In Search for Small-World Network at New Connect*

*Michał Zdziarski***

Abstract

Interlocking directorates enable exchange of information and resources between two or more firms that are linked by a director who participates in their boards. The relationships of multiple firms linked by interlocking directors are among classic network studies in organizational science. The aim of this paper is to verify empirically if the small world phenomenon is present in the interlocking directorates network of small and medium size companies that were listed on the Polish alternative investment market of the Warsaw Stock Exchange – New Connect. The unique study field of the research presented enables the development of theory on the crossroads of institutional, network and entrepreneurship theories.

Keywords: interlocking directorates, alternative investment market, social network analysis, network cohesion, small-world network, entrepreneurship**.**

Introduction

An interlocking directorate exists when "one person affiliated with one organization sits on the board of directors of another organization" (Mizruchi 1996: 271). Interlocking directorates enable exchange of information and resources between two or more firms that are linked by a director who participates in their boards. The phenomenon of interlocking directorates has been extensively studied from the early twentieth century. It has become a major area of research in management, sociology and political science, and has been investigated across different countries, cultures and governance systems. The main theoretical tradition of these studies in management science is resource dependence theory (Pfeffer/Salancik 1978). The existence of an interlocking directorate serves as a proxy for a firm's access to resources and information, co-optation of stakeholders, and signaling of legitimacy to external audiences. Interlocking directorates were among the most popular proxies of relationship among companies studied by management scholars, alongside alliances and joint ventures (Borgatti/Foster 2003).

The distribution of the number of interlocks in empirical studies tends to be highly skewed with relatively few prestigious directors being invited to serve on many boards, while most directors serve in only one board position. Distribution of interlocks leads to emergence of the small-world network phenomenon in

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which most nodes are highly clustered in small, connected subgroups, and relatively few nodes link otherwise isolated clusters. The aim of this paper is to verify empirically if the small-world phenomenon is present in the interlocking directorates network of small and medium size companies that were listed on the alternative investment market New Connect. Earlier interlocking directorates studies in Poland looked at the main market of the Warsaw Stock Exchange (Zdziarski, 2012).

Research on the empirical evidence of small-world networks have been conducted in several markets including Germany (Kogut/Walker 2001; Conyon/ Muldoon 2006), the Netherlands and Switzerland (Heemskerk/Schnyder 2008), the Scandinavian countries (Sinani, et al. 2008), the United States (Davis, et al. 2003) and Poland (Sankowska/Siudak 2016). These studies have been conducted on interlocking directorates among large corporations, listed on main capital markets of a country, with the notable exception of the study by Sankowska and Siudak (2016), in which data from both the main and the alternative market were aggregated in a single network dataset. All the above studies confirmed that the small-world phenomenon is present among interlocking directorates networks. Their authors observed a combination of a high degree of clustering as compared to random networks of similar size and density, and low scores of average path length as compared to random networks. The small-world networks emerged in other inter-personal, and inter-organizational phenomenon such scientific and artistic collaboration networks, industry alliances, and social networks (Uzzi, et al. 2007).

The unique contribution of this paper is in inquiring whether these network properties observed in earlier studies will hold true in the interlocking directorates network among small and medium size companies that are listed on the alternative investment market. The alternative investment market allows smaller companies to float their shares with more flexible regulatory and information requirements than those applicable to the main market, where large, blue chip companies are listed. 419 small and medium companies were floating their shares on New Connect as of December 2015.

Interlocking Directorates

In his review of interlocking directorates research, Mizruchi (1996) refers to several possibilities of why they are created that include: collusion, cooptation and monitoring, legitimacy, career advancement, and social cohesion. Within the career advancement theoretical explanations, it is acknowledged that although interlocks create relationships between firms, they are formed by individuals. Thus formation of interlocks depends on individual willingness to join a board, as well as on firms' intention to invite an individual to become new director. Both choices are likely to be driven by strategic motives (Siudak/ Sankowska

2015). Firms are likely to invite trusted, experienced and well connected directors who are likely to offer valuable strategic advice and signal high governance standards to investors. Candidates would be more willing to join the board of a firm that is able to obtain access to external resources, enjoys high levels of legitimacy, and bears little reputational risks. These motives, along with social cohesion mechanisms, should impact the distribution of interlocking directorates making them heavily skewed.

The interlocking directorate phenomenon can be analyzed through several theoretical lenses. The main theoretical tradition of interlocking directorate studies in management science is resource dependence theory (Pffefer/Salancik 1978; Mizruchi, 1996). Resource dependence theorists claim that the main driver for establishing a relationship among firms through an interlocking directorate is a need to provide access to scarce and valuable resources available in the environment of a firm. Access to external resources limits uncertainties, risks and power dependencies of a company and thus should lead to better results. Despite the fact that this claim is relatively intuitive, researchers are struggling to provide unequivocal results of relation between interlocking directorates and results (Mizruchi 1996). Studies aiming to check if broken interlocking directorate ties are replaced revealed that accidentally broken relationships were restored in a small percentage of cases (Palmer 1983). This findings were interpreted as evidence that interlocking directorates were not formed for strategic motives of companies aiming to limit their power dependencies, but rather are individual phenomena serving mostly the interests of directors. However, some of the incidentally broken ties were restored with other institutions in the same industry, which supports an alternative hypothesis. Resources limiting power dependency are restored form alternative sources, and thus the power dependence motivation matters (Mizruchi/Stearns 1988).

Another stream of research on interlocking directorates takes a different theoretical perspective of elite theory (Mills 1956). Proponents of this approach characterize directorate interlocking as a form of cohesion of business elites (Useem 1984). Elite theorists analyze network connections most often on the individual level, rather than the firm level analysis which is more common in resource dependence theory studies. This is driven by the observation that accidentally broken ties were rarely renewed with the same company, as evidence that inter-organizational relations are secondary to the relations formed by members of the same social group (Ornstein 1984). Recent studies of elite networks suggest the implosion of national interlocking directorates networks (Heemskerk 2007; Chu/Davis 2015). This phenomenon can be partially explained by the observed emergence of trans-national interlocking directorates networks, signaling business elite cohesion beyond national borders (Carroll et al. 2010; Heemskerk 2011).

A more recent theoretical approach that is increasingly applied in interlocking directorates takes a complex network perspective to characterize the overall social structure as a "small-world" (Uzzi et al. 2007; Kogut/Walker 2001; Conyon/Muldoon 2006). This type of investigation aims at demonstrating that empirical networks of directors and boards show different properties of clustering and average path lengths from those observed in random networks of similar size and density. These properties of small-worlds networks imply important consequences for the social phenomenon of interlocking directorates : a clique or clubby structure of the overall network enables high levels of trust and exchange in small sub-groups of directors, while short paths enable the rapid spread of practices, ideas and rumors in the overall structure (Conyon/Muldon 2006:1322). Research in this tradition has shown that small-world properties are consistent across different geographies and variances of capitalisms (Sankowska/Siudak 2016).

Several researchers aimed to verify the relationship between interlocking directorates and companies' financial performance. The theoretical motivations to expect such a relationship include: reduced cost of information exchange, partial stabilization of access to key resources, optimization of control processes, the possibility of joint lobbying, increased legitimacy and faster spread of innovations. Surprisingly these intuitive theoretical expectations were confirmed only in a relatively small portion of the research (Mizruchi 1996). Recent studies suggest that this can be explained by different levels of uncertainty that firms need to deal with, which was not accounted for in earlier studies on linking performance to interlocking directorates. Uncertainty positively moderates the relationship between interlocking directorates and performance – there is no evidence for a relationship between interlocks and performance in low uncertainty environments, while in highly uncertain environments this relationship is positive (Martin/Gözübüyük/Becerra 2015).

Research Methods

Methods of social network analysis were applied in this paper (Wasserman/Faust 1994; Batorski/Zdziarski 2009). In particular, two-mode network analysis was used to study interlocking directorates among companies that were listed on the New Connect Market. Interlocking directorates belong to a class of social situations that bring together two sets of entities that are linked together by participation in certain events. Common examples of such situations include countries' memberships in international institutions, social activists gathered at protests, scientists citing the same papers, women attending the same parties, and directors participating in boards of companies. These social situations vary in nature: some are enduring while others more tentative. In some situations, actors are expected to interact quite intensely, while in others participation is treated as an opportunity for interaction with only a minor probability that two actors will ac-

tually deal with each other. Despite these differences in nature, social situations in which actors (countries, activists, scientists, women or directors) are related if they participate in the same events (memberships, protests, paper citations, or parties) are commonly studied with a common methodological approach of modeling them as two mode networks, also called affiliation networks or bi-partite networks. Modeling two mode networks is distinct from more common analysis of social network with only one type of nodes is several aspects that include:

1) relationships in a two mode network occur only between two types of modes that are present in the network, and nodes of the same type are not directly connected
2) the nature of relationships is that it connects sets of actors rather than individual ones
3) the duality of perspectives on the social situation under analysis that can be approached at different levels of analysis (Faust 2005)

Two modes in the present study are directors and boards. Several network measures and procedures were applied to characterize network cohesion and to confirm if the network under research has small-world properties. In particular, the size, density and component structure were measured at three levels of analysis: two mode network, and its projection into two one mode networks, namely the network of directors and the network of boards. These properties enable one to describe network cohesion – a structural property that has important theoretical implications for opportunities and constraints that are present in the network.

Small-world network characteristics are present if there exists a combination of high degree of clustering and low scores of average path lengths between nodes present in the network (Watts/Strogatz 1998). If a network is not connected in such a way that a path of relationships links any two nodes present in this network, small-world properties are analyzed based on the properties measured for the giant component – the largest set of connected nodes present. Measures of clustering coefficients and average path length from the empirical network are compared with their equivalents measured for a random network of similar size and density (Watts/Strogatz 1998). In detecting the small-world properties of a network based on its giant component, there is an implicit expectation that it characterizes the network under analysis to exhibit properties of being heavily clustered but connected by short paths. There is no clear threshold what size of the giant component in proportion to the overall network makes it possible to determine if a network has small-world properties. A convention to call a component small if it has less than $n^{2/3}/2$ nodes where n is number of nodes in the network and large if it has at least $n^{2/3}$ nodes may serve as reasonable guidance of components that include non-vanishing fractions of nodes (Jackson 2008: 98).

Structural cohesion is the extent to which the social relation of nodes hold it together. The cohesion thus is a continuous concept measured at the group level that is zero for the collection of individual nodes and increases as relationships among nodes are formed and the density of a network increases. The group cohesion construct was operationalized, as the minimum number of nodes, that if removed will disconnect the group (Moody/White, 2003). This construct is applied in examining the cohesion of the giant component, and the second largest component in the network of boards connected by directors.

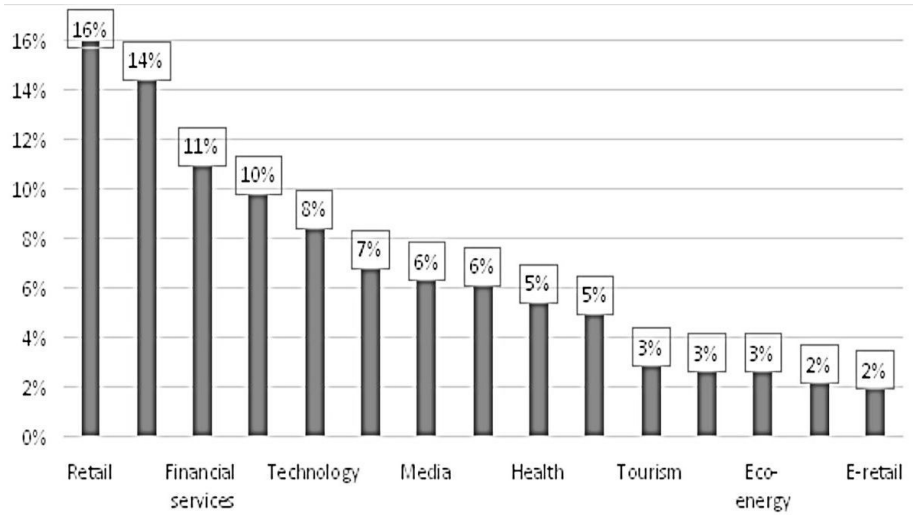
The empirical context of the presented research is a network constructed of all firms listed on the alternative market in Poland and their board members. The Polish alternative market called "New Connect" was created in 2007, and thus a unique opportunity to study a network of firms listed in new stock exchange institution emerged. The census approach was used, and due to the fact that research from a single country is presented it was possible to control for any confounding variables that can potentially bias the structural properties of observed phenomenon. While the observed results are only valid for one national institution and cannot be generalized, they enable theory building and formulation of a hypothesis about the unique structural properties of interlocking directorates among entrepreneurial firms. For further generalizations, hypotheses proposed in the conclusions of this paper need to be verified in further empirical studies.

Results

In search for a small-world network a census research was conducted on the alternative market in which firms trade their shares at Warsaw Stock Exchange – New Connect. The census type of research is rarely possible due to the high costs of aggregating the data and constraints in data availability. This study relies on archival data on all members of the supervisory and executive boards of firms listed on New Connect, which were collected in March 2015 based on information from The National Court Registry in Poland and the Warsaw Stock Exchange register of publicly traded companies. The complete population sets of 419 firms and 2902 directors were included in the census. Jointly they represent 3321 network nodes that are linked by interlocking directorate relationships. In their earlier study of thesmall world of interlocking directorates phenomenon in Poland, Sankowska and Siudak (2016) included in their sample 442 companies listed on the NewConnect in 2014. Different sizes of the sample in this study versus Sankowska and Siudak are due to the fact that some companies were delisted or moved to the main market.

As we can see in the figure above, the largest segment of firms listed at New Connect market is retail, which represents 16% of all companies present in the Polish alternative market. Other frequent segments are non-financial and financial services, IT and technology: together 43% of firms are present in these four segments. Market capitalization of firms listed at New Connect was in the range of 0.04 to 90.53 million Euros, with a median value of 1.79[1].

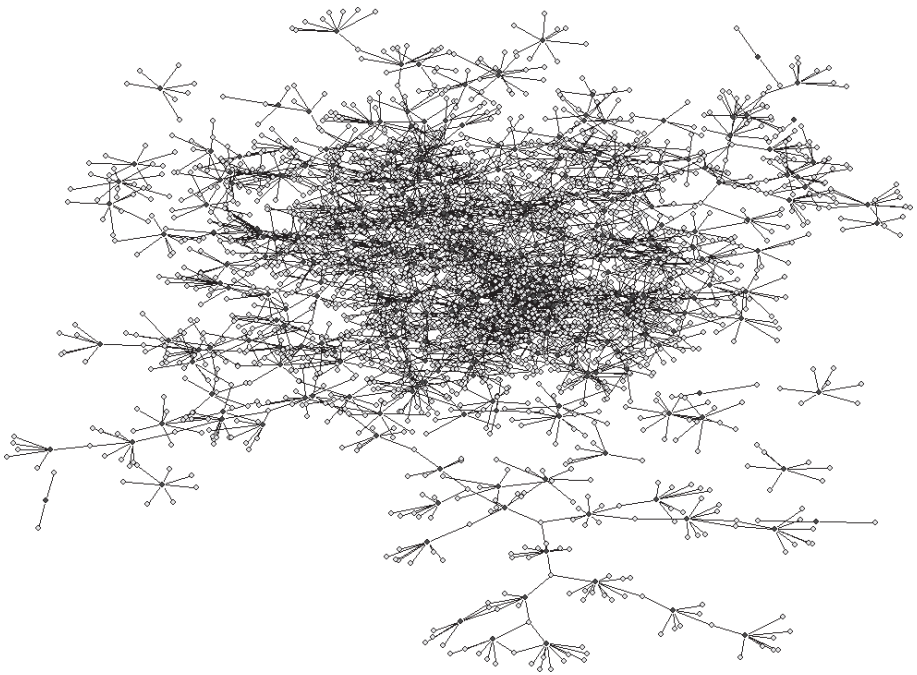
Figure 1. Industries' distribution on the alternative market New Connect in 2015. Author's own work based on statistical data from the New Connect market available at www.newconnect.com



Firms in the analyzed network are connected if they share at least one director. Directors are connected if they have seats in at least one board of any company from the dataset. 3321 connections are present in the observed network either among directors or firms. Only 33 connections or approximately 1% of all observed are not single, meaning that at least two directors have seats in at least two firms from the dataset. The average degree, or the average number of adjacent nodes in the network is approximately two. The network of interlocking directorates on the New Connect market is presented in the figure below:

1 http://www.newconnect.pl/index.php?page=statystyki_roczne Accessed 2016-11-08.

Figure 2. Interlocking Directorates on the alternative market New Connect in 2015. Author's own work in Pajek software using Kamada-Kawai layout. Directors are represented as white circles; firms are represented as black circles. Network relationships are represented as lines.



The average distance among reachable pairs of nodes, consisting of directors and firms linked by a chain of connecting relationships is 12.3 relationships. The longest connecting chain in the network, called network diameter, consists of 34 relationships. It connects directors visible at the far right and left sides of the figure above. The practical meaning of such long chain as conduits through which information and resources can potentially flow is rather limited. If, for example, we would observe a phenomenon that transmits through shortest paths in a network, with high probability of 0.9 that it passes between any pair of nodes, the cumulated probability that transmission will be successful through a path of 34 nodes is less than 3%. We should rather interpret the high length of the shortest path as the evidence that parts of the network would be relatively isolated from each other, a feature that creates barriers to diffusion of practices and information through network ties, and limits its cohesion. We can observe small structures consisting of only one firm and few directors serving on its board that are isolated from a larger network. An example of such a small structure, which is the evidence that a firm does not share any of its board members with any other company listed at New Connect, is visible in the upper left corner of Figure 2.

Figure 3. Directors network on the alternative market New Connect in 2015. Author's own work in Pajek software using a Kamada-Kawai layout. Boards are represented as black circles; network relationships are represented as white lines.

Density, a measure of the proportion of the number of observed relationships to graph a theoretical number, if all nodes were connected equals 0.0028. This measure is often used to compare networks. It is worth pointing out that one may not reasonably expect to observe a fully connected network of interlocking directors. For such a network to occur, the boards of all 419 firms should consist of all 2902 directors present in the dataset, which would be an absurd expectation. Density tends to decrease quickly with the size of the network, therefore we should not interpret that 0.0028 is unexpectedly low. Earlier research on interlocking directorates in Poland conducted on all firms from both the main and alternative markets reported a density values of a similar order for networks among firms (0.003) and directors (0.001) (Sankowska/Siudak 2016: 313).

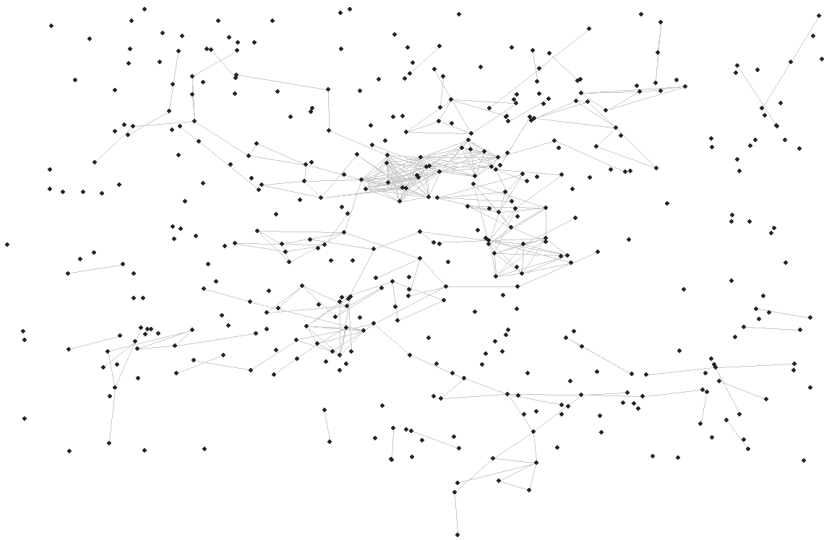
The network of 2902 directors is presented in the Figure 3 above. Directors are connected if they serve on the board of a company together. The fact that directors are nested in board structures introduces the clustering tendency. As a result, the clustering coefficient measure that indicates the probability of a network actors in direct neighborhood of a node to be connected equals 0.97 in the observed network. The maximum possible clustering coefficient if all nodes were connected is 1. We can therefore state that a network is highly clustered, which is one of properties of the small-worldliness of a network. The average distance among reachable pairs of nodes in the network is close to 6. The average degree of a node is 7.7, and the total number of ties present in the network is 11.124. Sankowska and Siudak (2016) reported an average director in their sample had 8.79 direct relationships, which suggests two possible explanations: boards of

companies are larger on average in their sample due to large companies which tend to have bigger boards, and directors may have more interlocks on average as directors of large companies that are more prestigious and thus invited to more boards. Indeed boards, of directors in the sample studied here have 6.92 members on average, while in Sankowska and Siudak's sample the average size of the board is 7.8 directors. The number of interlocks is also higher if one aggregates data from the main market and the alternative market: 1.2 on average versus 1.14. For a random network of similar size and average degree of nodes, created with Poisson distribution of ties, the distance among reachable pairs is a bit smaller then in the empirical network and equals 4.13. The clustering coefficient of the random network is much smaller from the empirically studied one and equals 0.003. These initial observations seem to confirm the hypothesis that a network of directors has small-world properties. However, the observed and the random networks also differ in the number of unreachable parts that exists for each of them. For empirical directors network, this equals 8170154 pairs, while in the random network it equals only 5802 pairs. The network of directors is thus much more fragmented then the random network of equal size and density.

Clearly, though not well visible in Figure 3 above, the empirical network of directors is not fully connected and there must be many components of separate boards that do not share directors with any other boards in this network. Separation of boards, and small sub-groups of boards, can be seen better in Figure 4 below. It represents a different level of analysis of the interlocking directorates phenomenon among the firms listed on New Connect- the network of boards. It is created through transformation of the two mode network into the network of boards that are represented in the figure as single points in space. Boards are connected if they share a common director that is represented as a white line.

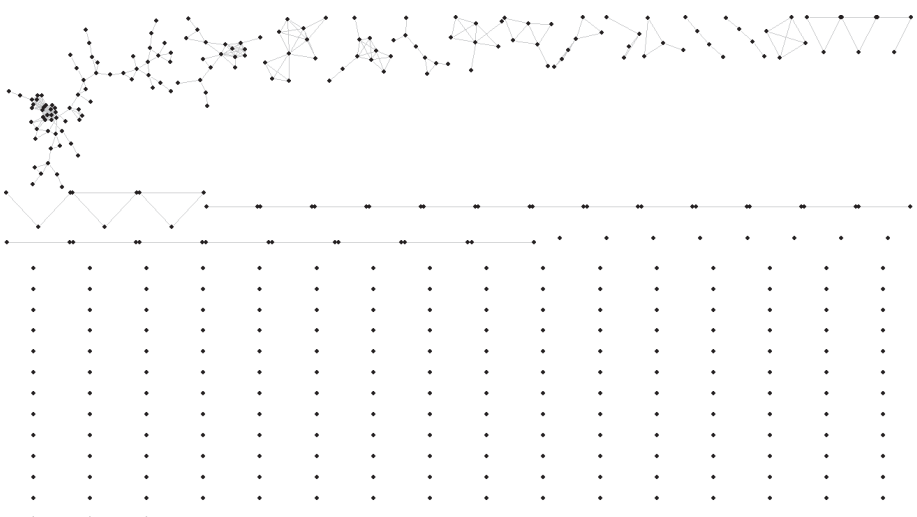
We can observe that several boards in Figure 4 are network isolates – they are not connected to any other board. The isolates count returns 245 boards that do not have any tie to other boards in the dataset, which represents 58% of the total population. Earlier studies of the interlocking directorates among companies listed on the Warsaw Stock Exchange reported smaller proportions of firms that are isolates, or a higher proportion of boards that are part of the giant component. For example, in their research on 902 companies that were listed either on the main floor of the Warsaw Stock Exchange or its alternative market New Connect, 521 boards or 58% of the population was connected in the giant component of the network (Siudak/Sankowska 2015). In the remaining 42% of the population, both isolates and boards connected in smaller components were present.

Figure 4. Boards network on the alternative market New Connect in 2015. Author's own work in Pajek software using a Kamada-Kawai layout.



To further investigate the group structure of the boards network among firms listed at New Connect, the network was partitioned into weak components of at least two boards related by a common director. 40 such components were identified and are presented in Figure 5 below.

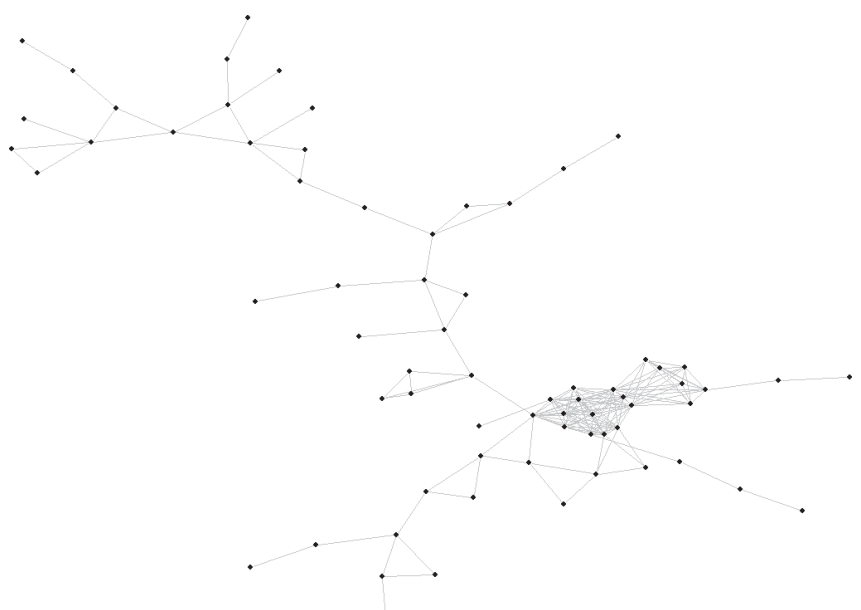
Figure 5. Component structure of boards network at New Connect. Author's own work in Pajek software using a Kamada-Kawai layout.



We can observe in Figure 5 that the giant component in the upper-left corner of the chart, in which boards were marked in red, is relatively small compared with the overall network. It consists of 70 nodes for which a chains of relationships exist, such as every pair of nodes can be reached by a path consisting of interlocking directorships among companies. Less than 17% of the total population of boards are present in the giant component. This perhaps is the key observation in this paper, as it is not possible to reasonably argue that network has small-world properties based on the observations of only a small fraction of its nodes that are present in the giant component. The empirical network is highly fragmented and not cohesive at all. The second largest component visible to the right in Figure 4 consists of only 19 boards connected by chains of interlocking directorship relations. There are 10 components of four boards or more in the analyzed network. The theoretical threshold that is used to determine if the component is small or large indicates that we only have one large component in the network – the giant component, and all other components are small. For number of nodes in our network n=419 $n^{2/3}$ equals 59 and $n^{2/3}/2$ equals 34.5.

To further investigate group cohesion, relationships among boards in the giant component of the network are presented in Figure 6 below.

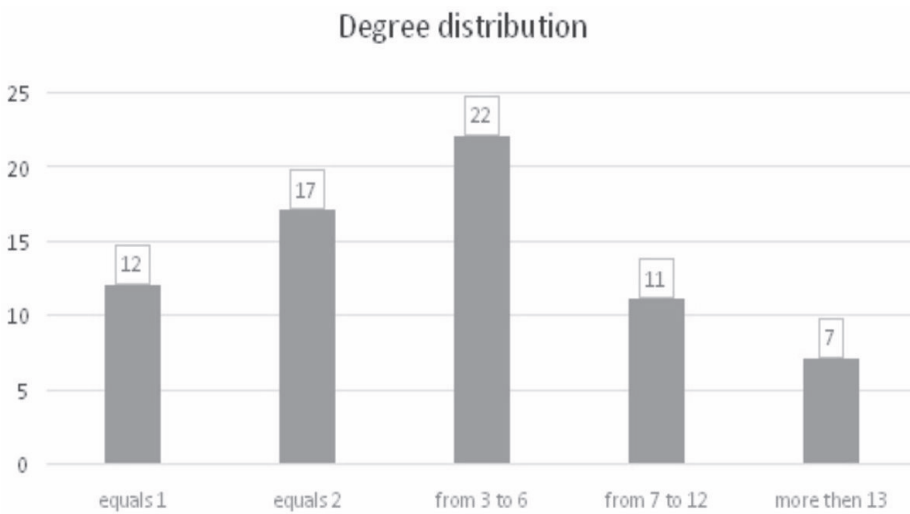
Figure 6. Giant component in boards network at New Connect. Author's own work in Pajek software using a Kamada-Kawai layout.



We can observe the presence of very long chains of relationships in the giant component. The network diameter in the giant component is 16, which is rather

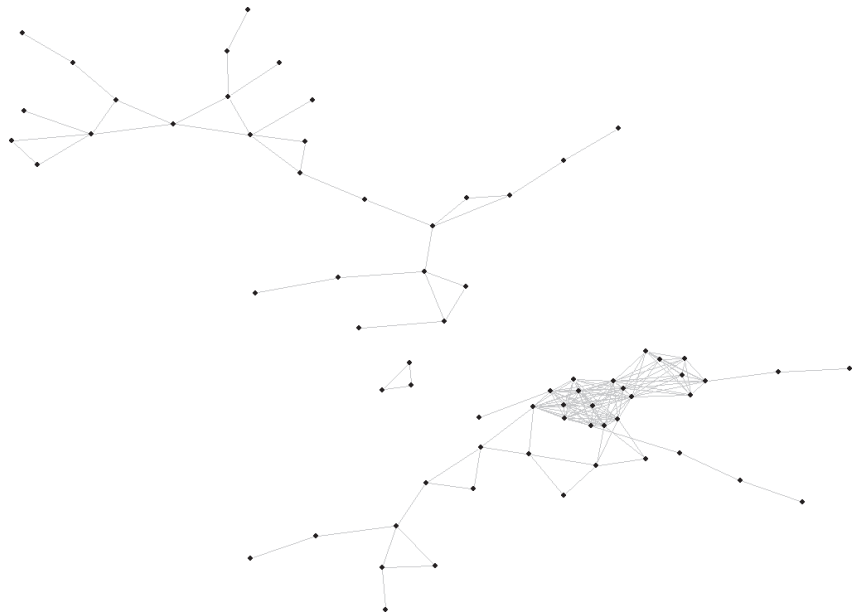
large for a network of only 70 nodes. The statics of inclusiveness, which is a proportion of nodes having at least one connection to all nodes present in the network, equals 51.55% as compared to 70.65% in the sample from Sankowska and Siudak's study (2016). Two cohesive subgroups in which many nodes are connected to all other nodes, and thus strongly clustered that are visible in the network above, on the right side of the graph. A large proportion of boards that are present in the giant component has only one or two interlocking directorship relationships. The structural position of boards that are part of densely connected clusters and those that are connected by weak ties to only one or two other boards are quite different and we may expect variance in access to resources and information within the giant component. This observation further supports the finding that the network of interlocking directorates among small and medium size companies listed at New Connect is not cohesive. The degree of distribution of nodes in the giant component is summarized in Figure 7 below.

Figure 7. Degree distribution in the giant component of the boards network. Author's own work.



12 boards of companies that are present in the giant component are connected only to one network. Breaking the tie for such a board would make it an isolate and the giant component would decrease to 69 nodes. To examine group cohesion in the giant component, a more important role is played by 17 nodes which have degree of two – they are connected to two other nodes in the network. Following Moody and White (2003), group cohesion is operationalized as the minimum number of nodes, that if removed will disconnect the group. In our case, this minimum number equals 1, and the result of removal of exactly one node is presented in Figure 8 below:

Figure 8. Giant component boards network after a removal of a single node. Author's own work in Pajek software using a Kamada-Kawai layout.



Removal of one node caused disaggregation of the giant component, and two smaller sub groups of connected nodes of almost equal size emerged. The size of the giant component would decrease from 70 to 37 vertices if only one interlock were removed. In reality, such a situation may occur when the term of a director interlocking two firms ends in one of them, or if a firm is delisted from New Connect. It is enough to have just one board removed to have no large components present in the analyzed network. This final observation confirms earlier findings of very low cohesiveness of the observed network, in which small-world properties are not present in its current stage of development.

Conclusions

Earlier empirical research confirmed existence of the small-world phenomenon in interlocking directorates among boards of companies across countries and institutional settings in Australia, Brazil, Canada, Chile, Denmark, France, Germany, Israel, Italy, Korea, Mexico, the Netherlands, Norway, South Africa, Spain, Sweden, Switzerland, Poland, Taiwan, the United Kingdom, and the United States (Sankowska/Siudak 2016). These findings suggested that small-world properties appear to universally occur in networks of boards linked by interlocking directors among big corporations across geographies and cultures. It was also confirmed in the research on the small-world properties of interlocking directorates listed on the Warsaw Stock Exchange in which data on boards of

firms listed on the alternative market New Connect were aggregated with data on large companies listed on the main floor of the Warsaw Stock Exchange. The unique finding of this paper is that the network of boards linked by interlocking directors among small and medium size firms does not have small-world properties. Directors from small and medium size companies form less interlocking directorates on average, which results in a network of boards that is less characterized by much lower inclusiveness then observed in the study by Sankowska and Siudak (2016). In consequence, the network of boards is fragmented into 40 components of size 3 or more, and the proportion of nodes that belong to the giant component to all nodes in the network is less than 17%. This finding alone proves that there is no small-world in the observed network as most pairs of nodes are disconnected from each other and cannot possibly use interlocking directorates to access and transmit resources and information. In addition, average path lengths among nodes in the giant component are rather long, and it can be easily broken into smaller subnetworks with no large component present if just one tie is removed – a property indicating low levels of cohesion among nodes that are present in more densely connected parts of the network.

The lack of cohesion and small-world properties of interlocking directorates among firms listed on New Connect has important practical implications for firms. In particular, it signals low levels of social capital, which is among critical strategic resources providing competitive advantage (Lin 2001). Firms lacking social capital have limited access to external resources and information from their environment (Johnson et al. 2013). Owners should consider strategically inviting directors from firms that are uniquely connected in a giant and other largest components, as they may benefit from reaching out to otherwise disconnected subgroups. Lack of cohesion thus creates an opportunity for strategic action that would uniquely position a firm as a boundary spanner that may take advantage of high levels of bridging social capital (Borgatti 2005).

At the institutional level, the lack of small-world properties in the network of firms causes slow adaptation of new practices (Powell 1990). We may expect that the lack of short paths among clustered boards negatively influences the overall innovativeness of the firms as they are not exposed to ideas and practices from other entrepreneurial firms. This expectation should be confirmed in further research.

The rather unexpected finding that there is no small world among small and entrepreneurial firms that trade their shares on alternative market in Poland provokes theoretical propositions that should be verified in further research. We may expect that networks consisting of small and medium enterprises linked by interlocks universally differ from networks of large, blue chip companies that tend to have small world properties. Further studies in different institutional, cultural and political settings should confirm this expectation. Since entrepreneurial

small and medium enterprises are experiencing higher volatility and uncertainty than large corporations, studies of interlocking relationships can test if the moderating effects of uncertainty (Martin/Gözübüyük/Becerra 2015) hold true for small and medium companies. We should also better understand antecedents of interlocks for small and medium size companies. Do ownership structure, industry sector, age and size of the firm, and board size influence probability of interlocking directorates being formed?

The present study was conducted on an empirical dataset of firms listed in a recently created alternative market; we may expect that cohesive networks emerge with certain maturity of an institution. The present study is cross sectional and measures network properties at a single point of time. Further longitudinal studies should confirm if more and larger cohesive subgroups will emerge as some directors serving on boards of companies listed on New Connect build their professional reputation, and may be invited to serve in multiple boards more often. Comparative studies of interlocks from alternative markets at different stage of development may also shed new light on the influence of institutional maturity on the small-world properties and social cohesion of boards and directors.

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