Social network analysis application in management

1. Introduction

An example of world airports connection was shown in class to illustrate the network visualization. It is an animated graph that map the connections among all the airports in the world. Martin Grandjean (2016) argues that it is a network but essentially it is a map which connects the geographic elements and airport connections. This example (shown in Figure 1) is a typical social network analysis (SNA). It is a method which analyzes the connections across subjects, i.e., can be individuals, groups, institutions, cities etc. SNA allows us to examine how subjects interrelated with each other. SNA is also acting as a great data visualization method to visually show the relationships. More especially, how the relationships are formed, what kind of clusters there are, how each group is connected with each other, and how information or other interested aspect are flowing among various subjects.

Figure 1: Airline transport display using social network analysis, by Grandjean (2016).

Nowadays, SNA is broadly used in many areas, for example, Facebook or Twitter friendship display (example shown in Figure 2) shows how people are clustered into distinct groups, and academic co-word analysis (example shown in Figure 3, I did last term) present how researchers are grouped into various disciplines. SNA provides a visual way to show the big picture. However, limited application has been attempted to apply SNA in the area of management, for instance in operations management, supply chain management, marketing and organization behavior. Therefore, in this study, I will discuss the possibilities of applying SNA in management, and more especially, I would like to talk about the opportunities and advantages of SNA as a data visualization tool.

Figure 2. Chad's Friendship in Facebook.

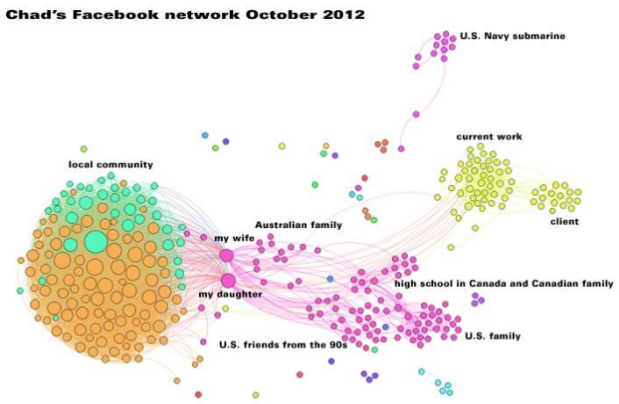
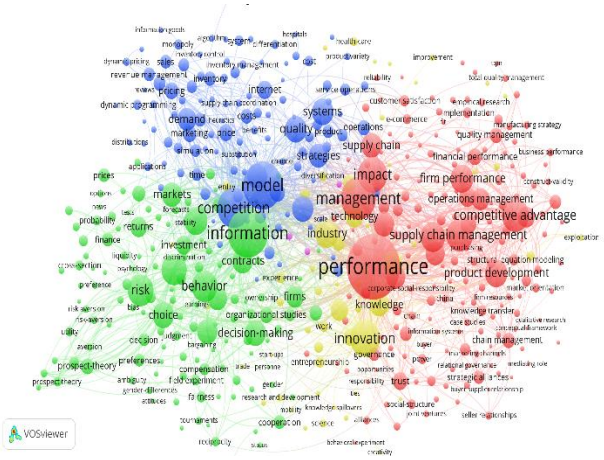


Figure 3. Co-word analysis.



2. Literature Review of Social Network Analysis in Marketing

Schulz (2014) states that SNA as a visualization technique, it not only provides a graphic presentation of the information, but also illustrates the underlying structural properties of these data, i.e., the connectivity and centrality.

"Understanding the relationships is fundamental to marketing" (Webster & Morrison, 2004). Therefore, connectivity and centrality are very important factors in marketing when researchers analyse customer behaviors, advertising and etc. Marketing researchers are looking for the method to display relationships that is beyond simple dyadic or triadic. Specially, for large networks, recognizing the relationships will become extremely difficult.

One of the best-known network theory in marketing is the strength-of-weak-ties (Webster & Morrison, 2004), and it argues that people within a network tend to gain information from those relationships that are not closely tied to them. However, in this study, I would like to propose another reverse thinking, i.e., ask the respondent to refer a friend. Let us take Figure 4 as an example. General marketing strategy tend to target random people in the market. However, what if the salesman could target and contact the "friend-of-friend"? The salesman will ask a respondent to name a friend whom he/she thinks this person will have more friends than him/her. In this figure, the worst case will be, the salesman contacts all nodes (respondents) at the edge but they point out a friend who has more connections than themselves, i.e., nodes with more connections and more centralized. An empirical study would test if this method would gain more influence. In addition, as the figure represents a great way to visualize these connections, further strategy would also distinguish the consumer clusters/groups based on this visual presentation.

Figure 4. an example of SNA.

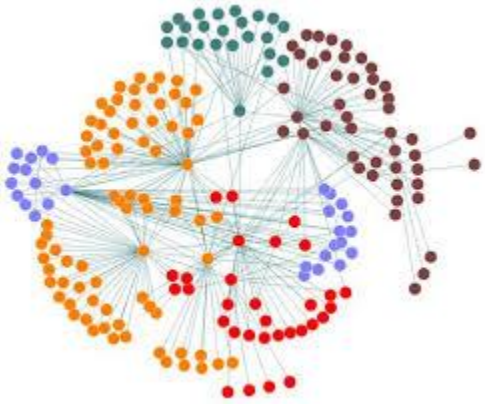
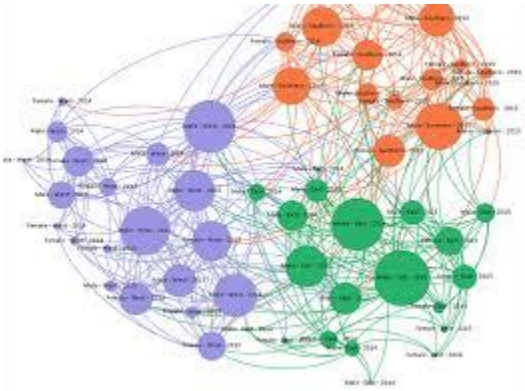


Figure 5. another example of SNA.



With today's advanced social media and platforms available, Twitter and Facebook are also able to act as a medium. For example, in Figure 5. It not only shows the connection and centrality, but also the strength of connection, i.e., the larger the nodes, the stronger connection it has. I would like to refer these nodes as most potential mediums who might have the largest influence on others. Therefore, to marketing researchers, another possible way to find the target maybe locating the nodes/person who tend to have the largest influence.

I would expect that in the near future, the SNA method would be more broadly used in marketing research and in real practice, so that gain a successful marketing campaign would be more easily to be visualized, directed and expanded.

3. Literature Review of Social Network Analysis in Supply Chain Management

As we know, the edges or links among nodes could represent not only the information, but also physical things. So, how about applying SNA in supply chain management. Wichmann & Kaufmann (2016) investigate when and how to best apply SNA in supply chain management. One

of the main challenges is to identify the supply chain activities within SNA framework. In this study, they do not provide a meaningful map to represent their ideas, but they contribute several managerial implications of using SNA for supply chain management, for instance, SNA enables managers to better understand the network with other firms and provides the possibilities of developing a leaner and quicker supply chain relationship. Moreover, Borgatti & Li (2009) address that, by visually seeing the network, firms are more likely to recognize the external environment and its internal position within the network. A more rational decision would be made based on a clear supply chain network.

4. Proposed Methodology

One of challenging question in supply chain management is, most of the studies focus on general implication or best practice, while the underlying relationships and the dynamic changes are usually overlooked. To fill the gap, I am proposing a study to explore the dynamics of supply chain relationships. The dynamics refer to changes over time. Here are some of my suggestions in employing SNA in supply chain management studies.

First, set up the framework and decide the primary connections in the supply chain. for instance, state clearly the manufacturers, wholesales, suppliers and retailers. Make sure their connections are with directions. Second, decide the time frame. Suppose we have past 10 years data about the relationships, one option could be year-by-year, and other options for example, exploring short-term changes, i.e., every 2 to 3 years, or a longer-term, i.e., year 1 to year 5 and to year 10. Third, determine the scales. One of the basic scale we could use is the monetary value, which makes the flow among different nodes in the supply chain consistent. Forth, plot the SNA. Fifth, adjust the plot on the following aspects, for example: adjust edges to reflect the amount of

value flows, adjust the nodes to reflect the centrality, use distinct colors to reflect the clusters of groups, identify and highlight the changes over time and etc.

By using the SNA in exploring the supply chain relationships changes over time, it could provide companies a bird-view of the overall relationship framework within a country or within a certain industry. By identifying the relationship changes, managers are able to understand the external environment, explore their positions and determine their collaboration strategies. I would appreciate the visualization tool, like SNA, could contribute to more operations researches.

Reference.

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