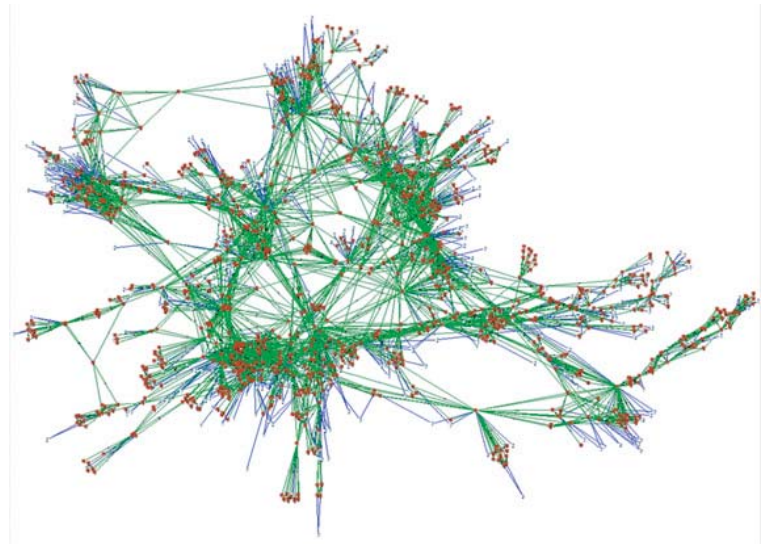


Finding Key Opinion Leaders

Using Large Scale Social Network Analysis

A COMPARATIVE ANALYSIS OF METHODS FOR FINDING KEY OPINION LEADERS



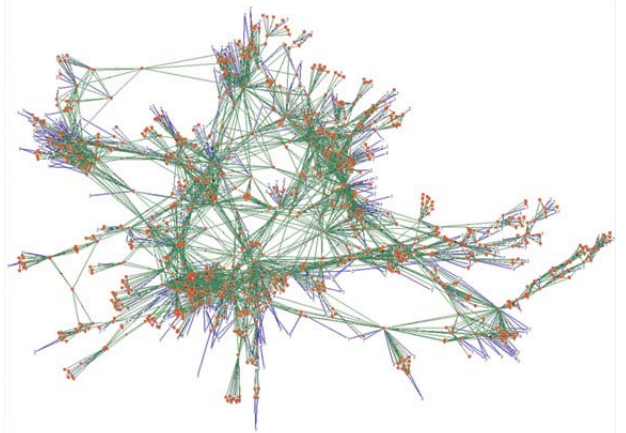
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This whitepaper compares and contrasts the four traditional methods of KOL identification and we introduce a new method to more empirically identify KOLs.

Perhaps no other area is under more scrutiny than financial remuneration to doctors.^{1,2} Even the appearance of a conflict of interest can cause issues. The pharmaceutical and biotechnology industries must hire *Key Opinion Leaders, KOLs*, for many services - including professional education, clinical research, advisory boards, medical policy and guideline boards, and strategic communications. Balancing the need to hire KOLs with the compliance risks requires care throughout the entire process. Bias, and thus possible conflicts, can even be found in the KOL identification and selection process.



Traditional Methods

The traditional approach is comprised of four methods, which are generally used in isolation from one another to identify opinion leaders.³ Each of these has a unique set of advantages and disadvantages.

Observation Method

The *observation* method is the most objective of the four. An outside observer familiar with the community names its most influential members.³ Problematically, the process relies on visibility, the ability to actually see the interactions. The outside observer's bias leans towards the more visible and higher profile person. A potential KOL may be someone who is not obvious. Also, some projects

This is the second whitepaper in a series - see "Finding Key Opinion Leaders Using Social Network Analysis - A New Paradigm in Key Opinion Leader Identification."

¹ AAMC Task Force on Financial Conflicts of Interest in Clinical Research. February 2003. *Protecting subjects, preserving trust, promoting progress I: policy and guidelines for the oversight of individual financial interests in human subjects research.* Academic Medicine. 78(2):225-236.

² Senate report: CME smells fishy, further checks needed. Medical Marketing and Media. April 25, 2007.

³ Doumit G, Gattellari M, Grimshaw J, O'Breain MA. 2007. *Local opinion leaders: effects on professional practice and healthcare outcomes.* Cochrane Database of Systematic Reviews, Issue 1. Art. No. CD000125. DOI: 10.1002/14651858.CD000125.pub3

require hundreds of thought leaders, and the observation method simply cannot identify and rank the impact that hundreds of individuals have on a network in any objective way. The sheer size of the US marketplace and the global nature of the pharmaceutical industry make observation difficult, if not impossible. This method can work well for small, relatively geographically contained communities.

A BRIEF PRIMER

Social network analysis, SNA, measures relationships between two nodes, such as the flows of information between people, groups, organizations, computers, web sites, and other information/knowledge processing entities. A community is the visual representation of these node-pair measurements. With this information you can describe nodes or the entire network. A common metric is to rank nodes based on their **centrality**, the quantity of immediate, **first degree**, connections. For example, in a social network map of Key Opinion Leaders' collaborations, centrality allows you to know who is the most connected person, the second most connected and so-on. By comparing the connections to the entire community you can determine the KOLs **reach**, or in simple terms their influence and ability to connect to others.

Self-Identification Method

The *self-identification* method is used to assess individuals' impressions of themselves as opinion leaders. Typically potential *self-designating opinion leaders, SDOLs*, will receive surveys that ask if they have influence on their community. Most people view their own work as important, and as a result, may estimate themselves to be more important and influential than they actually are. In fact, research shows that SDOLs are "relatively unlikely to have been identified as sociometric opinion leaders" by their peers.⁴ A better method of finding opinion leaders would incorporate a less biased estimation of the size and makeup of an influence-receptive population. For all its limitations, the SDOL method is still used. For example, the medical device industry often has devices that a limited number of highly specialized physicians would utilize. When all community members already know each other, using a SDOL may be appropriate.

Informant Method

The *informant* method solicits individuals within a particular community to name someone they believe to be influential,³ but not necessarily someone who influences the informant. In theory and in practice, this works out reasonably well. One impairment of this method is that it's nearly impossible to ensure that the community sample is sufficient. Increasing the sample size offsets this bias, yet it's still possible to get skewed results that under represent minority factions. Overall, this approach makes sense for small relatively homogeneous communities where informants are likely to have knowledge of the entire community. Yet soliciting sufficient informants to reduce bias to statistically significant and acceptable levels remains a daunting challenge.⁵

Sociometric Method

The *sociometric* or survey method is the most common. Surveys are given to community members, who are asked to rank individuals in their network on criteria ranging from quality of education to humanitarian goodwill⁹. As with the

³Doumit G, Gattellari M, Grimshaw J, O'Breain MA. 2007. *Local opinion leaders: effects on professional practice and healthcare outcomes*. Cochrane Database of Systematic Reviews, Issue 1. Art. No." CD000125. DOI:

10.1002/14651858.CD000125.pub3

⁵Bhandari M, Devereaux PJ, and Swiontkowski MF, et al. 2003. *A randomized trial of opinion leader endorsement in a survey of orthopedic surgeons: effect on primary response rates*. Int J Epidemiol. 32:634-636.

informant method, ensuring that the survey pool is sufficiently large and the quantity of responses is adequate can be difficult. In some regards, inferring that the survey responders accurately represent and account for the views of the survey non-responders and non-participants is another source of bias. As with all surveys, they can provide valuable insight, but bias often creeps in during the survey design process. The choice of questions and interpretation of the results will be highly subjective.

Often the results of such *sociometric* surveys are mapped using graph theory in a social network to show which person recommended whom, or they are mapped geographically. Care should be taken in interpreting these maps. The maps represent the survey respondents' "perceptions." The linkages on the maps are not measurements of collaboration nor do they show that person-to-person communication between two people (survey respondent and respondent's nominee) occurs.

Data Accuracy with Rich Contextual Information

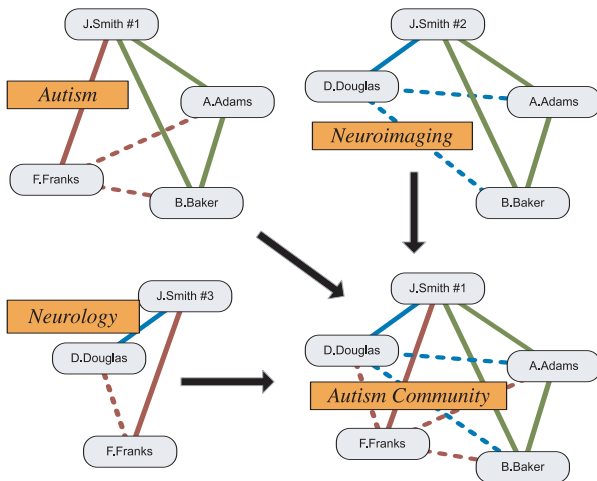


Figure 1. Large Scale Social Networking Analysis provides accurate results because unlike traditional methods that just match LETTERS, this approach extracts the rich contextual information from the community relationships themselves

Large-Scale Social Network Analysis Method

Given the inherent limitations with each of the four methods is there a better way? Such a solution would need to be unbiased, empirical and analytic; the solution would need to include the entire KOL candidate pool.

The *Large-Scale Social Network Analysis* method meets these needs. With Large-Scale Social Network Analysis, it is now possible to analyze a complete scientific community. Generally speaking, communities contain more than 7,500 individuals, with typical sizes ranging 10,000 to 20,000 individuals and as large as 100,000 individuals. With this large, objectively gathered sample, the bias is reduced significantly.

The data used to generate the map of a scientific community can come from anywhere: publication records, advisory boards, granting agencies, clinical trial monitoring sites, government websites, university hospitals, editorial boards, etc. Data from objective or near-objective sources are utilized to eliminate any data quality concerns.

By drawing the collaborations as relationships in a Social Network Map, rich contextual information is revealed and available for analysis. For example, the

top-tier KOLs generally have the highest *centrality*, or number of connections. Similarly, important people tend to work with important people, yet there are sometimes hidden *connectors* [®] between clusters of people. Further, individuals who aspire to greater responsibility and/or social rank will gravitate to the most important people. By tracing back through connections, the next-tier KOLs become evident.

Conclusion

Each of the traditional methods has limitations, but with advances in technology, Large-Scale Social Network Analysis provides a foundation for viewing KOLs in a community, peer-to-peer context - thus sidestepping these problems. You can easily see which KOLs work together or which KOLs work across geographic boundaries. This strategic view gives an advantage when designing the subsequent KOL engagement and management processes. LS SNA offers a new opportunity for the pharmaceutical and biotechnology industries to stay competitive.

[®]Gladwell M. 2000. *The Tipping Point*.
Boston: Little, Brown.

KOL IDENTIFICATION METHODS

OBSERVATION

An independent observer identifies opinion leaders by observing group interactions.

Difficult to use in large or geographically dispersed communities.

SELF-DESIGNATION

An individual expresses that they are an expert.

Strong bias; may be appropriate in communities where everyone already knows everyone.

INFORMANT

A selected individual or small set of individuals name someone who they see as most important.

Biased; difficulty finding sufficient informants, especially in large communities.

SOCIOMETRIC

Individuals in a network rank others in the network based on their knowledge of that person.

Biased; difficulty designing survey and getting sufficient response rates.

LARGE-SCALE SOCIAL NETWORK ANALYSIS

An empirical process to analyse a community and rank individual importance within the community.

Minimal bias; good for mid to large communities; difficult for massive communities.



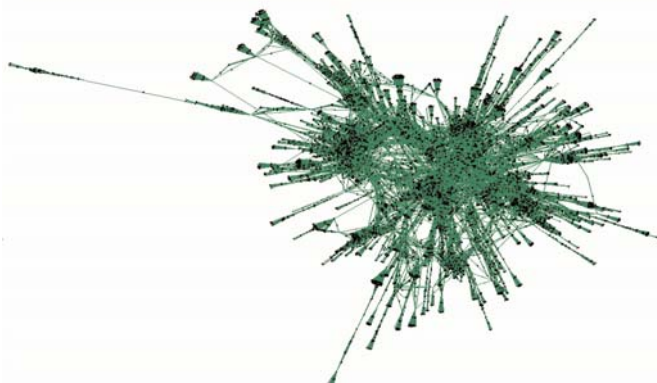
LnX Research, LLC, applies social network analysis [SNA] techniques to provide insights into scientific communities. For the Pharmaceutical Industry, LnX Research uses social network analysis to quickly locate Key Opinion Leaders' and characterize their local and extended communities. Mapping provides insights into relationships that would otherwise remain hidden in lists and tables.

A community can be "fairly open" or "tightly knit." By mapping the community you can easily see how regions, institutions or leaders are related. A marketing team can then adjust KOL programs to reflect these differences. For example, you might use a very different approach to work with a single tightly-knit cluster compared to five loosely connected clusters

SNA techniques can be tailored to a particular "slice" of a community or Product Lifecycle phase -- pre Clinical, Clinical, Launched, and Mature products.

Besides mapping a community to find its leaders; the reverse is possible, mapping the leaders to find their communities. With this approach you can characterize and quantify an individual KOL's reach and influence within a domain. This is particularly useful for distinguishing between "well-published" individuals and those with extensive relevant clinical trial experience. Adding affiliations (such as "disclosures") adds another layer of understanding that is highly relevant to selecting partners.

For further information on how LnX Research finds thought leaders through social network analysis, *contact Philip Topham, Director 714-784-7936.*



LnX Research, established in early 2006, is a privately funded company based in California.