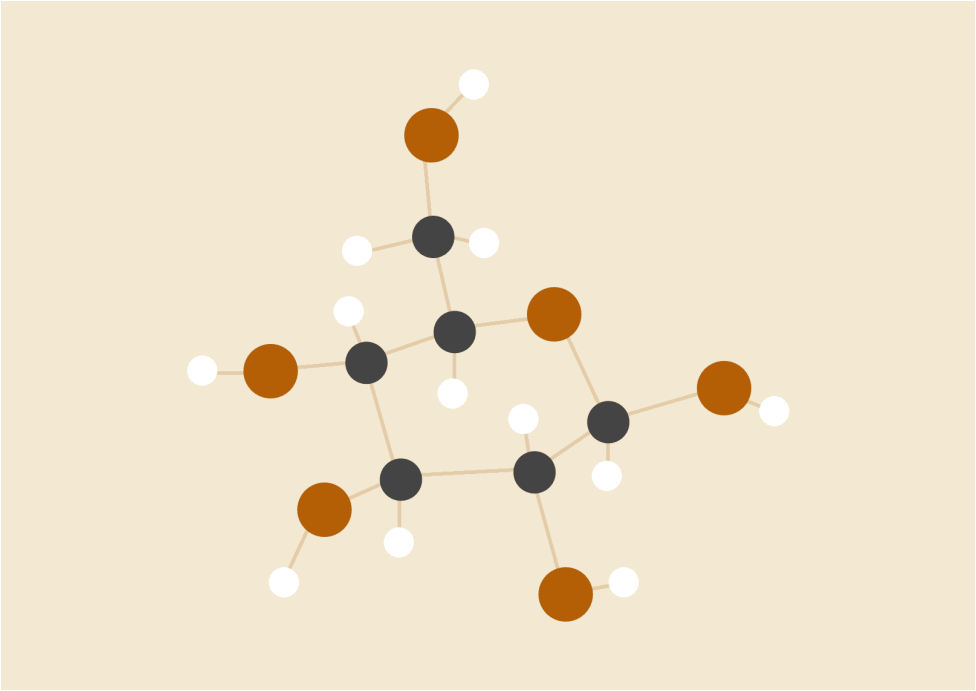
Inside the Legal Nexus:

Exploring Social Networks and Knowledge Sharing in a Corporate Law Firm



Maria Evrydiki Kanellopoulou, Jenna Tieby, Rakel Ósk Sigurðardóttir

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INTRODUCTION

This case study aims to explore the social dynamics and diffusion processes within a corporate law firm. By analyzing the networks and relationships among lawyers, our goal is to uncover patterns and behaviors that impact cooperation, decision-making, and knowledge sharing within the firm. We aim to identify influential individuals, detect community structures, and understand the underlying dynamics that shape the firm's functioning. We seek to answer key questions regarding the roles of influential nodes within the networks and power dynamics at play. Furthermore, by analyzing the cohesion among coworkers, we can understand the level of cooperation within the firm and explore the prevalence of different relationship types, such as advice-seeking, coworking, and friendships, and their implications for the firm's dynamics. The findings contribute to a broader understanding of organizational behavior, offering practical implications for managing cooperation, decision-making, balancing powers, quality control and knowledge sharing within law firms and similar professional contexts.

ANALYSIS

PRELIMINARY ANALYSIS

First we will analyze the centralizations of each of the networks, to determine if there are any lawyers more relevant than others in the networks. Centralization refers to the degree to which control, influence, or importance is concentrated in a few individuals in a network. To measure it we will use five centralization methods, as outlined in Table 1. Each of these methods provides a different way of quantifying centralization, such as by looking at the degree distribution of nodes, the number of nodes that are essential for communication, or the number of nodes that are involved in the most direct paths between pairs of nodes.

Table 1: Centralizations by network

network	indegree	outdegree	betweenness	eigen	closeness
advice	0,349	0,249	0,064	0,699	0,362
friend	0,199	0,241	0,118	0,728	
work	0,248	0,248	0,106	0,610	

Centralization values range from 0 to 1, where a value of 0 indicates that power is distributed equally among all nodes, and a value of 1 indicates perfect centralization, that is all power is held by a single node. We will only consider values above 0.5 to get more meaningful results of centrality measures. In Table 1, we can see that most methods result in values below 0.5, indicating that the networks have a decentralized network structure, where power and influence are more evenly distributed among nodes. However, as the eigenvector centrality is above 0.6 for all networks, it indicates that there are some lawyers in the network that are particularly important based on their connections to other important lawyers.

In table 2, we have outlined the top lawyers with the highest indegree, for each network

and in table 3, the top lawyers with highest outdegree. These tables tell us which lawyers are the most relevant in the firm. In terms of the advice network, lawyer 26, with highest indegree or prestige, is respected most for their professional expertise and are often sought out for advice by other lawyers in the firm. Lawyer 19, with the highest outdegree or gregariousness, is most proactive in seeking out advice from others in the firm. For the friend network, lawyer 31, with the highest outdegree, has listed the most lawyers in the firm as his friends, while lawyer 26 seems to have the highest number of lawyers who have listed him as their friend. This discrepancy between out and in degree shows the subjective nature of friendship and how it is not guaranteed you are the friend of a person who you consider to be your friend. Regarding the work network, we can see lawyer 22 has the highest indegree and outdegree, which tells us that he has worked with more people in the firm than any other lawyer. The reason why the indegree and outdegree is the same for the work network, is because the network is internally undirected. The number of people you have worked with and the number of people that have worked with you, are the same.

Table 2: Top lawyers by indegree

network	lawyer	status	sex	indegree
advice	26	partner	male	0,529
friend	26	partner	male	0,314
work	22	partner	male	0,400

Table 3: Top lawyers by outdegree

network	lawyer	status	sex	outdegree
advice	19	partner	male	0,429
friend	31	partner	male	0,357
work	22	partner	male	0,400

In table 4, we have highlighted the top three lawyers with highest eigenvector centrality for each network. With regards to the advice network, we can see that lawyers 26, 24 and 17 may have connections to other lawyers who are highly sought-after for advice. Looking at the friend network, lawyers 24, 17 and 13 may have friends who are also well-connected and highly central in the network. Lastly, with regard to the work network, lawyers 26, 22, and 16 are the most well-connected to other influential members of the firm through their work.

Table 4: Top 3 lawyers by eigenvalue centrality

network	lawyer	status	sex	eigen
advice	26	partner	male	1,000
advice	24	partner	male	0,802
advice	17	partner	male	0,801
friend	24	partner	male	1,000
friend	17	partner	male	0,898
friend	13	partner	male	0,834
work	26	partner	male	1,000
work	22	partner	male	0,965
work	16	partner	male	0,879

From this analysis, it seems that lawyer 26 is the most relevant lawyer in the firm, followed by lawyers 22, 24 and 17. Another important observation regarding tables 2, 3 and 4, is that all the most relevant lawyers in the firm have the status of a partner, and not that of an associate. This could indicate that seniority and leadership roles are highly valued within the firm and that partners are more likely to hold key positions of

influence and access to information. Alternatively, it could suggest that lawyers who are more central in the network are more likely to be promoted to partnership, as a result of their strong relationships and connections within the firm. Furthermore, the most relevant lawyers in the firm are all male, despite the firm having 25% female lawyers, which is a concerning finding. It suggests that there may be gender bias or discrimination within the firm, which is limiting the opportunities for female lawyers to build important relationships and access key information within the network. This could have negative consequences for the firm's performance and productivity, as well as for the career advancement and job satisfaction of female lawyers within the firm.

WHAT IS THE LEVEL OF COOPERATION?

To measure the level of cooperation in the law firm, we used six different metrics; Density, Average Path Length, Average Clustering Coefficient, Global Clustering Coefficient, Diameter, and Distance. Each of them tell us different things about the connectivity of the law firm, such as how far apart any two nodes are from each other on average, the degree to which nodes in a network tend to cluster together and the maximum or average distance between any two nodes.

Table 5: Connectivity measures by network

Network	Density	APL	ACC	GCC	Diameter	Distance
advice	0,179	1,781	0,522	0,479	3	2,243
friend	0,116	2,186	0,505	0,449	5	2,505
work	0,152	2,104	0,391	0,307	4	2,104

The advice network has the highest density and average path length, suggesting that lawyers in the firm frequently seek out basic professional advice from each other and that this information exchange is efficient. The global clustering coefficient suggests that there is some degree of homophily in the network, i.e., lawyers tend to seek advice from those with similar professional backgrounds or experience. The relatively small diameter and distance indicate that information flows relatively quickly and efficiently in the network. The friendship network has the lowest density and highest average path length, suggesting that social ties between lawyers in the firm are less common and may be weaker than professional ties. The global clustering coefficient suggests that there is some degree of homophily in the network, i.e., lawyers tend to socialize more frequently with those who are similar to them in some way (this will be analyzed more in depth later in this report).

The work network has a moderate density and average path length, suggesting that there is a relatively high degree of professional collaboration and interaction among lawyers in the firm. However, the low clustering coefficient suggests that there is less homophily in the

network, which can be explained because the work assignment is decided by the firm itself, and not the lawyers. The relatively small diameter and distance indicate that information flows relatively quickly and efficiently in the network. Based on these interpretations, we can conclude that the firm has a strong professional network that is conducive to information exchange and collaboration, but the social network among lawyers may be weaker and less developed. This could have implications for teamwork, productivity, and employee satisfaction within the firm, as strong social ties among coworkers have been shown to have positive effects on these outcomes. Additionally, the fact that the advice network has the highest density and average path length suggests that lawyers in the firm value and frequently seek out professional advice from each other, which could reflect a culture of knowledge-sharing and collaboration within the firm.

ARE THE CONNECTIONS RANDOM?

It is important to empirically test whether a network is random or not in order to understand its structural properties and potential underlying mechanisms. One approach to testing the randomness of a network is to compare its average clustering coefficient and average path length to those of random networks with the same number of nodes and edges. For this we generated 100 random Erdos Renyi models and averaged their average clustering coefficient and average path length values to compare with our true networks. This helps us to determine whether our social networks exhibit non-random structural properties. Our results showed that the values obtained for our true networks were not consistent with the values of the random networks, indicating that our networks do not exhibit structural properties seen in equivalent random networks. Next we analyzed the degree distribution of the three networks, we started by plotting them with a Poisson distribution overlapping on the graphs (Graph I, II, and III as can be seen in the appendix). From this we saw that the degree distributions of all three networks were not consistent with a Poisson distribution, meaning that they are not consistent with a random distribution. We analyzed the degree distribution further by performing Pearson's Chi-squared tests to determine if the degree distributions observed in the true networks were consistent with either Poisson or Binomial distributions, which would indicate a random distribution. The p-values we obtained from every network, for both tests, were smaller than our threshold of 0.05, meaning that the observed degree distributions significantly differ from both random degree distributions. Our final step in this analysis was to determine if our networks were consistent with a random network regime. We found that all three networks were far away from any regime, with a probability way higher than that of the regimes, indicating a well connected, non-random network. In the context of a law firm, this suggests that the relationships and connections among individuals within the law firm are not solely the result of random chance or arbitrary associations. Instead, there are underlying factors that shape the network structure, indicating the presence of intentional or non-random mechanisms at play.

PROPERTIES OF WORKERS

Next we investigate the relationship between workers' attributes and the likelihood of link formation in a social network. Specifically, we examine whether any of the attributes in our dataset affect the generation of any kind of link. To explore this relationship, we calculated the assortativity by the attributes for every network, as can be seen in table 6. By doing so, we aim to identify which attributes, if any, are predictive of link formation and to what extent.

Table 6: Assortativity by attributes for each network

Network	status	sex	age	office	tenure	school	practice
advice	0,320	0,087	-0,012	0,476	0,028	0,027	0,461
friend	0,552	0,206	-0,009	0,601	0,085	0,055	0,183
work	-0,235	0,002	-0,022	0,566	-0,027	0,031	0,572

From this table we can determine that those values in red, having an assortativity value close to zero, are neutral and not affecting the generation of a link. For example, a lawyer's sex does not affect them being asked for advice, as well as their age, and lawyers don't have a tendency to be friends with lawyers of the same (or different) age as them. The value in blue, a disassortative value, indicated that people of different statuses tend to work together in the firm. Furthermore, people of the same office tend to work with people of the same office and people of the same practice (litigation or corporate) tend to work together. In terms of the friend network, it seems that lawyers tend to be friends with people of the same status, same office and same practice. The table indicates that lawyers tend to seek advice from people with the same status as them, as well as from colleagues in the same office and colleagues within their practice. Clearly there are certain factors that influence the generation of social and professional connections between lawyers. The tendency for lawyers to work with others of the same office and practice area highlights the importance of commonalities in professional experiences and goals. While the tendency of lawyers to work with people of different status outlines the collaboration within the law firm and potentially a more dynamic and diverse work environment.

COMMUNITIES WITHIN THE FIRM

In this section of the report we will be detecting the communities that have been established within the law firm, aiming to identify underlying patterns that explain the creation of subgroups within the firm in terms of friendships, advice and work. We determined that the best algorithm for community detection in both the advice and friendship networks is 'Louvain' as it maximizes modularity, optimizing the division of communities. However, for the work network, the algorithm that maximized modularity was 'Walktrap'. All computations were carried out with a set.seed(1234) in order to obtain persistent results throughout the analysis.

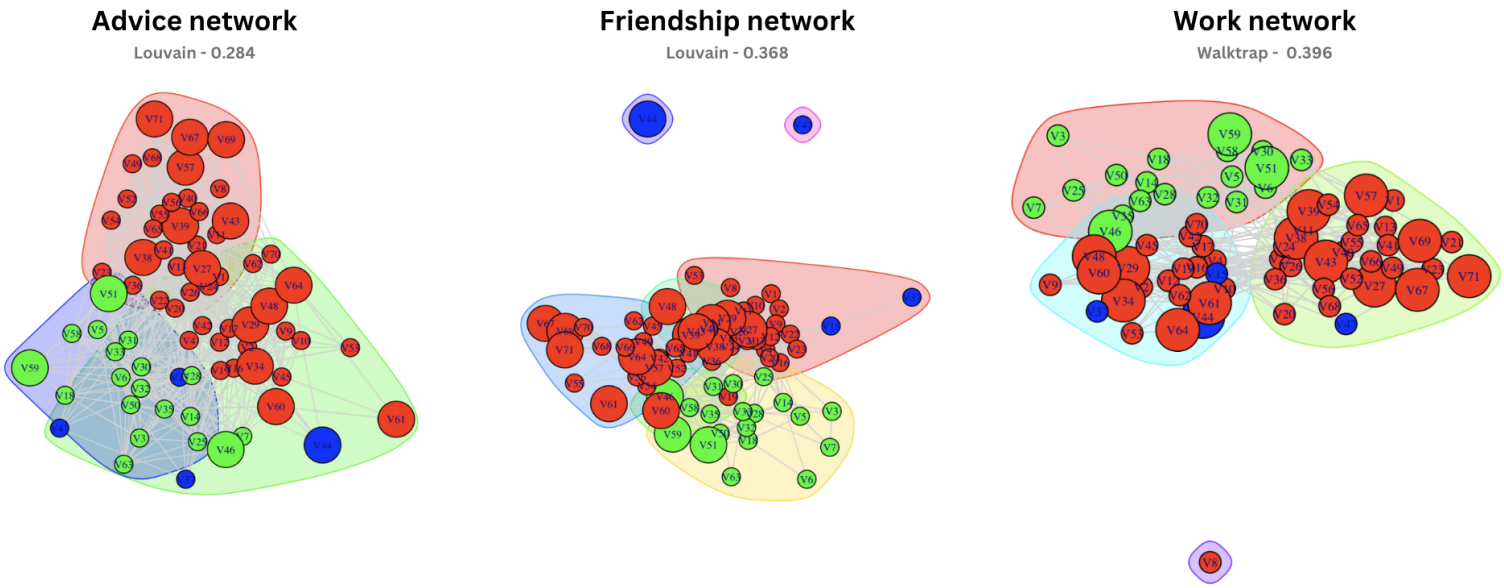
Firstly, the advice network was splitted into three communities, two of them consisting of 27 lawyers, and one of 17 lawyers. This suggests that there are three distinct groups of lawyers who frequently seek and offer advice within their local communities. These groups are thought to be more closely connected in terms of sharing knowledge and exchanging advice on cases and decisions. In comparison to smaller groups, the larger communities may show a higher level of interactions involving advice-giving and seeking. Comparing the groups in terms of attributes, like gender and office, it is clear in graph 1 that people tend to seek advice from lawyers in the same office as them, while gender does not seem to affect who you are seeking advice from since both males and females seem to be equally approached in each community when one wishes to ask about a case or a decision.

Moreover, the friendship network was divided into six significantly uneven communities. The members of the communities are the following in the respective order: 24, 19, 21, 5, 1, 1 members. The six communities created represent the distinct groups of lawyers who have closer social ties and engage in more frequent social interactions outside of work. The larger communities consist of more lawyers and broader social networks within the firm, while the smaller communities may represent more exclusive friend groups in the firm. The two single components are individual lawyers that have not developed any friendship ties outside the law firm. It is important to note that a lawyer can belong in more than one friend group. In terms of comparison with office or gender, we can observe that individuals from the same office tend to be in the same community, suggesting that lawyers of the same office have a higher likelihood of socializing outside of work, knowing each other's families, and forming friendships. Gender does not seem to be an important factor when developing friendships, however, we can identify the presence of more females in the friend cluster in the center of the graph (green), compared to the other groups.

In terms of the coworkers network, four communities were created based on the Walktrap algorithm where only one was a single component. The first cluster consists of 18 lawyers, the second has 29 and the third non-single-member community has 23 lawyers. The formation of four communities within the coworkers network suggests the existence of distinct groups of lawyers who have collaborated and worked together on various cases, assignments, or projects. These communities represent clusters of colleagues who have had significant professional interactions and have relied on each other's work products. In graph 1 we can see that office 1 (red) has been split into two working groups compared to office 2 which belongs to one working community. This may be due to the office’s size and in order to increase productivity, lawyers have been divided into two working groups where they have collaborated and worked together extensively. These communities represent clusters of colleagues who have shared professional interactions, collaborated on cases, assignments, and projects, and have relied on each other's work products. Additionally we can see that lawyers from office 3 have not closely collaborated

with lawyers from office 2, as they solely belong in working clusters with lawyers from office 1. In terms of gender, no community seems to have more females working together instead of males, suggesting that the work network does not exhibit a significant gender-based clustering. The absence of communities consisting primarily of females or males indicates that collaboration and work relationships within the law firm are not strongly influenced by gender.

Graph 1: Communities generated for each network using the best algorithm



Color: red = office 1, green = office 2, blue = office 3 / Size: small = male, big = female

IDENTIFYING RELEVANT PATTERNS - ERGM ANALYSIS

After having conducted analysis to identify the relevance of properties, we can further expand our insights by creating Exponential Random Graph Models, using the advice network. Before creating a complete final model, we developed separate models to identify different patterns, in terms of attributes, dyadic relationships, relational effects etc. In table 7, there is a representation of each of the individual models in the columns, where the last column is the complete model consisting of the significant parameters which are depicted in the rows.

Initially, we can see that the ‘edges’ parameter has a negative coefficient in almost all the models meaning that as the number of connections between the lawyers increases, the likelihood of professional advice links to be created decreases. The strongest negative effect is recorded in our complete model where the coefficient is equal to -5.27, suggesting that lawyers within the law firm are more likely to establish professional advice relationships with a smaller group rather than having numerous connections in the firm.

Moving on to identifying relevance of different attributes in the creation of advice links,

status, specifically that of the associate, has a significant negative effect, suggesting that lawyers at that level are less likely to be sought out for professional advice compared to the partners, as it would be expected. Additionally, offices are a relevant factor in the advice network, especially those in Hartford and Providence. More specifically, lawyers working in Hartford and Providence have a higher likelihood of forming advice-based links compared to those in Boston according to the complete model. We can identify a change in the coefficients compared to the previous models, which can be due to the effects of the other parameters included in the complete model, which when considered together, reveals that these office locations have a positive impact on the likelihood of advice ties within the law firm.

Furthermore, dyadic analysis allows us to identify whether the creation of advice links can be due to homophily. For example, the 'nodematch' parameter on status, office, and practice allows us to learn whether there is a homophily effect. In terms of status, the positive coefficient amongst all models indicates that lawyers tend to seek advice from colleagues with similar status levels. The same applies in terms of practice, where the positive coefficient suggests that lawyers within the same practice area, litigation or corporate, are more likely to seek advice from each other. In terms of office, the positive coefficient indicates that lawyers are more likely to create advice links with colleagues they interact with regularly in the same physical office, which agrees with our findings in the previous stages of our analysis.

Moreover, reciprocity (gwdsp) holds a significant role in the model. The negative coefficient suggests that there is a lower likelihood of reciprocated advice ties compared to what would be expected based on the network structure alone. More specifically, when one lawyer seeks advice from another, there is a reduced likelihood of the reciprocal exchange of advice. Thus, we can conclude that advice links are more likely to be one-sided, where one lawyer seeks advice from another without necessarily reciprocating the exchange. This for example can be true because as we have established, associates tend to seek advice from partners, but this would not be reciprocated back from the partner to the associate.

Focusing on relational effects to identify how work ties and friendship ties can influence the advice network. The positive coefficients characterizing both external networks indicate that lawyers who have worked together on cases or socialize outside of work are more likely to also have advice ties. Hence, past work collaborations and social relationships foster relationships that lead to seeking advice from each other. Finally, in terms of centrality measures, the higher the degree centrality of a lawyer, the more likely to be sought out for professional advice. When focusing on eigenvalue centrality, meaning the influence of the lawyer in the network, the high positive coefficient implies that lawyers who are more central in the network are considered valuable sources of advice.

Overall, as we can see in table 7, the complete model has the lowest AIC and BIC values,

suggesting that it provides the best trade-off between goodness-of-fit and model complexity. Conducting an ANOVA test on our complete model allowed us to further validate its goodness. With a p-value of (< 2.2e-16), we conclude that the parameters included in the complete model contribute to a better understanding of the professional advice ties within the law firm.

Table 7: ERGM models - significant parameters at level of significance a = 0.001

	Attributes	Attributes_Recip	Dyadic	Dyadic_Recip	Relational	Complete
edges	-0.78 ***	0.38 ***	-3.85 ***	-2.24 ***	-2.44 ***	-5.27 ***
	(0.07)	(0.07)	(0.12)	(0.11)	(0.06)	(0.26)
nodefactor.status.2	-0.56 ***	-0.60 ***				
	(0.06)	(0.06)				
nodefactor.office.2	-0.32 ***	-0.36 ***				0.43 ***
	(0.06)	(0.07)				(0.07)
nodefactor.office.3	-0.82 ***	-0.76 ***				0.86 ***
	(0.16)	(0.15)				(0.20)
gwdsp.fixed.0.7		-0.14 ***		-0.16 ***		-0.19 ***
		(0.00)		(0.01)		(0.01)
nodematch.status			0.96 ***	0.96 ***		0.94 ***
			(0.08)	(0.10)		(0.10)
nodematch.practice			1.36 ***	1.12 ***		1.06 ***
			(0.09)	(0.07)		(0.08)
nodematch.office			1.52 ***	1.12 ***		0.82 ***
			(0.09)	(0.09)		(0.10)
edgecov.work_ergm					2.12 ***	1.75 ***
					(0.10)	(0.12)
edgecov.friend_ergm					2.30 ***	1.61 ***
					(0.11)	(0.12)
nodecov.degree						0.04 ***
						(0.00)
nodecov.evcent						6.14 ***
						(0.54)
AIC	4533.25	4234.82	3969.03	3629.71	3540.26	2660.27
BIC	4559.29	4267.38	3995.07	3662.27	3559.79	2731.90
Log Likelihood	-2262.62	-2112.41	-1980.51	-1809.86	-1767.13	-1319.14

*** p < 0.001; ** p < 0.01; * p < 0.05

DIFFUSION OF KNOWLEDGE WITHIN THE FIRM

Furthermore, this section of the report will investigate the diffusion of knowledge as the spread of advice seeking behavior amongst the attorneys in the Northeastern Corporate Law Firm. The behavior being analyzed in this section represents the sharing of insights, knowledge, and expertise amongst the lawyers or professional community of the firm. The independent cascade model (ICM) suggested that the initial spread of knowledge began with lawyer (node) 28, meaning that this lawyer was the first adopter and so can be regarded as the 'first' source of knowledge. As demonstrated in

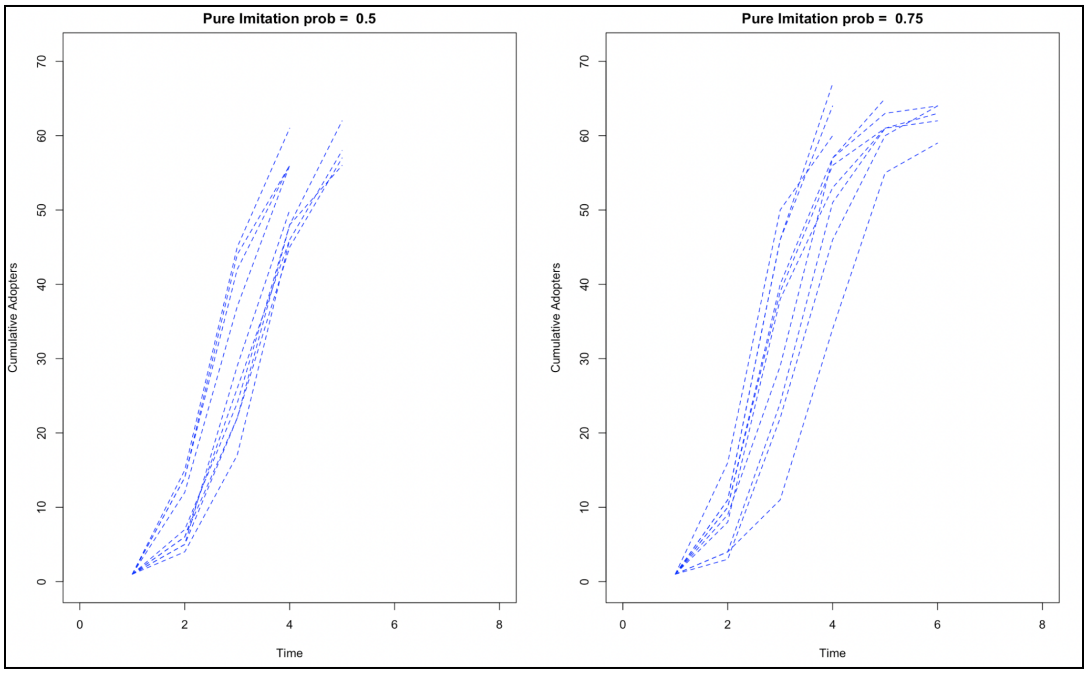
Table 8: Statistical Summary of the Diffusion Stages

	Diffusion Stage		
	1	2	3
num_new_adopters	1	23	38
avg_age	38.00	42.57	42.68
avg_years_with_firm	11.00	9.96	12.13
percent_male	1.00	0.74	0.82
percent_partner	1.00	0.61	0.53
percent_associate	0.00	0.39	0.47
percent_boston	0.00	0.57	0.76
percent_harft	1.00	0.35	0.21
percent_provid	0.00	0.09	0.03
percent_litigation	0.00	0.65	0.58
percent_corporate	1.00	0.35	0.42
percent_harvard_yale	0.00	0.13	0.32
percent_uconn	1.00	0.48	0.32
percent_other	0.00	0.39	0.37

Table 8, lawyer 28 had the following attributes: he is a 38 year old male partner at the Hartford office for 11 years, practices corporate law and is a University of Connecticut graduate. Seeing as though lawyer 28 holds a high position as a partner, this makes his knowledge highly valuable to the lawyers in the firm. Therefore we can see that this lawyer's expertise initializes the cascade of information dissemination within the network.

The second stage of diffusion consists of the attorneys that directly sought advice or expertise from lawyer 28 or could have been influenced by the advice given to other colleagues by lawyer 28. The second stage of the information dissemination consisted of a total of 23 lawyers / new adopters. Approximately 61% of these lawyers were partners, 65% worked in the litigation department, the average age was 43, 57% of them worked in the Boston branch, and 48% of the lawyers were University of Connecticut alumni. As for the third stage of diffusion, it consisted of an additional 38 lawyers / adopters that sought information either directly from the initial adopter which is lawyer 28 or indirectly through the lawyers in the second stage. The propagation of advice in the network in the third stage mainly consisted of lawyers from the Boston branch and demonstrated an almost equal distribution of partners and associates.

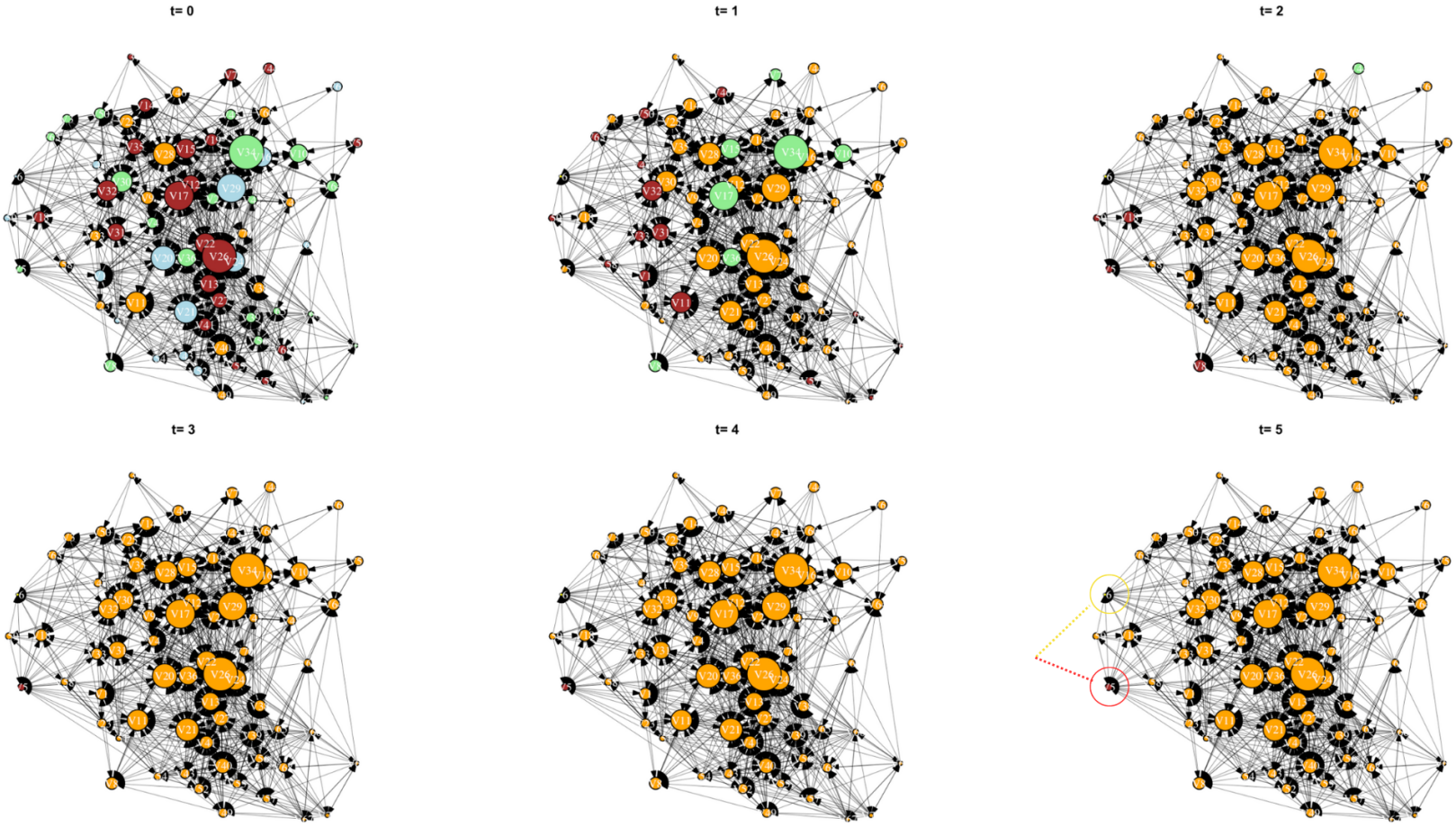
Graph 2: Pure Imitation Model to Understand Information Dissemination



As for the pure imitation plots, it can clearly be seen that lines which represent the iterations of the simulation are closely bundled together which indicates that the diffusion of knowledge within the law firm is deterministic. This suggests that the lawyers in the firm take into account advice from their peers or the initial adopter at roughly the same time across the simulations. Moreover, the plot suggests that the adoption probability of advice is high and has a strong effect, meaning that the diffusion of advice and information across the network will be quick and so lawyers tend to consider and implement advice they are given directly after they are

informed.

Graph 3: Exploring Consensus Formation in a Law Firm: A DeGroot Model Analysis



The Degroot model visualized above, suggests that the discussion held in the law firm regarding the specific legal procedure approximately reached consensus at the third iteration, meaning that after three rounds of discussions (t=3). More specifically, exactly 69 lawyers out of 71 agreed on the same approach to tackle this legal procedure. As a result of further analysis, we were able to pinpoint the lawyers which did not agree with the resulting opinion which were lawyers 5 and 6. Looking at their attributes, both of these lawyers are partners at the Hartford office and have similar demographic characteristics. Their status as partners suggest that they hold significant influence within the firm, and with tenures 31 and 29 years respectively, they have a significant amount of experience which makes them less likely to alter their opinion regarding the approach they deem best towards that specific legal procedure. Moreover, lawyer 5 is a partner in the litigation department whilst lawyer 6 is a partner in the corporate law department. These differing areas of practice could suggest that they have obtained distinct viewpoints on how the firm shall deal with the legal procedure and thus may not agree with the majority of the lawyers.

On the other hand, without knowing specificities regarding the legal procedure, the Degroot model does not inherently determine whether the opinion reached is the 'optimal' course of action, however seeing as though two significant lawyers that are influential partners in the firm have not agreed with the opinion reached regarding the legal procedure, this may suggest that it was not the most optimal opinion reached. Additionally, regarding the learning biases, it can be concluded that the other partners within the firm are more influential than lawyers 5 and 6, leading to the fact that other partners' opinions and advice are given more consideration, whilst the opinions of lawyers 5 and 6 may be overlooked in such decision procedures. This distribution of values may bias the decision making process when discussing the legal procedure, and thus may alter the reached consensus.

CONCLUSION

In conclusion, this case study aimed to explore the social dynamics and diffusion processes within a U.S. corporate law firm by analyzing the work, friendship, and advice aspects of the firm. The analysis conducted provided valuable insights into the patterns and behaviors that impact cooperation, knowledge diffusion and other characteristics of the lawyers' relationships.

The centralization analysis revealed that while the firm seems to have a decentralized structure, there were some influential individuals, who held important positions based on their connections to other influential lawyers in the firm. These influential or relevant individuals were all partners and all males, suggesting the significance of seniority and leadership, as well as gender disparity or bias within the firm. The level of cooperation varied across the different aspects of the firm, but the highest being in terms of advice, with frequent and efficient knowledge sharing. The work aspect showed a moderate level of cooperation, indicating significant collaboration, while the friendship network suggested that social ties among the lawyers were weaker and less common than professional ties. Furthermore, the analysis found that there are underlying factors that shape the network structure, indicating the presence of intentional or non-random mechanisms at play, and that none of the networks are random. Moreover, lawyers tend to seek advice from those within the same office, while gender did not significantly influence advice-seeking patterns. Office also influenced friendships as lawyers were more likely to be friends with lawyers within the same office. In terms of the work relationships of lawyers, their area of practice and their office influenced whether they had work ties, which is consistent with the logistics of a law firm. The analysis also highlighted the existence of communities within the firm. In terms of advice-seeking, three distinct communities were identified, indicating groups of lawyers who frequently sought and offered advice within their community. Regarding friendship within the firm, we found six communities, representing different groups of lawyers with closer social ties and more frequent interactions outside of work.

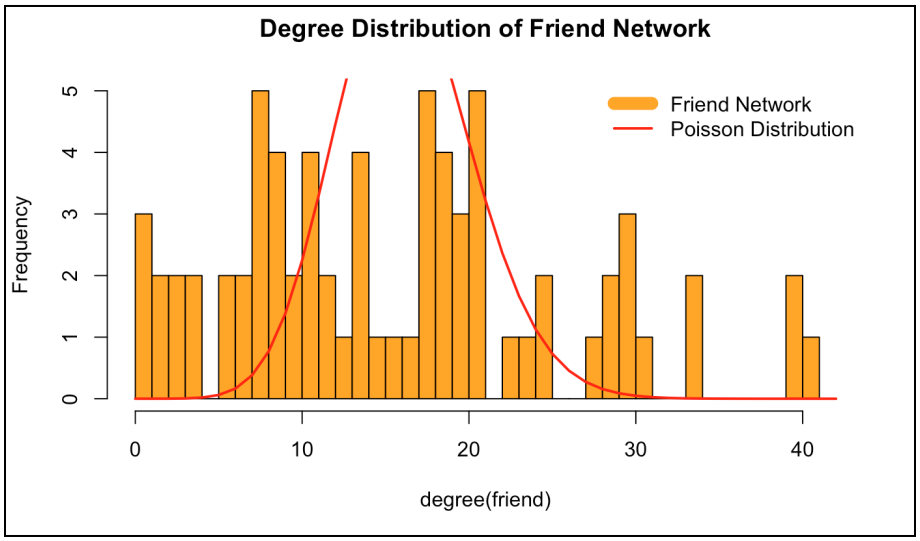
The work environment revealed four communities, representing clusters of colleagues who had collaborated extensively in the firm.

Our ERGM analysis validated our conclusions as it suggested associates are less likely to be sought out for advice compared to partners. Lawyers in Hartford and Providence have a higher likelihood of forming advice ties. Additionally, our complete model determined that reciprocity is low, indicating one-sided advice relationships, while also having more connections in the law firm decreases the likelihood of professional advice ties. There is also a relational effect as work and friendship ties influence advice relationships, meaning that past work collaborations and social relationships foster relationships that lead to seeking advice from each other.

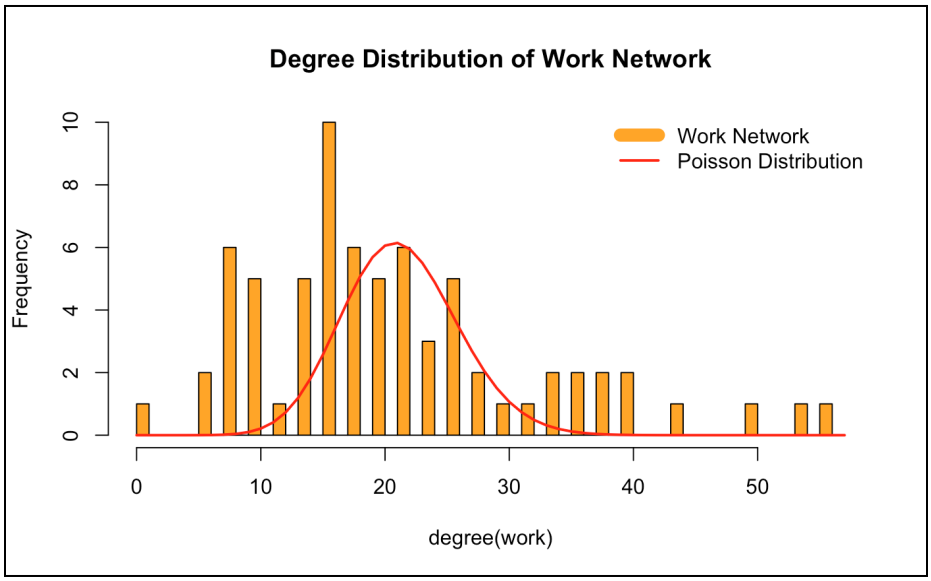
The analysis on the diffusion of knowledge in the law firm yielded valuable insights regarding the advice seeking behavior and its influence on the adoption of certain legal procedures and the spread of opinion. The independent cascade model suggested that the original source of information was lawyer 28 and that the diffusion of knowledge in the law firm is deterministic. Indicating that the adoption of advice occurs rapidly once information is shared, suggesting that this firm is heavily influenced by peer-advice. Regarding the Degroot model, it revealed that amongst the 5 opinions in the law firm regarding the legal procedure, the consensus reached by the majority of the lawyers was not unanimous as two influential lawyers who are partners had differing opinions. This dissent may suggest that the consensus reached was not optimal and the existence of a learning bias where these two valuable lawyers are overlooked in the decision making process of this legal procedure.

APPENDIX

I. Degree distribution of friend network



II. Degree distribution of work network



III. Degree distribution of advice network