Advanced Topics in Social Network Analysis

The relationship between types of posts shared on Facebook and the amount of attention received by different active users.

Submitted by: Nadia Tannous

Table of Content:

Title	Page 1
Table of Content	Page 2
Abstract	Page 3
Introduction	Page 4
Related Work	Page 5
Research Question and Hypotheses	Page 7
Methodology	Page 9
Results	Page 11
Discussion	Page 13
Conclusion	Page 14
References	Page 14

Abstract:

Facebook is quickly becoming one of the most popular tools for social communication. The purpose of the present study was to examine relationship between the types of posts different people on share on a Facebook page called: "Secret Jaffa" and the amount of attention (measured in "Likes" and "Comments") given by different members of the group. Data was collected from the latest 50 posts shared in "Secret Jaffa" from members in that group. This study may assist others in understanding what types of posts motivate people to click "Like" or "Comment", by gaining much of the popularity online. To accomplish this, some of the applicable measures of social networks are centrality, transitivity, clustering, and diameter. The latest posts of 50 participants, 25 men and 25 women, were observed, and tested, for popularity. Results indicate that on average the advertising posts shared in that certain group receive the largest number of social engagements (i.e., likes and comments).

Introduction:

Social media has lately been achieving an increasing significance for gathering information about products and services and making profit of new opportunities (Verhoef & Lemon, 2013).

Communities and brands are developing its presence in social networking sites to meet brand awareness, engagement and word of mouth.

Accordingly, many studies have covered the effects of social media on consumers and organizations while opening new research avenues for strategists and marketers (Bughin & Manyika, 2009; Constantinides & Fountain, 2008; Fischer & Reuber, 2011; Hayat & Lyons, 2010; Hayat & Mo, 2015; Urban, 2003).

Following, this study points at the patterns created on social networks that reflect the mentioned statements. Since social network websites allow users to publish and interchange opinions and experiences about brands and their products and services, or basically, about anything and everything, this paper aims to focus on what type of content gains much attention and the relationship between the nodes/likers and members of a certain group that comment or are active in it.

Keeping in mind that people are regularly shifting their trust to recommendations and experiences from other consumers. It is interesting to examine which type of content attracts the users' attention and what makes them react to what is being posted.

Several studies confirm that such user generated content may influence different intentions. However, this study covers the different categories that may influence others more (or less), and what type of content receives most of the attention online. (Chevalier & Mayzlin, 2006; Dhar & Chang, 2009; Duan, Gu, & Whinston, 2008; Hayat, Samuel-Azran & Galily, 2016; Hayat, Lesser & Samuel-Azran, Forthcoming; Rehmani & Khan, 2011; Sierra Snchez, 2012; Ye, Law, & Gu, 2009).

In the sections below, we will survey the relationship between the number of "likes" and "comments" and the type of post it is (to which category it may fall into) in a local group called: "Secret Tel-Aviv".

The methodology section includes the types of categories. Moreover, in section six, we present the observation results.

Related work:

Online social communities are identified as one of the key new media phenomena (Hennig-Thurau et al., 2010) with research implications for the successful management of different organizations.

The behavior of transferring a message from one person to another through a medium is known under the term of word-of-mouth (Brown, Broderick, & Lee, 2007; Kozinets, de Valck, Wojnicki, & Wilner, 2010; Moldovan, Goldenberg, & Chattopadhyay, 2011; Trusov, Bucklin, & Pauwels, 2009), and it contrasts with more traditional marketing communications and seems to be gaining importance with the rise of Web 2.0.

Social network analysis aims to study relationships among actors that interact with one another in social networks (Wasserman and Faust 1994). It has generated graphic and mathematical methods of representing human interactions in a social network (Erlin et al. 2008). Relationships between nodes, which can be persons, communities, countries, agencies and companies, are represented graphically, while interactions between actors are represented as paths between nodes (Scott 2000).

These relationships can be of many types, such as economic, relational, motivational, communicational, emotional and family based. Within Facebook, dissemination of different content or posts can be achieved through several mechanisms. Users who are fans of a specific brand, category, or share the same interest will see in their walls anything that is shared or posted in that specific group, and then they can interact with it by liking, sharing or commenting. Each of these actions potentially promotes the content to all the member's friends' walls. Consequently friends of friends can also contribute to exponentially disseminate this content.

Like most social network website, Facebook allows brands to create profiles and interact with users. Fan pages are brand oriented profiles that provide additional functionalities like detailed analytics and better content and fans administration. Facebook characteristics "provide unique and

interesting conditions for investigating the interaction of multiple selves and the incorporation of brands in consumer self-expression” (Hollenbeck & Kaikati, 2012, p. 396).

From brands point of view and according to the classification of Dholakia, Bagozzi, and Pearo (2004), Facebook combines characteristics of small group communities, based on pre-existing offline relationships, with those of network-based communities where a member without pre-existing relationships connects through pages and groups. As members of a certain community, participation incentives are based on personal benefits.

Theory:

SNA allows researchers to examine naturally existing social structures, which is especially useful for studying human behavior. A social structure among human beings evolves based on internal mechanisms (e.g., homophily for individual attributes; McPherson, Smith-Lovin, & Cook, 2001) as well as external mechanisms (e.g., sociostructural conditions such as proximity; Preciado, Snijders, Burk, Stattin, & Kerr, 2012). The resulting social network will, in turn, socialize attitudes, beliefs, and behavior via norms that spread among individuals across their interrelating ties (Brechtwald & Prinstein, 2011).

Therefore, considering this social structure and its dynamic is a beneficial perspective for understanding and predicting.

In accordance with the definition of SNA, network theory highlights the importance of relationships, interdependencies, or intermediating processes for explaining the behaviors of network members, above and beyond their individual characteristics (Borgatti & Halgin, 2011). That is, how things are structured in the social network is assumed to determine the flow between, the power of, and the coordination among network members, which—in combination with their individual characteristics—explains the behaviors of the network members to some extent.

According to Singh, Jain, and Kankanhalli (2011) there are no theoretical frameworks available yet that could be used to analyze why and how users contribute to social media.

Moreover, Agresta and Bough (2011) state that there is no simple formula that guides on how to publish

in social media due to diversity of brands' goals and sectorial characteristics.

Research question and Hypothesis

“Secret Jaffa” is a shared community based page on Facebook that includes members of all ages and genders that live in the Jaffa area right next to Tel-Aviv, Israel. Jaffa is an entity of itself and the purpose of this page is to maximize the Jaffa experience by sharing tips, sharing news, advertising (businesses, restaurants or selling goods), and upcoming events within the area.

This study proposes the following hypothesis:

H1: Advertisement posts gain much more popularity (comments and likes from group members) than posts about event posts, news, and tips.

H2: People who live in the Jaffa area are more likely to be more active by sharing and commenting on posts shared in the group.

What the media's new generation offers is the distribution of data, content, anything and everything can be achieved through several mechanisms. Everything is reachable and made closer. For example, within Facebook, users who are fans of a specific brand, category, or share the same interest will see in their walls anything that is shared or posted in that specific group, and then they can interact with it by liking, sharing or commenting.

By sharing, liking, commenting or joining a specific group, raises the potential to promote a specific content since it appears on “your friend's wall”. This can be similar to the snowball effect.

Referring the idea to the current study, it is important to note that people are regularly shifting their trust to recommendations and experiences from other consumers. Therefore, this study asks which type of posts gain much of the user's attention, and what is the relationship between the active users who contribute to the continuation of the flow of the posts. .

Hypothesis Development:

This paper considered three antecedents to support the hypothesis (Fisher, 2009):

- Page views: Visits to a group's main page, which often consists of content-rich, static text, and brand-related visuals or product pictures (active consumption).

- "Likes": A Facebook user can support content on the group's page or can support the group itself by clicking on "Like" (active support).

"Likes" One of the most popular key performance indicators among Facebook specialists is the number of "Likes." The number of "Likes" that a page has—or the number of "Likes" a specific post or campaign has managed to generate—frequently is discussed in market reports that suggest consumers more likely will purchase after "Liking" a brand (Cruz and Mendelsohn, 2010). By "Liking" a posting or content on a page, the user actively supports that content, indicating a positive attitude. This activity implies a higher degree of user control, relevance, and motivation compared to "stream-impression" viewing or page views. Generally, if users actively support content, by providing their input they indicate high involvement.

- User contributions to the group's content, such as verbal comments, uploaded photos, and videos (active contribution with the highest level of interactivity).

This model incorporates measures that represent attention (page views), interaction (contributions), and qualitative aspects ("Likes").

Methodology:**Participants:**

After the selection of the latest 50 posts shared within the “Secret Jaffa” Facebook group, 250 participants were randomly chosen out of the 794 members who liked/commented on the selected posts. Therefore, a convenient sample of 250 participants, 125 men and 125 women, age range: 18-56 years, was selected from among the active group members. Selection was random, but individuals who posted infrequently (e.g., less than 2 times per week) were excluded.

Data collection:

The content on the company's Facebook profile mainly consisted of posts created by the group admins, and members.

The posts were of different categories:

- 1) News posts
- 2) Event promotions posts
- 3) Business advertisements posts
- 4) Tips and entertaining posts

The Facebook page was managed actively by a small team of the Jaffa community whose task was to coordinate and make sure posts were in control and not abusive or insulting by any means.

Procedure:

To begin with, we have collected 50 of the latest posts shared in the Facebook group called “Secret Jaffa”. After selecting the 50 posts, we have analyzed and divided the posts into 4 different categories; 1) News posts, 2) Event promotions posts 3) Business advertisements posts and 4) Tips and entertaining posts.

The popularity of each post was measured using the number of likes and comments each post received from the moment the group member shared it.

The names of the active members were recorded and signed consents were collected from each of the randomly selected participants that summed up to 250.

The participants were asked to answer a survey sent to them via e-mail at their own comfortable zone in order to examine the social network of each of them.

Here, we have attempted to analyze the collaboration network using the egocentric type of analysis to see if there exists any interesting pattern underlying those active members. And if by any way it affects the popularity of the post.

By this, I am going to compare and contrast the data I gathered, such as age, gender, and ethnicity (using the survey method) on the ties and their strengths or weaknesses.

Results:

Observing the social network as a whole, I can see that some people fall into the strong tie network while others in the weaker tie network. Social scientists know that contacts with other people are important in both instrumental and socio-emotional domains (Fischer 1982; Lin 2001). Focusing on the strong tie network, all those that fall into this category seem to be locals of the same city, either neighbors, go to the same school, or hang out at the same bars. The closer and stronger the tie with someone is, the broader the scope of their support (Wellman and Wortley 1990) and the greater the likelihood that they will provide major help in a crisis (Hurlbert, Haines, and Beggs 2000). As a result, of the summarized surveys, those who live closer to each other and the higher their “mutual friends” are, seem to get some sort of social support. Network.

Weak ties are described as heterogeneous ties and are perceived to be a critical element of social structure, enabling information to flow into other social clusters and the broader society (Burt, 1992a).

One surprising outcome noticed throughout the research is that the group “Secret Jaffa” created a community of its own. Something that even the weak ties are made stronger.

By observing the posts shared within the “Secret Jaffa” group, and by gathering 50 of the latest posts, dividing them into categories, 62% were advertisement posts that received an average of 61.39 “likes” and an average of 41 “comments”. This clearly supports hypothesis #1 which states that “Advertisement posts gain much more popularity (comments and likes from group members) than posts about event posts, news, and tips.”

It is important to keep in mind that the value and strength of weak ties is not related to the weakness of the relationship, but in the possibility of connections to other social systems (Ibarra, 1993).

While comparing the social networks, it is clear the weak tie network is more homophilous by city the person lives in and less by ethnicity. This might be so because Jaffa is known for its multicultural population (co-occurrence) where all the locals do not necessarily share the same ethnicity. Also, in this case, the physical distance between the nodes matter. The further the people are, the weaker the network might.

Once again, the similarity between the weak tie network and the strong tie network is that the majority of the agents are Jaffa citizens. Finally, this supports the second suggested hypothesis that states that the “People who live in the Jaffa area are more likely to be more active by sharing and commenting on posts shared in the group”.

In conclusion, the main findings in analyzing both the strong tie network and the weak tie network is that at certain times certain people tend to be a “bridge” that provide an only path between agents either on the weak tie network while others on the strong tie network (Harary, Norman and Cartwright 1965, p.198).

```
T-TEST GROUPS=Post('1' '2')
/MISSING=ANALYSIS
/VARIABLES=Likes Comments
/CRITERIA=CI(95).
```

T-Test

[DataSet0]

Group Statistics

Post	N	Mean	Std. Deviation	Std. Error Mean
Likes advertisement	31	61.39	28.492	5.117
Likes news	5	13.00	7.810	3.493
Comments advertisement	31	40.39	41.556	7.464
Comments news	5	6.80	7.014	3.137

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference		Lower	Upper
Likes	Equal variances assumed	4.165	.049	3.733	34	.001	48.387	12.963		22.044	74.730
	Equal variances not assumed			7.810	24.531	.000	48.387	6.196		35.614	61.160
Comments	Equal variances assumed	1.852	.183	1.782	34	.084	33.587	18.848		-4.717	71.891
	Equal variances not assumed			4.149	33.658	.000	33.587	8.096		17.128	50.047

which helped me come up with suggestions for future research.

One limitation I faced while running the analysis is that I noticed that the participants taking the survey were limited to options while there are other perspectives one can consider when measuring the personal social network (Such as “how often you meet”), if this question is added to the survey, it would affect the relationship between the dyad. I would then better capture who is weak and who is strong.

It is important to note that liking and commenting actions are of different nature and need to be examined separately. This was not taken into consideration when measuring the different posts shared in the Facebook group. Not all determinants which are found to positively enhance one form of brand post popularity (likes/comments) also have a positive effect on other forms (comments/ likes).

For example, Writing a comment is a much more time-consuming process than liking and is related to different motivations triggered by the meaning of the content.

Writing a comment seems more dependent on the emotions and feelings. Also users may be willing to comment if they perceive specific benefits (e.g. discounts, special offers) or when the content

of the post causes an emotional impact or a feeling that overwhelms the reader (Hettler, 2010). This is also a proof to the original hypothesis that stated that advertising posts receive more attention.

Given the increasing importance that social networking sites are gaining as marketing tools and in the light of our findings, I believe that further research efforts in this direction are necessary.

Conclusion:

Since Facebook is quickly becoming one of the most popular tools for social communication, I have decided to focus this study on the relationship between the types of posts different people share on a Facebook group called “Secret Jaffa”, measure the amount of attention each post receives, and examine the social network of the active members.

To accomplish this, some of the applicable measures of social networks are centrality, transitivity, clustering, and diameter were taken into consideration.

Two hypotheses were suggested, while both of which were supported in the above section:

H1: Advertisement posts gain much more popularity (comments and likes from group members) than posts about event posts, news, and tips.

H2: People who live in the Jaffa area are more likely to be more active by sharing and commenting on posts shared in the group.

By observing the latest posts shared by 50 participants (25 males; 25 females) results indicate that 62% of the posts were advertising posts and of which they received the most attention and the largest number of social engagements (i.e., likes and comments).

By going through the comments and likes, I have randomly selected 20 active users to answer a survey in order to examine their social network.

Once again, the similarity between the weak tie network and the strong tie network is that the majority of the agents are Jaffa citizens as well as members of a virtual community that created an illusion of a “strong weak tie”.

Reference:

- Verhoef, P. C., & Lemon, K. N. (2013) Successful customer value management: key lessons and emerging trends. *European Management Journal* **31**(1), 1–15.
doi:10.1016/j.emj.2012.08.001.
- Bughin, J., & Manyika, J. (2009). How businesses are using Web 2.0: a McKinsey Global Survey. *McKinsey Quarterly*, (09).
http://www.mckinsey.com/insights/business_technology/how_companies_are_benefiting_from_web_20_mckinsey_global_survey_results <Accessed 06.17.13.
- Constantinides, E., & Fountain, S. J. (2008) Web 2.0: conceptual foundations and marketing issues. *Journal of Direct, Data and Digital Marketing Practice* **9**, 231–244.
doi:10.1057/palgrave.dddmp.4350098.
- Fischer, E., & Reuber, A. R. (2011) Social interaction via new social media: (How) can interactions on Twitter affect effectual thinking and behavior? *Journal of Business Venturing* **26**, 1–18. doi:10.1016/j.jbusvent.2010.09.002.
- Urban, G. L. (2003). *Customer advocacy: is it for you?* (Working Paper No. 175).
<http://digital.mit.edu/research/papers/175_Urban_Trust.pdf <Accessed 10.10.12.
- Chevalier, J. A., & Mayzlin, D. (2006) The effect of word of mouth on sales: online book reviews. *Journal of Marketing Research* **43**, 345–354. doi:10.1509/jmkr.43.3.345.
- Constantinides, E., & Fountain, S. J. (2008) Web 2.0: conceptual foundations and marketing issues. *Journal of Direct, Data and Digital Marketing Practice* **9**, 231–244.
doi:10.1057/palgrave.dddmp.4350098.

- Dhar, V., & Chang, E. A. (2009) Does chatter matter? The impact of user-generated content on music sales. *Journal of Interactive Marketing* **23**, 300–307.
doi:10.1016/j.intmar.2009.07.004.
- Hayat, T. Z., Lesser, O., & Samuel-Azran, T. (Forthcoming). Gendered discourse patterns on online social networks: A social network analysis perspective. *Computers in Human Behavior*, 77, 132-139.
- Hayat, Z., & Lyons, K. (2010). The Evolution of the CASCON Community: A Social Network Analysis. *CASCON 20th Annual International Conference*. Toronto, ON, Canada.
- Hayat, Z., & Mo, G. Y. (2015). Advice giving and receiving within research networks. *American Behavioral Scientist*, 59 (5), 582-598.
- Hayat, T., Samuel-Azran, T., & Galily, Y. (2016). Al-Jazeera Sport's US Twitter followers: Sport-politics nexus?. *Online Information Review*, 40(6), 785-797.
- Rehmani, M., & Khan, M. I. (2011) The impact of E-media on customer purchase intention. *International Journal of Advanced Computer Science and Applications* **2**, 100–103.
- Duan, W., Gu, B., & Whinston, A. B. (2008) The dynamics of online word-of-mouth and product sales – an empirical investigation of the movie industry. *Journal of Retailing* **84**, 233–242.
doi:10.1016/j.jretai.2008.04.005.
- Fournier, S., & Avery, J. (2011) The uninvited brand. *Business Horizons* **54**, 193–207.
doi:10.1016/j.bushor.2011.01.001. Golder, S. A., Wilkinson, D. M., & Huberman
- Sierra Sánchez, J. (2012) Factors influencing a student's decision to pursue a communications degree in Spain. *Intangible Capital* **8**, 43–60. doi:10.3926/ic.277.
- Ye, Q., Law, R., & Gu, B. (2009) The impact of online user reviews on hotel room sales.

International Journal of Hospitality Management **28**, 180–182. doi:10.1016/j.ijhm.2008.06.011.

Brown, J., Broderick, A. J., & Lee, N. (2007) Word of mouth communication within online communities: conceptualizing the online social network. *Journal of Interactive Marketing* **21**, 2–20. doi:10.1002/dir.20082.

Kozinets, R. V., de Valck, K., Wojnicki, A. C., & Wilner, S. J. S. (2010) Networked narratives: understanding word-of-mouth marketing in online communities. *Journal of Marketing* **74**, 71–89.

Trusov, M., Bucklin, R. E., & Pauwels, K. (2009) Effects of word-of-mouth versus traditional marketing: findings from an internet social networking site. *Journal of Marketing* **73**, 90–102.

Moldovan, S., Goldenberg, J., & Chattopadhyay, A. (2011) The different roles of product originality and usefulness in generating word-of-mouth. *International Journal of Research in Marketing* **28**(2), 109–119. doi:10.1016/j.ijresmar.2010.11.003.

Kilian, T., & Langner, S. (2010) *Online-Kommunikation: Kunden zielsicher verführen und beeinflussen*. Gabler, Wiesbaden.

Hettler, U. (2010) *Social media marketing: marketing mit Blogs, sozialen Netzwerken und weiteren Anwendungen des Web 2.0*. Oldenbourg, München.

Agresta, S., & Bough, B. B. (2011) *Perspectives on social media marketing: the agency perspective, the brand perspective*. Course Technology, Boston, MA.

Hollenbeck, C. R., & Kaikati, A. M. (2012) Consumers' use of brands to reflect their actual and ideal selves on Facebook. *International Journal of Research in Marketing* **29**(4), 395–405. doi:10.1016/j.ijresmar.2012.06.002.

- Hennig-Thurau, T., Malthouse, E. C., Friege, C., Gensler, S., Lobschat, L., Rangaswamy, A., et al. (2010) The impact of new media on customer relationships. *Journal of Service Research* **13**(3), 311–330. doi:10.1177/1094670510375460.
- Dholakia, U. M., Bagozzi, R. P., & Pearo, L. K. (2004) A social influence model of consumer participation in network- and small-group-based virtual communities. *International Journal of Research in Marketing* **21**(3), 241–263. doi:10.1016/j.ijresmar.2003.12.004.
- Erlin, B.Y., Yusof, N. & Rahman, A.A. (2008). Integrating content analysis and social network analysis for analyzing asynchronous discussion forum. In: Information Technology, 2008. ITSIm 2008. International Symposium on. IEEE, pp. 1–8.
- Scott, J. (2000). Social network analysis: a handbook. London: Sage.
- Wasserman, S., & Faust, K. (1994). Social network analysis: Methods and applications. Cambridge, England: Cambridge University Press.
- Cruz, B., and J. Mendelsohn. "Why Social Media Matters to Your Business." *Chadwick Martin Bailey* (2010). Retrieved from [http:// www.cmbinfo.com/cmb-cms/wp-content/uploads/2010/04/Why_Social_Media_Matters_2010.pdf](http://www.cmbinfo.com/cmb-cms/wp-content/uploads/2010/04/Why_Social_Media_Matters_2010.pdf)