

SONEAN



Connecting The Nodes

The influential networks behind Germany's largest listed companies (DAX-30) *

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Introduction

Our latest research examines the influential social networks that connect executive managers and non-executive directors in Germany's largest 30 listed companies.

We hereby analyze 4500+ social ties that connect 395 managers and directors (not including employee representatives in the non-executive board), uncovering unique insights about the social fabric of the DAX-30 organizations, and the relevant people as well as institutions (core actors) connecting these entities.

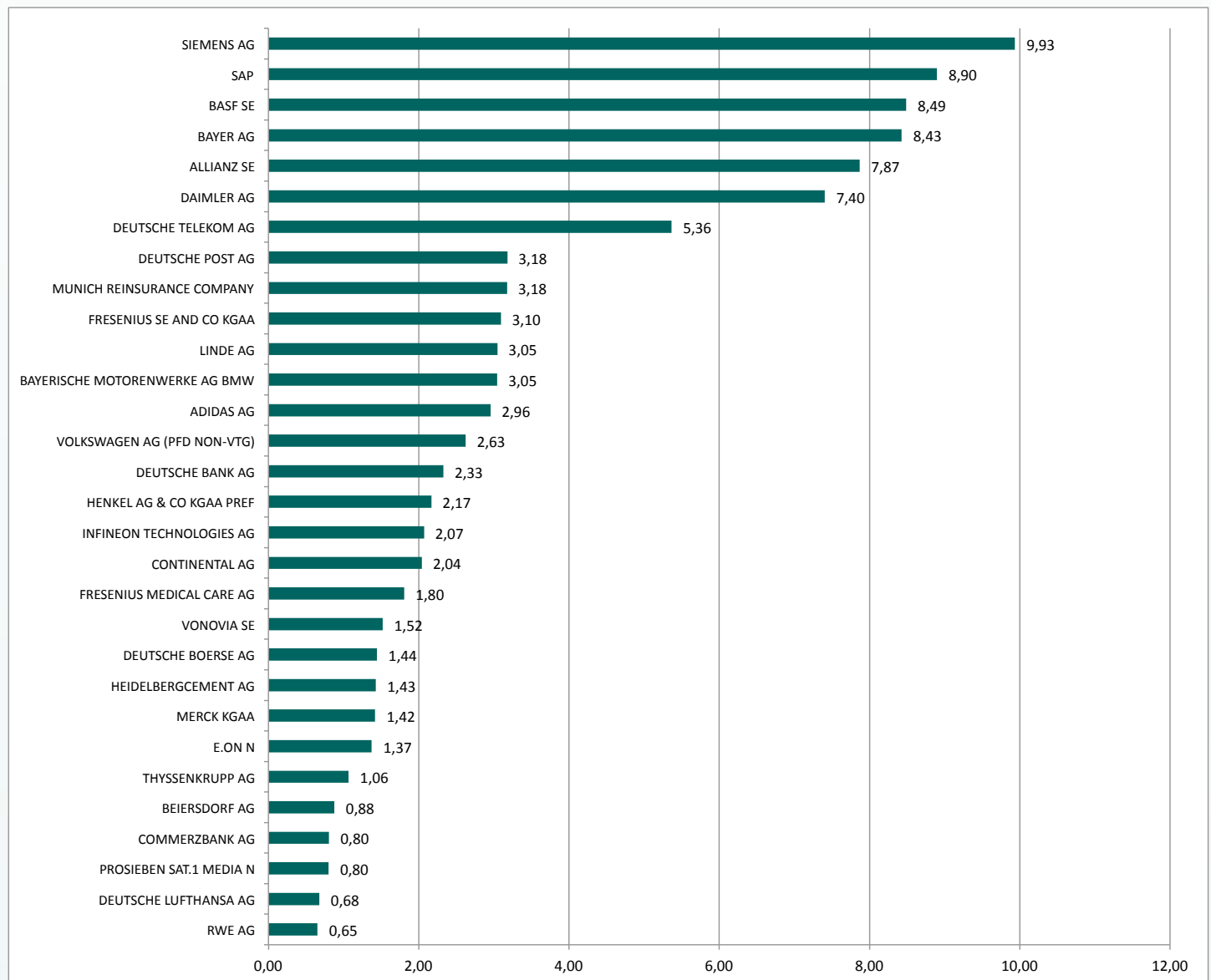
We follow a multiple tie approach, researching and analyzing not just school or university related ties (where did these people go to school or study?) but also include their professional career (where did they work in the past and which companies connect them with their peers?) as

well as other institutional ties (foundations, associations, lobby groups, governments, military, clubs, NGOs, standard setters, and other relevant organizational links).

We provide detailed insights into the institutions driving the executive networks among DAX-30 companies but also about the organizational networks behind the boards (i.e. non-executive directors).

A special focus is dedicated to the role of network diversity, i.e. the unique ties that executive (managers) and non-executive directors bring to the company and thus provide greater social capital. We hereby also highlight the unique ties by company and their executive managers as well as non-executive directors and show that the diversity discussion, which is currently being led by policy makers, investors, and shareholders alike, needs to go well beyond traditional measures such as gender, age,

Chart 1 – Market capitalization of DAX-30 companies as of 28 November 2016



and e.g. ethnicity. Diversity of social ties is crucial when it comes to innovativeness as well as performance of the company.

Particular attention is paid to women serving executive management and non-executive boards of the DAX-30 companies. Our data reveals some significant findings about these women and shows that prior and existing social ties between male and their female decision makers are a potentially a crucial reason for hiring women into the job. The research further unveils some clear patterns about women's roles.

Background

The DAX-30 companies overall

Chart 1 on page 2 shows relative market capitalizations of DAX-30 companies (their weights in the DAX-30) as of 28 November 2016. These 30 companies are the basis of our social network related study. According to this overview Siemens is the largest position in the DAX-30 representing 9,93 % of the index.

Since 2013 SONEAN has analyzed the social ties that connect executive managers and non-executive directors in Europe's largest companies. Our paper "The Social Dependence of Independent Directors in Europe's largest Companies" (see <http://www.sonean.com/research-publications/#c48>), showed not only how independent directors were

socially dependent but also gave unique insights into the largest 50 European companies and the network dynamics behind those organizations that ultimately affect shareholders and stakeholders alike.

In this latest research we looked at Germany's largest listed 30 companies (DAX-30). Based on our prior data, and over a period of 6 months, a team of very well trained researchers analyzed the multiple ties that each of the executive and non-executive directors hold, and the institutions they are connected to. Hereby we identified 395 unique people, executive and non-executive directors of the DAX-30 companies (not considering the employee representatives on the board for various reasons) and researched in great detail their past and existing ties to organizations (universities they went to, trustee boards they sit on, associations or foundations they are linked to, lobby groups, prior jobs, government related advisory roles, board positions they hold and many other). As you can see below in table 1 for the executives we identified 1446 ties and for non-executive directors 3131 connections. What was immediately obvious is that on average non-executive directors tend to have almost double the amount of connections and in line with prior research span boundaries between institutions.

Women held only 10.71% of the executive positions, and more striking is that none of the women holds a CEO or CFO position (by the end of October 2016). Furthermore the majority of their positions are in human resources (41%). Overall, if you disregard employee representatives on the non-executive board, women will

Table 1 – Descriptive statistics related to executive and non-executive directors in the DAX-30

No. of management and board seats occupied by women	95	20,79 %
No. of management and board seats occupied by men	362	79,21 %
No. of management (executive) positions held by women	21	10,71 %
No. of board (non-executive) positions held by women	74	28,14 %
No. of management (executive) positions held by men	175	89,29 %
No. of board (non-executive) positions held by men	189	71,86 %
No. of executive (manager) positions including men and women	196	
No. of non-executive (director) positions including men and women	263	
No. of organizations that executives are linked to	1446	
No. of unique organizations that executives are linked to	1079	
No. of organizations that non-executives are linked to	3131	
No. of unique organizations that non-executives are linked to	2689	
Average unique ties that executive managers hold	5,61	
Average unique ties that non-executive directors hold	10,48	

hold **28.14% of non-executive positions and 20,79 % of all positions (including management and board positions).**

It is striking to see the absence of women in executive boards (only 10.71 % of positions are occupied by women), and more importantly despite this absence, women typically pursue non-CEO and non-CFO functions which tend to be less influential. CEO and CFO positions are mainly reserved for men at this stage.

An important aspect is also the selection of women into the executive and non-executive boards. **We analyzed the past and existing connections of the women in the DAX-30 companies and identified that at least 62 % of the executive and non-executive positions are occupied by women who have prior and existing multiple ties that connect them to the male board members.** We say at least as there is probability that we might have overlooked existing links (missing ties) and that the real number is much higher. This gives us the impression that most women are extensions of male networks and that the selection process is not necessarily an objective one but very much dependent on the level of connectivity of the women in management and on

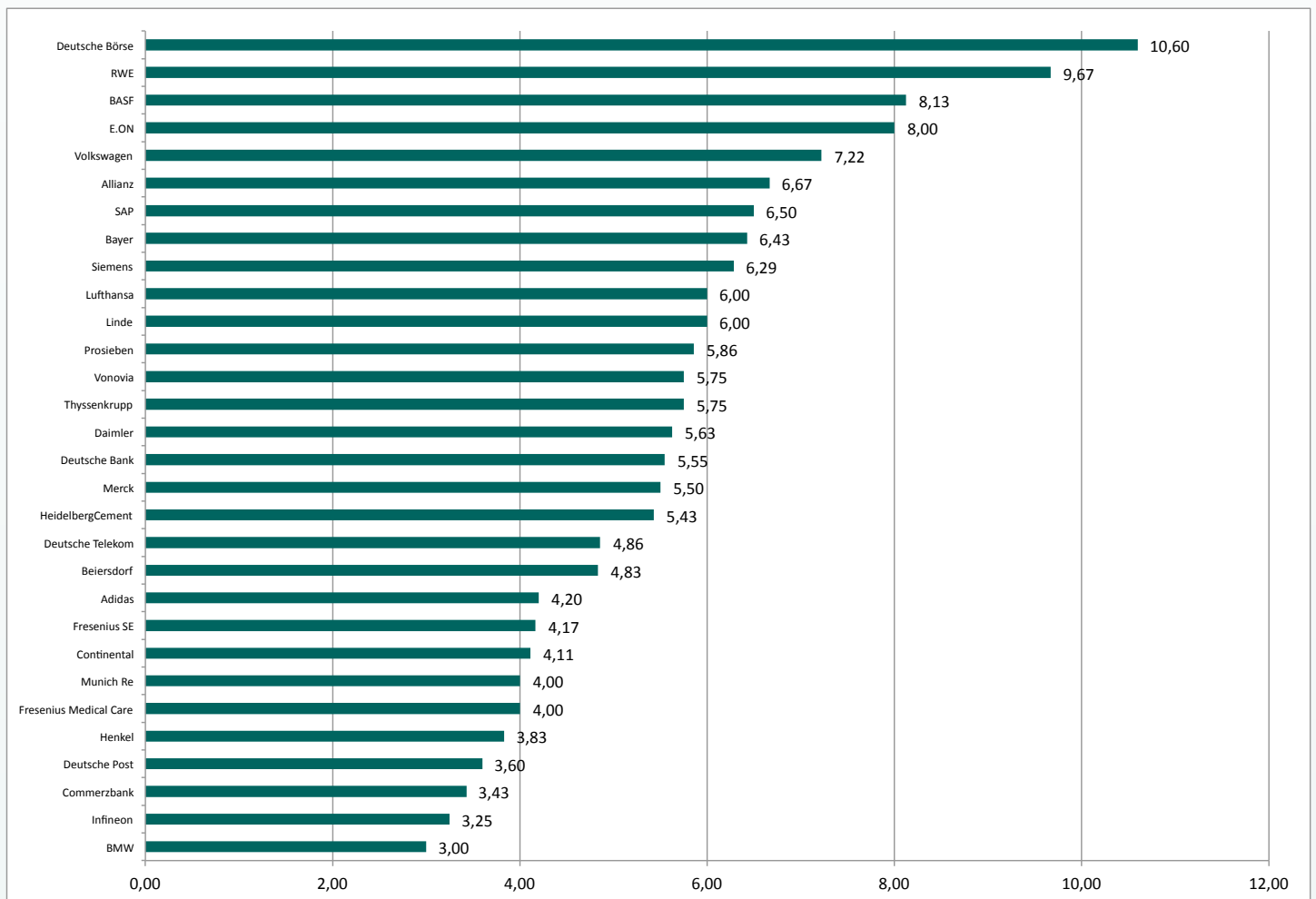
boards. The more ties women have to existing male managers and non-executive directors the higher the likelihood seems that they will receive a job. Ideally though, it should be the women who fit the job best that receive the positions and not necessarily the ones connected, and who are potentially mere extensions of male networks.

Regulators, investors, and market participants should be aware of these dynamics.

Unique ties of executive managers

When you analyze the unique ties that individual managers bring to the executive management of the respective companies then you will find large differences between the individual organizations. Hereby we have focused on unique organizational ties that managers bring to the board, and which are complementary and not overlapping with other executive’s existing and prior connections. A BMW executive e.g. on average only holds 3 unique ties (based on prior education, jobs or other institutional links) while Daimler executives on average hold 5.63 unique ties (the data is normalized by the size of the executive management).

Chart 2 – No. of unique connections that executive managers bring to their DAX-30 companies



This can have many reasons:

- 1) People at BMW have more company specific ties, having worked at BMW for a long time, and are less connected outside the BMW network
- 2) The ties that executives at BMW hold are more overlapping (therefore not unique) making them more alike, i.e. homogeneous than e.g. their peers at Daimler.

Network heterogeneity has a value as people are able to tap into more social capital, are less inward looking, less homogeneous, and potentially more innovative. The list shows the differences among the DAX-30 companies in relation to this very relevant metric. (See chart 2 on page 4)

Unique ties of non-executive directors

When you consider the average unique ties that a non-executive director brings to the board and thus her/his exclusive and complementary networks, BASF is certainly leading the way with 15.83 unique ties per

board-member complementing his/her peers. Beiersdorf on the other hand has a less diverse non-executive board which in the previous case (mentioned when we discussed executive managers) can have similar reasons. Here being a family driven company can also lead to less diversity as people on the board will have similar backgrounds and networks and thus potentially reduce diversity. (See chart 3 below)

The Top 30 institutions behind the DAX-30 executives

When you look at the DAX-30 management boards (see chart 4 on page 6) from a network perspective, i.e. consider the organizational ties that connect executive/managers (i.e. where they have worked before or where they studied), the weighting of the DAX-30 gets a different dynamic. Daimler e.g. is dominating the DAX-30, which means that in most cases DAX-30 executives will have a Daimler connection. Why is this relevant? Well when executives have worked or are connected to a company like Daimler e.g. through a board membership their learning and social ties will very much affect Daimler's business success. As Daimler

Chart 3 – No. of unique connections that non-executive directors bring to their DAX-30 companies

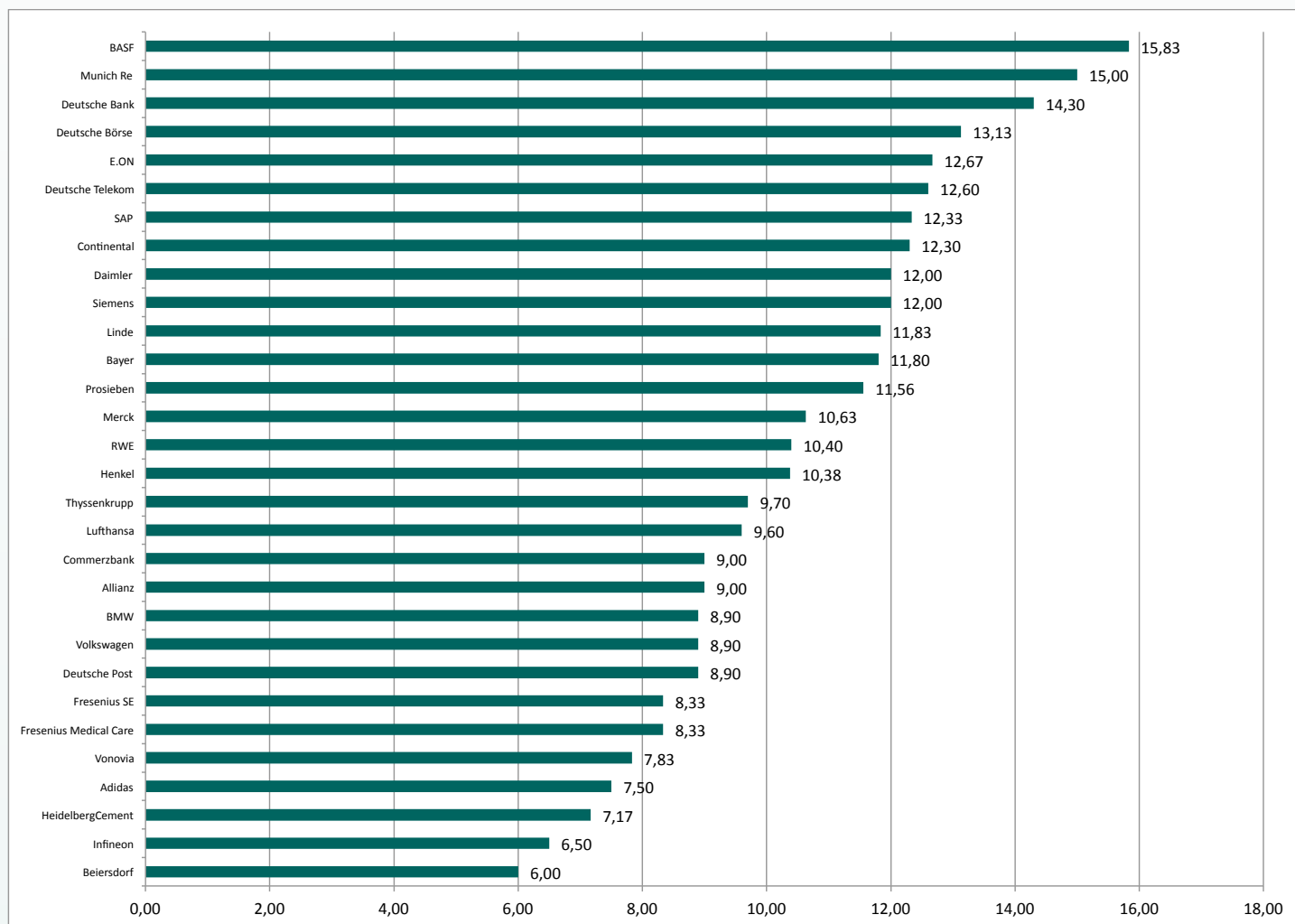
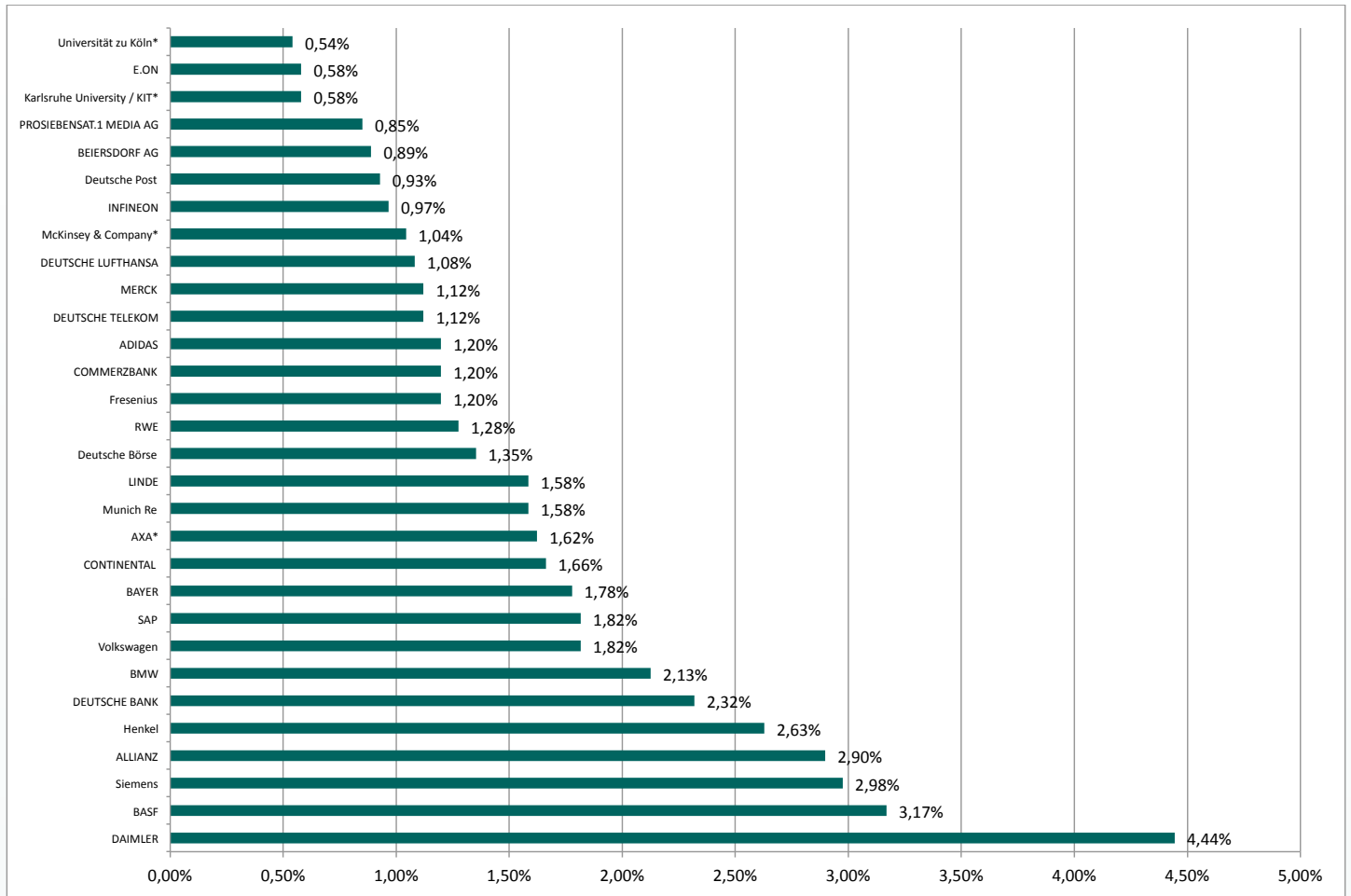


Chart 4 – What are the institutions that connect DAX-30 executives?



provides a dominant network of people this will affect other DAX-30 companies’ potential co-operations with Daimler or even their attitude towards Daimler. An important example is McKinsey which as you know is “not” a DAX-30 company but has a strong alumni base among DAX-30 organizations as prior employees today run DAX-30 companies and are part of their executive management. Being part of the DAX-30 network provides McKinsey a considerable advantage over its competitors such as BCG or Deloitte/Monitor as the boards literally speak their language, i.e. ex McKinsey people run these executive boards, and have a higher likelihood to bring on McKinsey in respective projects. (See chart 4 above)

The Top 30 non-DAX-30 institutional networks behind the DAX-30 executives

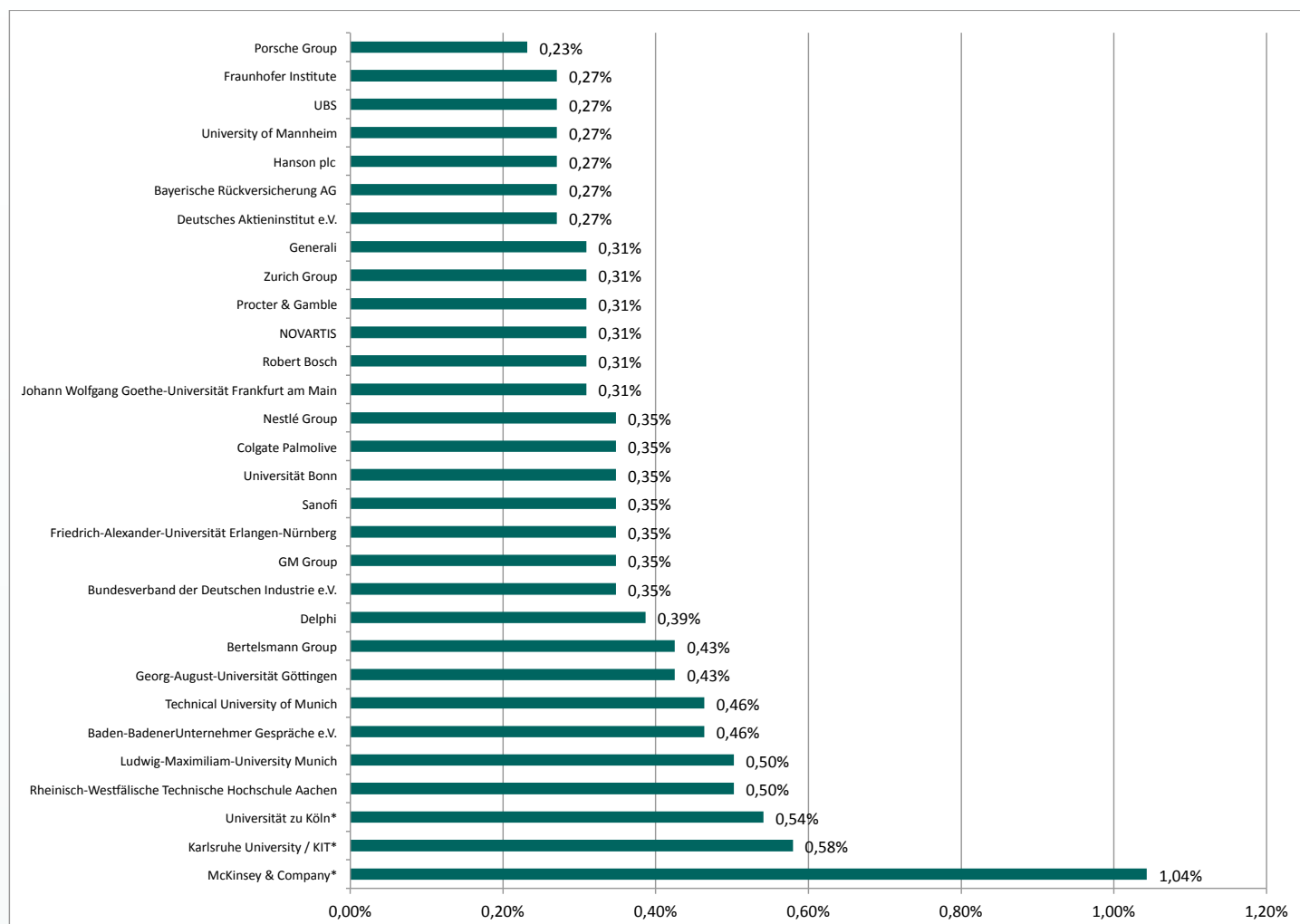
If you leave out the DAX-30 companies and focus only on the non-DAX-30 institutions that connect executive managers in the DAX-30 you will see that McKinsey is clearly the largest identifiable network behind non-DAX-30 companies followed by educational institutions such as KIT, Cologne University (Universität zu Köln), and RWTH Aachen where

executives were trained. A very important vehicle to connect executives is their roles in the “Baden Badener Unternehmer Gespräche e.V.” and as you can see the non DAX-30 networks also include players such as the Bertelsmann Group which has people that ultimately joined DAX-30 institutions but also other lobby groups such as the Bundesverband der Deutschen Industrie (BDI) e.V.

The overview also reveals the top training institutions, among the executives with most having been trained at Karlsruhe University which had merged with Karlsruhe Institute of Technology (KIT), followed by the University of Köln (as stated earlier), RWTH Aachen, LMU Munich, TU Munich, University of Göttingen, University of Nürnberg, University of Bonn, Frankfurt University, and University of Mannheim. So the top ten universities behind the DAX-30 executives (where they have been trained) are entirely German. (See chart 5 on page 7)

Top 30 institutions in the DAX-30 based on non-executive directors’ prior and existing networks

If you look at the DAX-30 from the network perspective behind non-executive directors controlling the companies it is surprising to see how

Chart 5 – What are the non-DAX-30 institutions that connect DAX-30 executives


the dominant networks change. While non-executive directors with existing and former Allianz ties dominate the boards, existing and former Lufthansa employees have carved out a nice niche for themselves and providing the fourth largest network behind the DAX-30. Thus even if Lufthansa plays a minor role in terms of market capitalization of DAX-30 companies, its existing and prior executives have a thorough network in the non-executive boards of DAX-30 companies. The same is true for Robert Bosch which is not a DAX-30 company but constitutes a major network behind DAX-30 organizations. Surprisingly Accenture is also more present at the non-executive board level of DAX-30 companies while it is literally absent at the executive management level where McKinsey dominates as a consultant. (See chart 6 on page 8)

Top non-DAX-30 institutions in the DAX-30 based on non-executive directors' prior and existing networks

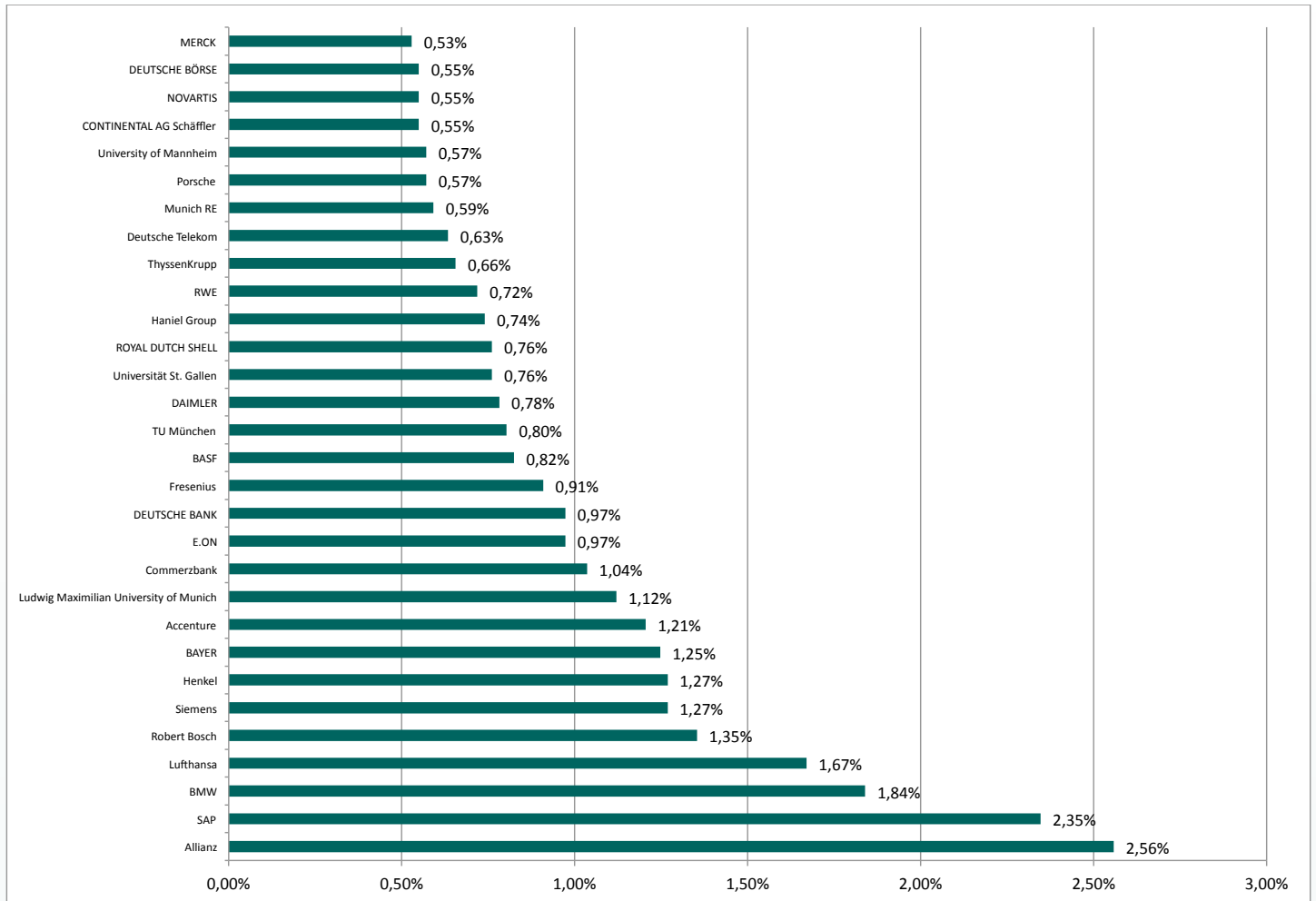
As stated earlier Robert Bosch (executives in the DAX-30 with prior and existing ties to Robert Bosch) is a relevant network behind DAX-30

companies, the same is true for family owned companies such as e.g. Haniel. Auditors such as KPMG, which seems to be better connected at the non-executive board level than its auditing peers (the other Big-4 members), will potentially profit from its network in the DAX-30.

What is very surprising at the non-executive level is still the dominance of LMU Munich (Ludwig Maximilian University) and TU München (Technische Universität München) graduates which gives both training institutions considerable presence among both executives (as seen earlier) and the non-executive board of German companies. University of St.Gallen is literally ranked no.3 and the first international school in the network, followed by University of Mannheim, University of Münster, University of Göttingen, Harvard University, University of Bonn, and University of Cologne (Köln).

Lobby Groups such as the Bundesverband der Deutschen Industrie (BDI), and ACATECH are also main sources of potential non-executive directors. (See chart 7 on page 9)

Chart 6 – What are the institutions that connect DAX-30 non-executive directors?



The Top 30 institutions behind the DAX-30 executives – a network perspective

The *network graph no.1 on page 9* nicely shows how the DAX-30 companies are connected with each other through their executives (pink anonymous circles). As stated earlier McKinsey is quite central at the executive level and former employees now dominate respective boards. Again, the pink circles represent the anonymous executives connecting the organizations with each other seamlessly. The proximity of nodes/dots also gives an indication about which companies are close to each other based on similar ties. This can e.g. be seen nicely in the case of Henkel Group that has solid ties to Adidas or Volkswagen which is linked to Daimler based on executives who worked for both institutions. (See *network graph no. 1 on page 9*)

The Top 30 institutions behind the DAX-30 non-executives (directors) – a network perspective

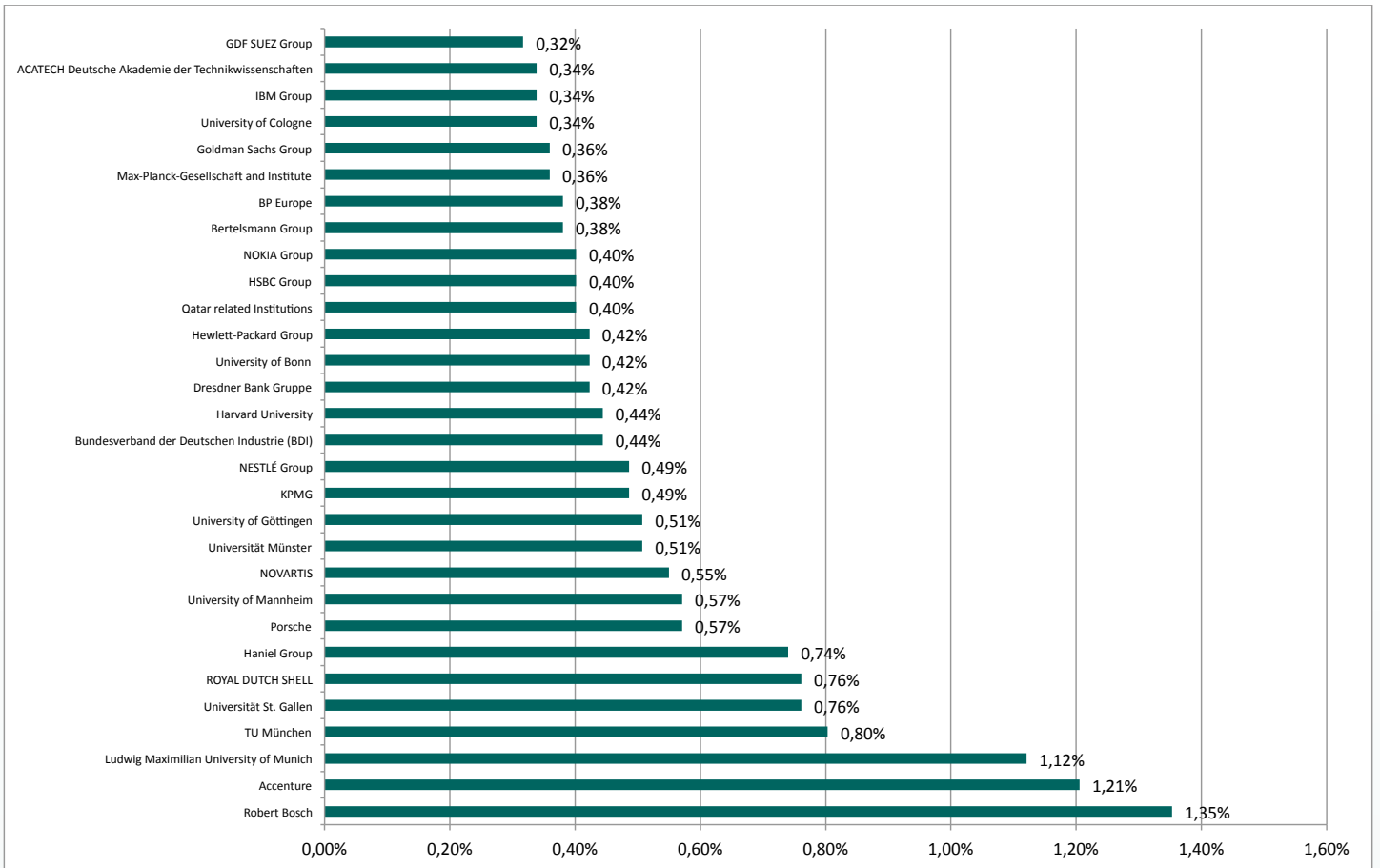
Network graph 2 on page 10 gives you a nice overview of the non-executives (anonymous red circles) connecting the organizations at the board level. As mentioned earlier former and existing Allianz people are

dominating these boards followed by players such as SAP AG, BMW, Lufthansa or even non-DAX-30 companies such as Robert Bosch. Tie proximity, i.e. the closeness of companies to each other is also an indication of overlapping non-executives which link those institutions to each other. (See *network graph no. 2 on page 10*)

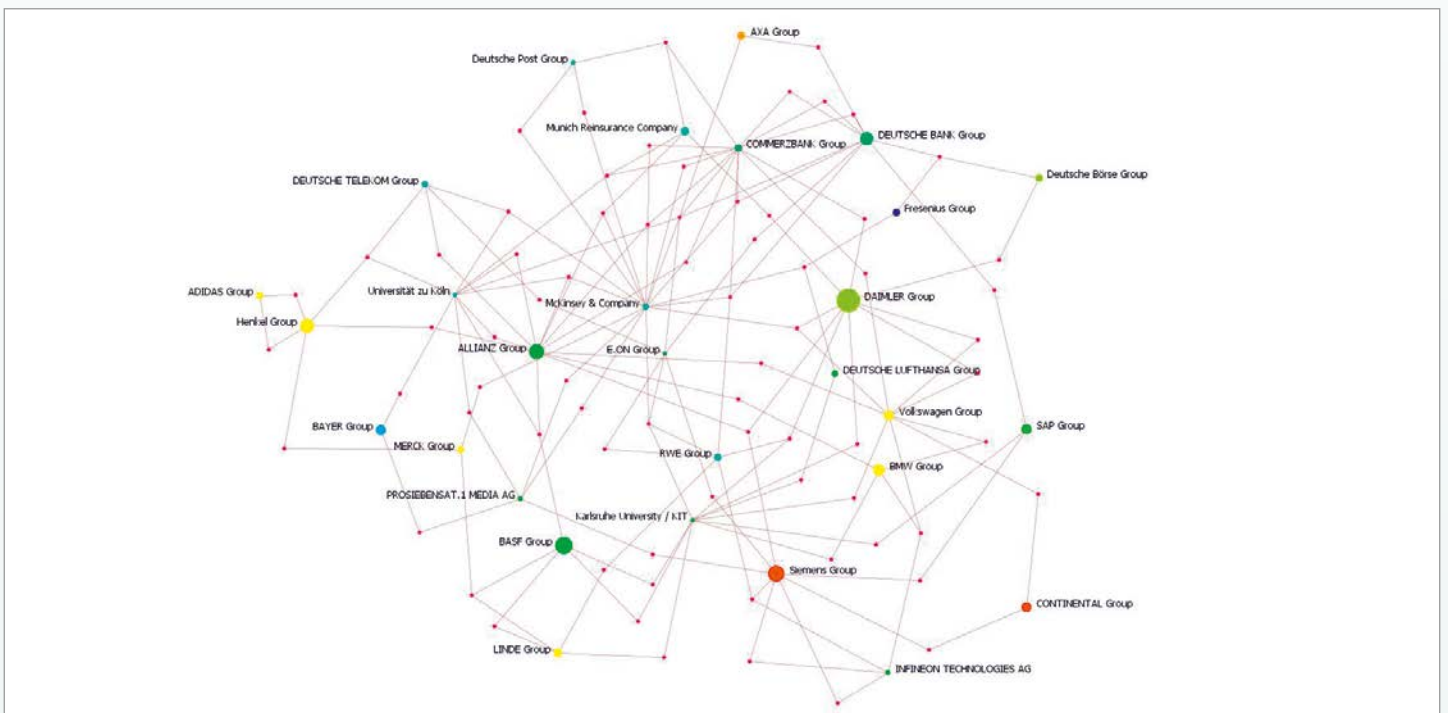
Summary

Investors and shareholders alike should consider social network related data when it comes to decision making, and complement financial as well as non-financial factors (such as environmental, social and governance related ones) with network related data when taking decisions. This will help them to move away from an isolated perspective when looking at companies and see them and their people as part of a broader ecosystem in which they are embedded, and thus get the big picture. Focusing on the people behind institutions helps to anticipate their moves but also understand their interdependence, and how existing as well as prior ties can shape entire strategies and decisions taken by large organiza-

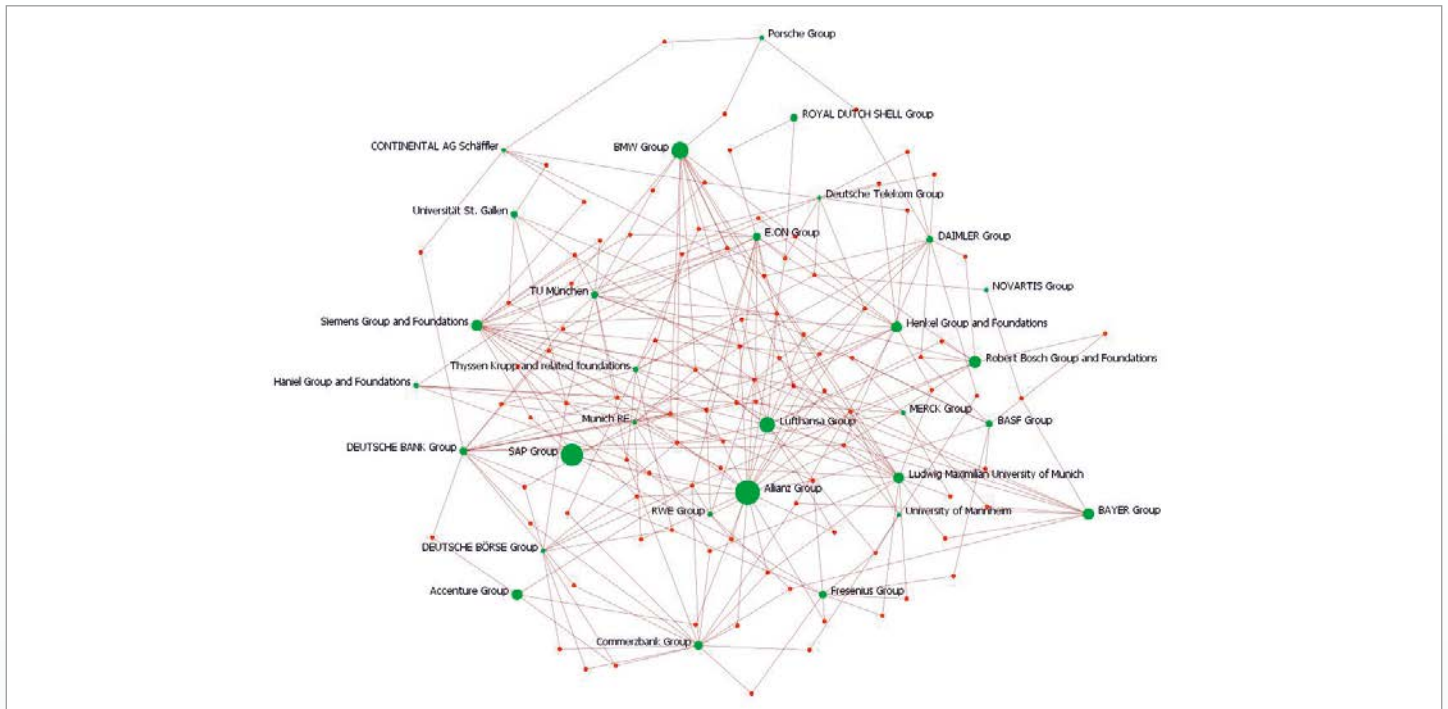
Chart 7 – What are the non-DAX-30 institutions that connect DAX-30 non-executive directors?



Network graph 1 – The executive managers that connect DAX-30 companies



Network graph 2 – The non- executive directors that connect DAX-30 companies



tions (whether related to hiring of executive and non-executive directors, M&A activities, creation of new businesses, corporate governance, strategic alliances etc.). Thus social network related data is crucial and complements existing financial and non-financial data. This latest DAX-30 paper shows the importance of considering the social ties that bind people, even when it comes to the role of women in executive and non-

executive boards, and shows that the current diversity discussion has to go well beyond traditional diversity measures to really understand the dynamics and influential factors behind organizations. People are ultimately social animals and not considering the social networks in which they are embedded will create inferior results when it comes to decision making and setting the framework for a sound and sustainable system.

About SONEAN

Decision makers like executive and non-executive directors, investors or creditors e.g. face a world inherently defined by complexity and continuous change, where uncertainty is prevalent, volatility the norm and ambiguity omnipresent.

Today, they need to rely on a breadth of dynamic and actionable intelligence; sharp insights from vast amounts of data which are systematically connected in a meaningful way, analyzed and interpreted to identify, contextualise and reveal the implications of relevant developments in their competitive and external environment.

SONEAN tackled this problem by taking corporate and investor intelligence further than anyone before: we've gone beyond the scope of traditional financial and non-financial (ESG) data, to create, analyze and monitor a perpetually improving map of our client's ecosystem applying social and meta network related analysis.

Our Ecosystem Intelligence taps into all relevant sources to develop a tailored ecosystem map including our client's customers, competitors, as well as all other stakeholders like governments, NGOs and universities affecting our client's success.

Ecosystem Intelligence allows our team to monitor developments in the whole ecosystem, better identify threats and opportunities and provide our client with a unique and revealing embedded perspective. Social network analysis, and how we uniquely apply and pioneered it globally, acts hereby as a backbone. We thus bring the social network perspective into our clients' ongoing decision making.

Disclaimer

The vast information which forms the basis of this paper has been obtained from multiple public sources (publications, social media, trade registries, and many other ones) believed to be reliable and was extensively verified, cross checked and validated. SONEAN however does not warrant its accuracy or completeness. The opinions represent our judgement based on data collected until 30 October 2016 and are subject to change without notice in line with ongoing developments.

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