional topics.
    - Relation 2: With this person I am cooperating on projects.
    - Relation 3: This person I ask for advice in professional matters.
    - Relation 4: With this person I talk regularly about private topics (Family, Hobbies...)
    - Relation 5: This person I meet in private for sport or leisure activities.
    - Relation 6: This person I would lend an amount of 200 Euro if needed.

**Personal / demographic questions:**

- General speaking, would you say that most people can be trusted or that one cannot be too careful?
    - Most people can be trusted
    - One cannot be too careful
    - I don't know
    - Other opinion

- Sex: male / female

- Year or birth: ____

- Which professional education did you complete?
    - Prof. / Technical Education
    - Apprentice / Trainee
    - Apprenticeship completed
    - Professional School completed
    - Degree from a University of Applied Sciences
    - University Degree
    - No professional education
    - Other

# APPENDIX B

## Questionnaire for a Team Workshop – Expert interview about the inter-organizational network and evaluation of network management

**Part I: Name generator:**

- Who are the most important customers of the company?
- Who are the most important suppliers and distributors of the company?
- Who are partners / contractors of the company?
- Who are the most important competitors of your company?
- Which contacts do you have to the local and national administration?
- Which contacts do you have to the public; to the media? Local and national?
- Do you have contacts at NGO's, NPO's, trade/ labour unions, professional associations?
- Who are you most important competitors in your field?
- Who are the owners/shareholders of the company?
- Please sort your contacts according to the segments: Customer, Supplier, Competitor, Administration, Public and Shareholder according to the relation you have to them closer or further from the centre/your company. A contact to which you have a really strong relationship should be located close to the centre and a contact, where only a weak relation exists, at the periphery of the network.
- Please chart the type of relation which links you and your contacts. The following four types of relations are available: formal, informal, trustful and critical.
- Can you identify relations between your contacts?
- Are you informed about relations that your contacts have to others (which are not your contacts)?
- Please look at your network: Are contacts/stakeholders missing?

**Case studies:**

- You are planning to generate a new project/ a new customer. From your experience you know that it is really difficult to win this customer/ project.
    - Can your network be helpful?
    - How would you use your network for winning this project/customer?
    - How far can you use your existing network?
    - Where it is necessary to develop your network?
- You have been informed through your network that a new legislative adjustment will be adopted, which would have negative consequences for your company.
    - How are you proceeding to avoid this legislative adjustment?
    - Which steps are you planning to be informed earlier about such legislative changes?

**Part II: Network management:**

- Is networking done in your company target-oriented? If yes, to what extend?
  - Level 1 (not target-oriented)- Level 10 (strongly target-oriented): _____
- Do you analyse your network?
  ☐Never ☐Seldom ☐Sometimes ☐Regularly ☐Often
  If yes, how? _____

- Which activities do you perform in order to align strategy, organization and technology in your intra- and inter-organizational network?
- Which activities do you perform for facilitating shared norms, values and visions within your company?
- How do you foster social integration? Intra-/Inter-organizational?
- Is there a possibility of informal communication for your employees?
- Which activities are you using for developing your network?
  - Direct Contact-acquisition: _____
  - Indirect Contact-acquisition: _____
- Is the network governance (fostering and control) in your company organized? If yes, how?
- How does the coordination of exchange of resources and information work in your intra- and inter-organizational network?

**Part III: Performance Measurement**

- Employees:
  - Churn rate in the last 3 years
  - Number of staff away sick in the last 3 years
- Customers:
  - Turnover in the last 3 years
  - Market-share in the last 3 years
- Process:

Is there a quality management within this organisation such as Six Sigma or TQM? If yes, which one?_____

- Financial Ratios:

Please insert the following financial rations for the last 3 years into the table:

  - Return on Equity (ROE): ROE = Net Income after taxes / Equity
  - Return on Assets (RoA): RoA = EBIT / Total Assets
  - Net Profit Margin: Net Profit Margin=Net Income/Net Sales (Revenue)
  - Debt-To-Equity Ratio = Debt (Liabilities)/Equity
- Please name the mission / vision of this company (in your own words): _____

# APPENDIX C

| | **Company 1** | **Company 2** | **Company 3** | **Company 4** | **Company 5** | **Company 6** | **Company 7** | **Company 8** |
|---|---|---|---|---|---|---|---|---|
| inner circle | 25 | 14 | 9 | 15 | 22 | 10 | 9 | 11 |
| medium circle | 23 | 12 | 28 | 23 | 5 | 4 | 7 | 13 |
| outside circle | 18 | 8 | 15 | 7 | 4 | 1 | 1 | 16 |
| Customers | 18 | 6 | 10 | 15 | 8 | 5 | 8 | 9 |
| Partners and Suppliers | 21 | 7 | 9 | 14 | 7 | 3 | 4 | 9 |
| Competitors | 10 | 6 | 14 | 5 | 2 | 2 | 0 | 8 |
| Public Administration | 9 | 1 | 6 | 1 | 7 | 1 | 4 | 6 |
| Public/Media/NPO | 3 | 7 | 11 | 8 | 6 | 2 | 1 | 8 |
| Shareholders/Owners | 5 | 7 | 2 | 2 | 1 | 2 | - | - |
| Total nr. of actors | 66 | 34 | 52 | 45 | 31 | 15 | 17 | 40 |
| Density (with Ego) | 0.05 | 0.21 | 0.11 | 0.09 | 0.11 | 0.27 | 0.28 | 0.10 |
| Density (only Alteri) | 0.02 | 0.16 | 0.08 | 0.05 | 0.06 | 0.16 | 0.19 | 0.06 |
| Formal Ties | 27 | 210 | 244 | 8 | 89 | 20 | 62 | 128 |
| Informal Ties | 65 | 20 | 40 | 131 | 4 | 18 | 24 | 24 |
| Trustful Ties | 90 | 16 | 14 | 49 | 23 | 26 | 0 | 12 |
| Critical Ties | 42 | 0 | 4 | 2 | 0 | 0 | 0 | 4 |
| Ties in total | 224 | 246 | 302 | 190 | 116 | 64 | 86 | 168 |
| Ties between Alteri | 92 | 178 | 208 | 100 | 54 | 34 | 52 | 88 |

# APPENDIX D

| SNA code | Cluster name | Region | Founded in | No. of members |
|---|---|---|---|---|
| C1 | Plastikářský klastr | Zlín Region | 2006 | 28 |
| C2 | OMNIPACK<br>Klastr výrobců obalů | Hradec Králové Region | 2005 | 59 |
| C3 | NANOMEDIC | Hradec Králové Region | 2006 | 24 |
| C4 | Clutex<br>klastr technické textílie | Liberec Region | 2006 | 22 |
| C5 | ENVICRACK - klastr obnovitelných zdrojů energie | Moravian-Silesian Region | 2005 | 26 |
| C6 | Národní strojírenský klastr | Moravian-Silesian Region | 2003 | 57 |
| C7 | Moravskoslezský automobilový klastr | Moravian-Silesian Region | 2006 | 50 |
| C8 | Moravskoslezský dřevařský klastr | Moravian-Silesian Region | 2005 | 29 |
| C9 | IT Cluster | Moravian-Silesian Region | 2006 | 53 |
| C10 | Klastr českých nábytkářů | South Moravian Region | 2006 | 37 |
| C11 | EKOGEN | South Bohemian Region | 2006 | 18 |
| C12 | Český nanotechnologický klastr | Olomouc Region | 2006 | 15 |
| C13 | Water Treatment Alliance | South Moravian Region | 2006 | 16 |
| C14 | CEITEC Cluster - bioinformatics | South Moravian Region | 2006 | 26 |
| C15 | Knowledge Management Cluster | Moravian-Silesian Region | 2010 | 31 |
| C16 | CZECH STONE CLUSTER | Hradec Králové Region | 2006 | 25 |
| C17 | Dřevařsko-nábytkářský klastr | Zlín Region | 2007 | 20 |
| C18 | Klastr Aquarius | Ústí nad Labem Region | 2005 | 9 |
| C19 | Moravskoslezský klastr cestovního ruchu | Moravian-Silesian Region | 2008 | 32 |
| C20 | Český IT klastr | South Bohemian Region | 2009 | 15 |
| C21 | Klastr NUTRIPOL | Hradec Králové Region | 2009 | 15 |
| C22 | Klastr přesného strojírenství Vysočina | Vysočina Region | 2007 | 17 |

| | | | | |
|---|---|---|---|---|
| C23 | Hydrogen - CZ | Moravian-Silesian Region | 2006 | 11 |
| C24 | Hradecký IT klastr | Hradec Králové Region | 2008 | 19 |
| C25 | Klastr obecného strojírenství | South Bohemian Region | 2008 | 76 |
| C26 | Klastr MedChemBio | Olomouc Region | 2009 | 26 |
| C27 | Moravskoslezský energetický klastr | Moravian-Silesian Region | 2008 | 17 |
| C28 | CzechBio - asociace biotechnologických společností ČR | Central Bohemian Region | 2008 | 30 |
| C29 | CREA Hydro&Energy | South Moravian Region | 2008 | 16 |
| C30 | Energoklastr | South Moravian Region | 2008 | 20 |

# APPENDIX E

| ID | **Cluster** | **Region** | No. of Members | Founded in |
|---|---|---|---|---|
| 1 | Life Science Austria Vienna Region | Vienna | 0 | 2002 |
| 2 | Automotive Cluster Vienna Region | Vienna | 133 | 2001 |
| 3 | ATTC - Austrian Traffic Telematics Cluster | Vienna | 25 | 2003 |
| 4 | RTCA - Rail Technology Cluster Austria | Vienna | 35 | 2005 |
| 5 | Vienna IT Enterprises / IT-Cluster | Vienna | 193 | 2004 |
| 6 | InitialFactor | Vienna | 13 | 2010 |
| 7 | Kunststoff-Cluster | Lower&Upper AT, Salzburg | 418 | 1999 |
| 8 | Lebensmittel Cluster Niederösterreich | Lower Austria | 82 | 2006 |
| 9 | Bau.Energie.Umwelt Cluster Niederösterreich | Lower Austria | 195 | 2001/2003 |
| 10 | Logistik Cluster, NÖ | Lower Austria | 76 | 2009 |
| 11 | Mechatronik-Cluster NÖ | Lower Austria | 322 | 2010 |
| 12 | Lebensmittelcluster OÖ | Upper Austria | 247 | 2000 |
| 13 | Möbel und Holzbaucluster OÖ | Upper Austria | 273 | 2000 |
| 14 | Automobilcluster OÖ | Upper Austria | 200 | 1998 |
| 15 | Ökoenergiecluster | Upper Austria | 203 | 2000 |
| 16 | Gesundheitscluster | Upper Austria | 222 | 2002 |
| 17 | Mechatronik Cluster OÖ | Upper Austria | 322 | 2003 |
| 18 | Netzwerk Design & Medien OÖ | Upper Austria | 75 | 2004 |
| 19 | Netzwerk Humanressourcen | Upper Austria | 106 | 2006 |
| 20 | Verein Netzwerk Logistik | Upper Austria | 349 | 1996 |
| 21 | Umwelttechnik-Cluster | Upper Austria | 106 | 2006 |
| 22 | Netzwerk Energieeffizienz | Upper Austria | 0 | 2009 |
| 23 | Holzcluster Salzburg | Salzburg | 1290 | 2000 |
| 24 | Netzwerk Design & Medien, Salzburg | Salzburg | 75 | 2004 |
| 25 | Energienetzwerk Salzburg | Salzburg | 0 | 2009 |

| | | | | |
|---|---|---|---|---|
| 26 | GIS Cluster Salzburg | Salzburg | 14 | 1999 |
| 27 | Holzcluster Tirol | Tirol | 95 | 2003 |
| 28 | Cluster Life Science Tirol | Tirol | 47 | 2003 |
| 29 | Cluster Mechatronik Tirol | Tirol | 69 | 2004 |
| 30 | Cluster Wellness Tirol | Tirol | 122 | 2003 |
| 31 | Cluster Gesundheit Osttirol | Tirol | 52 | 2005 |
| 32 | TechnoGate | Tirol | 41 | 2004 |
| 33 | Cluster Erneuerbare Energien Tirol | Tirol | 84 | 2004 |
| 34 | Cluster Informationstechnologien Tirol | Tirol | 111 | 2008 |
| 35 | Cluster Qualitätsbetriebe Tiroler Niedrigenergiehaus | Tirol | discontinued | 2005 |
| 36 | V-Pack Verpackungsland Vorarlberg | Vorarlberg | 25 | 2007 |
| 37 | IG Passivhaus | Vorarlberg | 284 | 2001 |
| 38 | v.a.i – Vorarlberger Architektur Institut | Vorarlberg | 396 | 1997 |
| 38 | werkraum bregenzerwald | Vorarlberg | 92 | 1999 |
| 39 | me2c - [micro] electronic cluster | Corinthia | 42 | 2000 |
| 40 | Software Internetcluster | Corinthia | 40 | 1999 |
| 41 | ACstyria Autocluster | Styria | 186 | 1995 |
| 42 | Holzcluster Steiermark | Styria | 145 | 2001 |
| 43 | Human.technology Styria | Styria | 81 | 2004 |
| 44 | Materialcluster Steiermark | Styria | undisclosed | 2001 |
| 45 | ECO WORLD STYRIA | Styria | 156 | 1998 |
| 46 | Creative Industries Styria | Styria | 7 | 2007 |
| 47 | TECHFORTASTE.NET | Styria | 52 | 2007 |
| 48 | ICT Burgenland | Burgenland | 31 | 2004 |
| 49 | Kunststoff-Cluster Burgenland | Burgenland | 20 | 2006 |
| 50 | Ökocluster | Styria | undisclosed | 1997 |
| 51 | Verein NETZWERK Arbeit Gesellschaft | Lower&Upper AT&Salzburg | 108 | 1998 |