How does Social Capital affect Retweets?

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Abstract

In Twitter, a retweet happens when a user copies another user's tweet, making it clear that the content is someone else's, and is a common way to share information. This paper explores user's perceptions of the way social capital influences retweet practices. We discuss how Twitter users perceive values and how they create benefits for the social network and themselves from three points of view: referrals, information access and timing. We do so through a qualitative analysis of questionnaires answered by Twitter users and four quantitative case studies of retweets. We analyze users' motivations, map the spread of retweets and their content, and discuss how referrals, information access and timing can play important roles in what and how users will retweet. Our findings lead to the conclusion that users seek individual benefits but the competition for social capital allows for collective benefits to emerge.

Introduction

Many studies have shown that one of the key motivations for Twitter's usage is information access (see Mischaud, 2007; Java et al, 2007; Brooks & Churchill, 2010). Twitter also has characteristics of social network sites (Recuero & Zago, 2009) and thus displays social networks (Huberman, Romero & Wu, 2009). Therefore, it constitutes a perfect environment to observe how information is spread within social networks.

In this work, we analyze the relations actors establish when they engage in spreading information, based on the social capital concept. This means actors make decisions to share or not certain types of information based on the possible benefits they may receive from the social network.

In order to explore these relations in Twitter, we focus on the benefits of *retweets* – the act of reproducing a piece of information posted in Twitter (tweets) to a user's own group. Retweets not only share information with a particular group, but they also allow for other users (those originally posting the information) to become visible to this group. Therefore, we argue that retweets play an important part in gathering social capital. The motivations for users to select the tweets they will copy, and how they may be modified, can influence how information diffuses

and what types of values the social network can have access.

The guiding questions for this paper are: How does retweet practices are influenced by social capital? How they create values and to whom? How Twitter users perceive these values?

In order to discuss these questions, we use data from two different sets. The first one is a set of 151 questionnaires about retweet practices with four open questions and two closed ones, answered by Twitter users. The second is a set of four case studies where 2590 retweets were collected, mapped and analyzed by content. Based on theoretical and empirical discussion, we argue that retweets are a practice based on exchange of values, through which actors seek and gather social capital.

Retweets Practices

Retweets are a social practice that emerged in Twitter in order to quickly share a piece of information and its source (Suh et al, 2010). It was first a social appropriation done by manually copying someone's tweet and prefixing it with the letters "RT", so that other users would know that that was a copied content. Any comment on the information from the user retweeting appears before the "RT". Since then, Twitter has implemented a dedicated button that mimics this behavior to some extent.

In addition to copying the information, it is a common practice to mention the source or sources of information. This is done by including the source's Twitter username before the information, right after the "RT" (see Figure 1).

Since a user will typically be part of many different groups, a retweet has the purpose of diffusing some information gathered in some particular group with other users in her group (Israel, 2009).

Original Tweet	Retweet
schuschny: Manuel Castells fala sobre Wikileaks http://nblo.gs/cOOWd	someuser: very cool! RT @schuschny: Manuel Castells fala sobre Wikileaks http://nblo.gs/cOOWd

Figure 1: Example of how a typical retweet is built

Changes to the retweet may be done for several reasons. For example, some retweets are shortened because of

Twitter's limits on tweets' length. This is due to source being added, which will use extra characters, or because users will add a personal comment to the information (as in Figure 1).

In general, retweets can be identified by their focus on information. Cha et al (2010) differentiate retweets from mentions: while mentions are focused on a public response to someone, retweets are focused on sharing content. They show that 92% of all retweets they researched had a URL and 97% also had the @username field. Also, retweets typically cite the original source – the user that was recognized as first bringing the information to Twitter.

Retweets have several roles within the social network. They are not only a way to share information, but also a way to initiate or create a context for conversations (boyd, Golder and Lotan, 2010) or to make statements (Cha et al, 2010). They may also influence the social structure because of the mentions they usually carry (Yang & Counts, 2010), which may lead users to follow other, previously unknown, users. Also, the identity of who is retweeted may influence the total number of clicks a URL receives (Canavilhas, 2010).

In this paper we focus on retweet practices as something users engage in order to gain some benefits from the social network. Our view is that retweets are a product of a complex system of interactions, motivations and benefits. However, before discussing retweets relations to social capital, we need to discuss what is social capital and how information access is perceived as a form of social capital.

Social Capital and Twitter

Social capital is a broad concept, usually focused on the values obtained by being part of a social network and thus, referred to as the sum of "social resources" (Lin, 2001). Coleman (1988) argues that social capital has several forms and consists of an aspect of social structure and the fact that it facilitates actions within this structure. Social capital is thus based on the value social structure creates to actors, in the sense that through this structure, they can achieve benefits. As Burt (2000, p.3) argues, "better connected people enjoy higher returns".

As a form of capital, social capital is the product of each actor's investments in her social network. However, there has been some discussion on whether social capital is a public good (Putnam, 2000), private good (Burt, 1992) or both (Lin, 2001). Actors have control over certain types of resources and are interested in resources that are controlled by others. In order to gain access to these types of values, users engage in exchanges from which they may benefit.

In this paper, we focus on social capital partially from the Coleman perspective, where social capital has several forms and can be exchanged between actors and partially from Lin perspective, where social capital can be accessed and used by actors and by groups alike.

Social capital is a key ingredient of online social networks and also of the exchanges users make in order to use tools such as social network sites (Ellison, Steinfeld & Lampe, 2007 and Valenzuela, Park & Kee, 2009). Although Twitter doesn't fill all requisites, it may be considered a social network site (as defined by boyd & Ellison, 2007) because it displays recognizable users' profiles publicly and allows users to connect to each other, even though the nature of these connections as "social" is arguable (Recuero & Zago, 2009). Thus, social capital must also be key ingredient of Twitter.

Information as a form of Social Capital

The most common form of social capital is information access (Coleman, 1988; Burt, 1992; Bertolini & Bravo, 2004). The structure of social networks is strongly connected to the way information reaches its members, and how it is propagated within groups. Granovetter (1973) in his well-known study about the importance of the weak ties shows partially this influence. He argues that the more weak ties one has, the larger are the chances of receiving key pieces of information and opportunities that would be otherwise inaccessible. Thus, the place where one is inside the social network structure may help with the access of these values.

Burt (1992) argues that there are three types of benefits obtained from information in social networks: access, timing and referrals. Access refers to "receiving a valuable piece of information and knowing who can use it", i.e. using the social network to filter and to give you information. Timing is related to making information quickly accessible - the earlier the information reaches someone the more value this person can get from it. Referrals, in the form of associating the information to particular people, add value to the information (e.g. credibility) and also to the individuals who are referred.

There is a high cost involved in the search for information within a social network. One has to invest time and emotion in order to create and maintain social ties, so as to remain connected and receive useful information. However, in Twitter, there is a very low cost for users to engage in following each other in order to receive information. Therefore, many people use Twitter as an information tool (as showed by Java et al, 2007, for example). Unlike social connections that rely on interaction to be created and maintained, connections in social network sites such as Twitter rely only in computer databases to exist. Thus, it is possible to follow, for example, a thousand people and to keep receiving information from all of them. This creates another problem: how does one find which actors may provide relevant information in Twitter?

Romero et al. (2010) argue that a majority of Twitter users are passive, not engaging in creating and sharing information. Not all twitter users engage in sharing information because this requires an effort in seeking for new information. Since those users sharing information are crucial in how information spread in Twitter, in this paper we focus on those users, reporting on the values involved in their acts of sharing. As we will argue, users who are active in retweeting compete for certain values.

Lanhan (2006) argues that the new resource scarcity in the information economy is *attention*. Because information is now so easily accessible, there is a constant competition for the attention of people everywhere. Wu & Huberman (2007) showed that this also influences the information diffusion in social networks and that information success is closely related to its novelty. Because attention is so scarce, the older a piece of information is, the less likely it is to spread.

Therefore, users who retweet are engaging in a competition for visibility against other users that have access to the same information. Winning the competition may provide them certain privileges in their social network.

Methodology

In order to examine retweets influence in social capital and user's perceptions of these values, we chose to gather data in two different ways that we believe complement each other. In the first data set we applied a questionnaire to 151 users in order to gather qualitative data on how users perceive Twitter and retweets. The second data set was based on a quantitative study on four case studies, where we collected retweets and their relations to the social networks that spread them.

Questionnaire

The first set of data was collected through a questionnaire. In it we explored users' motivations to retweet and their perceptions of the values Twitter has. The questionnaire was online and users were invited to answer them through Twitter. In total, 151 users answered. The questionnaires had two closed and four open questions. The closed questions were about gender and age. The open questions, originally in Portuguese, were the following:

1) Check your last 5 retweets. Paste them here and explain why you retweeted each of them.
2) Do these retweets represent your usual reasons to RT in general? Why?
3) Which is the most important value in Twitter for you?
4) How do you choose whom to follow in Twitter? Why?

Also, a contact email was asked in order to further discuss some answers. All questions and answers were made in Portuguese and the questionnaire spent three weeks online (in November of 2010) (see Table 1).

All the open answers were examined and will further be presented in the following sections.

Table 1: Summary of answers to the closed questions

Respondent demographics (N=151)	
Gender	Female - 86 (57%)
	Male - 65 (43%)
Age	Less than 18 years old - 0 (0%)
	Between 18 and 25 years old - 66 (44%)
	Between 26 and 35 years old - 55 -(36%)
	Between 35 and 50 years old - 25 (17%)
	More than 50 years old - 5 (3%)

Retweets

We examined four cases of information being retweeted. In order to gather data about retweets we followed the spread of particular links to websites, since they are present in most retweets according to Cha et al (2010). In order to make it unique, we chose specific shortened URLs from Migre.me[1]. Migre.me is a service that allows users to create a shortened unique URL in order to tweet some piece of information. Because it creates unique URLs that cannot be modified, if they appear in someone's tweet, even without a referral, it means the user saw it somewhere in Twitter. Thus, whenever this happened it was considered a resonance of the original tweet. Also, the service allows one to follow how much has a link been retweeted and clicked on. The cases were chosen based in the number of total retweets. We wanted information that had been retweeted several times, thus we chose the most popular links in Migre.me.

Case one was a link to a piece of news about the rain tragedy in Rio de Janeiro (Brazil) and the fact that the Brazilian Ministry of Health was creating a registry of health professionals interested in helping in the flooding zones. The second was a link to another piece of news about the changes in the Zodiac, where an astronomer claimed zodiacal signs were incorrect. The third one was a promotion for a publicity action in Campus Party Brazil. The promotion asked users to retweet the information in order to participate in a raffle of a netbook. The last piece was a link to a picture of a famous actress who was being made fun of by a popular humor site. All cases considered only information in Portuguese and contained tweets that were published in January of 2011. Data was collected within three days after the day they first appeared, with the limitation of 1000 nodes researched. For each case, we

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[1] http://www.migre.me

collected time stamped data on retweets, followers and referrals.

In order to collect and map the retweets we used NodeXL[2]. NodeXL automatically searches for keywords in the Twitter's search, get data on followers and also on referrals, which were key for this work. However, the process has some limitations. First, NodeXL only allow us to search for 1000 nodes in the network, which is problematic for larges chains of retweets. Also, Twitter only allows searches for the last 7 days, which limitates the amount of data possible to gather.

In total, we collected 2590 retweets, 2554 referrals, 1740 vertices and 4697 edges. This summarized in Table 2.
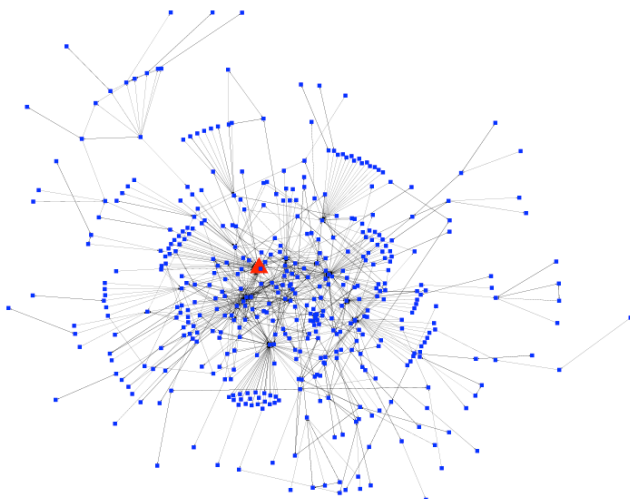
Table 2: Summary of retweets mapped

	Total Retweets	Total Vertices	Total Edges	Total Mentions
Case 1	537	453	1003	761
Case 2	1018	683	802	676
Case 3	662	501	2786	770
Case 4	359	103	101	347

Created by NodeXL (http://nodexl.codeplex.com)
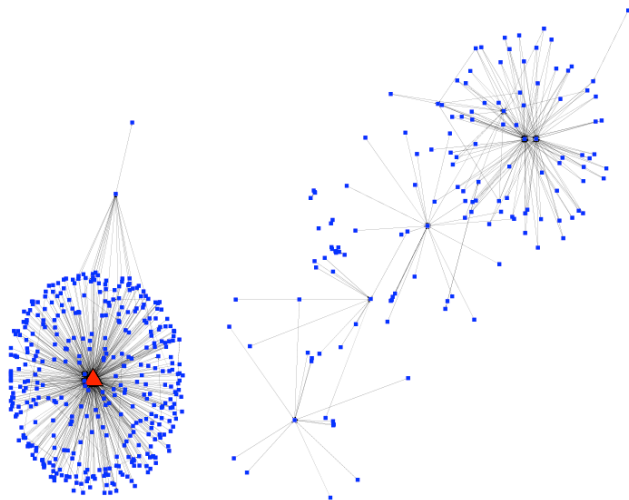
Figure 2: network of mentions. The triangle is the original source.

Created by NodeXL (http://nodexl.codeplex.com)

Figure 3: network of followers. The triangle is the original source.

Results

Twitter Values

Firstly, we explored the values users find in Twitter, so we could evaluate if it made sense to think of retweets as a tool to obtain social capital. The following results focus only on the questionnaire and they set the context for the following discussions.

We found that three key values make Twitter relevant for users who answered our survey. Firstly was information access: 74.6% (N=112) of the answers mentioned relevant information as the most important value, followed by contacts 31.3% (N=47) and timing 20% (N=30). The three benefits were often pointed out together (e.g. "I like Twitter because I can quickly receive relevant information from relevant people"). Most answers regard Twitter as a collective information filter. Users can receive information about very specific subjects and create a "newspaper that only has information I choose", as one user put.

Twitters' benefits are closely linked to information access. Unique pieces of information in Twitter propagate along the edges of the social network, often as retweets. Retweets are key to the twittersphere because they not only facilitate information access, but also aggregate timing and referrals values. Retweets have specific benefits, related to how users perceive them and their roles in Twitter. Thus, we will analyze the results on the prism of these benefits: referrals, information access and timing.

Retweet Benefits

Retweet has two types of benefits. It benefits the social network as a whole, since it is used to spread information that may interest all users. But it also benefits particular users, since it allows for original information to reach farther from their social network, along with their identity, creating forms of social capital they can use.

Benefits from Referrals

There are some common practices when creating a retweet. Some users will only mention the user that they directly received the information from. In this case, if User A first posted an original piece of information, and User B follows this user, User B will attribute the retweet to User A. However, if a User C is connected to User B but not to User A, he may either mention the original source (A), the direct source (B), both or none. Naturally, the decision will involve the length of the tweet and the available space to mention further sources, but is also a function of how users

perceive the values they may obtain from referring particular sources.

Table 3 shows that, when considering the number of mentions made to each user that retweet some particular original information, the original source had the largest amount of mentions, while intermediate users who are retweeting are much less referred. This can also be seen in **Error! Reference source not found.**.

Table 3: Summary of mentions in each case

	Case 1	Case 2	Case 3	Case 4
Total Tweets	537	1018	662	359
Mention original source	77%	42%	99%	91%
Mention original and additional sources	0.3%	1.7%	17%	2.7%
Mention and follow original source	2.1%	1%	1%	90%

Therefore, the user who originally tweeted the information received most of the credit *even when the information is retweeted by users who are not followers*. Therefore, creating original pieces of information in Twitter allows for a user to increase her visibility in the network. More so than only retweeting existing information.

While there usually is a chance to receive credit for a retweet, the referral is much less likely to happen beyond the second degree. The average number of mentions in the collected tweets was close to one and the largest number of mentions in a single tweet was three, despite the fact that many followers were quite distant (long path length) from the original source (see Table 5). This shows that even though information can reach users that are far from the original source, not all users are credited in the same way for spreading the information. The chain of mentions is much shorter than the length the information traverses the network.

In part the limit in the number of mentions can be attributed to Twitter limits in the length of the messages, since additional mentions require more characters, but even in short tweets the number of mentions is severely limited. This is a case of a competition for attention (Lahan, 2006) – the more mentions in a tweet, the older the contained information looks. As one user has put:

"I cut sometimes [the names of the sources] because I want the information to seem fresh"

In fact, were not for the editing of retweets, the chain of mentions could be used to determine how new some information is.

However, the users that get mentioned in a retweet are not random. As we said, the original source receives a disproportionate large fraction of the total number of mentions. In part, this is due to the fact the mention can affect how credible some information is – an information

that clearly comes from a major newspaper's account in Twitter will be much more credible than if it was attributed to some regular user. This is certainly the case for the Ministry of Health's tweet. But credibility is not the only reason. In the case of the joke on the actress, credibility has little to do with choosing to mention the original source. Rather, the main motivation in effect is *reputation* – since the joke first came from a popular website dedicated to humor, mentioning its tweet account is a way to inject reputation in the joke, making it more likely to be viewed and retweeted by others.

Because of these perceptions, users typically mention the original source in their retweets, even if they don't follow the source directly (see Figure 2 for a graphical representation of this effect).

These results are consistent with Wu & Huberman's (2007) findings, where the novelty of information is key for the value it receives when spreading in a social network. However, the users' perception of what is "new" and of the benefits they would receive by spreading some piece of information also play a role in Twitter's information diffusion.

Some differences in the numbers in Table 3 are interesting. For example, Case 2 was the one with less mentions to the original source. When examining the retweets we found out that the majority of retweets that didn't quote the source would only quote the link and make a comment about it. In this specific case, retweet seem to be a more conversational act. Part of the value of giving the news about the new zodiac was also to comment. Through commenting users believe they generate more value to the retweets, as pointed by the user quoted bellow.

"I always try to add some personal comment to make the tweet mine and more interesting."

In case 3 we had the largest number of mentions to original and additional sources. Because of the promotion, users would worry less about the visibility of the tweet. These type of retweets are also often common, and pointed as an usual practice by 85% of the users in the open questions.

"It is not about the content, it is just to participate."

Finally case 4 had the largest number of users who not only retweeted but also follow the original source. Even though it didn't appear in the other cases, this may be due to the type of retweet. Case 4 was about a tweet from a very popular humor site. "Funny things" was the second most pointed retweet in the questionnaires. 72 users (47.6%) said they like to retweet this type of information and 35% had done it within the last tweets. While for other retweets users seek for very specific information on subjects they like, humor was a more general value.

These results may point to different types of retweets receiving not only different values for the sources, but also,

having different forms of spreading within followers' networks.

Since being mentioned in a retweet makes a user visible to other parts of Twitter's social network, this user is more likely to receive new followers or being perceived as influent.

Benefits from Information Access

To retweet is an easy way to create content that is potentially new to a user's network and to try to obtain some of the benefits associated to information diffusion.

> *"Retweeting is sometimes easier than searching for something new to tweet"*

When a user retweets something she is making a piece of information accessible to her followers. But not all tweets are retweeted and different users may choose to retweet some information and not other. Therefore, it is important to understand the motivations behind retweets.

In our interviews, a majority of users said they retweet in order to give visibility to some information they believe will be relevant to their followers. Users thus filter the information based on what they believe may interest their social networks (Table 4).

Table 4: Motivations to retweet based on answers to open questions in the survey

Reason	Mentions
Share relevant information with followers	140
Show agreement	50
Show support	23
Participate of promotions	22
Initiate a conversation	15
Reciprocate another retweet	6
Others	26

As Cha et al. (2010) argue, in order to influence others through retweeting, users have to invest time and effort in seeking information that their followers may find interesting, sometimes, focusing on a single topic. Even though, each tweet has to compete with thousand of others for attention. By retweeting, users invest less time while also achieving some of the benefits.

The decision to retweet is not only based on the tweet's content, but also associated to who is being retweeted. Retweets work as display case for users to show their social network that they are following, as pointed out by these two users:

> *"I retweet people I think are relevant"*
>
> *"I like to show who my contacts are"*

Based on the answers given in the questionnaire, users who are frequently retweeted are perceived as able to create reputation, gather more followers and become

hierarchically relevant in the structure of the social network. Although not all parts of the chain of retweets receive credits for making the information available, those users considered "relevant" are mentioned along, or replacing, the original source. This happens when a user wants to show that she follows some particular user to her social network.

Another often mentioned reason to retweet was to show agreement with an expressed opinion or to show support to some argument or cause. In these cases, retweets are used to show ideas and positions to followers.

> *"I retweet things I agree with so my followers will know I support these ideas"*

Finally, retweets also create conversations, which has appeared in other works as part of retweeting practices (boyd, Golder e Lotan, 2010). However, conversations are often regarded as difficult to keep track in Twitter. Nonetheless, retweeting a information can be a conversational tool when the retweet is part of the context of a conversation taking place.

While these motivations are user-centered, and actions are taken by users seeking to benefit themselves in some way, these practices also benefit the social network as a whole, since more people have access to the information. This is an important indicative of the value of retweets for the social structure. Through these practices information can reach users who otherwise wouldn't have contact with it. Retweets generate both private and public goods for the social structure.

Table 5: geodesic distances

	Maximum Geodesic distance	Average geodesic distance
Case 1	11	3.93
Case 2	10	2.66
Case 3	9	3.73

Benefits from Timing

Timing is a very important value associated to Twitter. In the questionnaires it was closely associated to the information access values and to the values users seek in Twitter. User often associated information with timing. From the questionnaire, 30 users (19.8%) mentioned the timing as a key value of retweets. Also, 45 (29.8%) mentioned receiving information quickly is one of the Twitter's main advantages.

Timing also seems to be related to retweet practices however, not by the same values. As can be seen in **Error! Reference source not found.**, in two of the case studied we observed that the number of retweets fell as time passed. These cases have a large amount of retweets in the first few minutes after the original tweet and then a sharp drop

in number of retweets. However, in case 3, the opposite was observed – the number of retweets actually *increased* with time. Case 3 is the case of a promotion being held, where users had to retweet a tweet in order to participate. The promotion had a deadline, when the raffle took place.

While in the two first cases information loses novelty and seems to became less valuable and thus less retweeted (as argued by Wu & Huberman, 2007), in case 3 the information gains value as the final deadline approaches. However, after the deadline, the number of RTs quickly
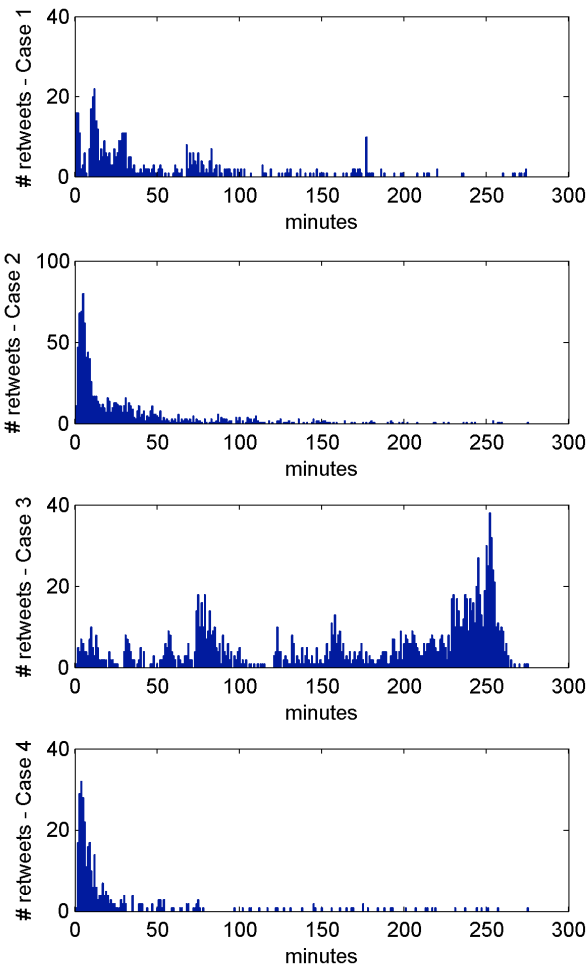

Figure 4: number of retweets per minute for each case

falls to zero.

Therefore, while novelty is certainly a factor affecting retweets, other values may also emerge. In case 3, the value was not to spread the information. In fact, spreading it would reduce the chances one has to win the prize.

Therefore, users have an incentive not to spread until the last minute, effectively reversing the dynamics observed for other cases.

Conclusion

These results indicate all three benefits of information access as a form of social capital (as proposed by Burt, 1992) influenced retweets in the examined cases. All three benefits generate values both to who is retweeted and to who retweets, even though in different amounts. Nonetheless, retweets are perceived by users as a way to create private goods and not public ones (differently from Benkler's perpective, for example). Public goods seem to be rather a side effect of users' actions.

Retweets happen in a highly competitive context. Not only because users are competing for receiving RTs and mentions, but also because information is competing for attention. Thus, although retweets are a form to gather some values, often, these values are only accessible to few users.

Referrals, for example, while increase visibility and credibility, also add some part of these benefits to users who retweet. Although the chances of being retweeted as a source of a RT are sparse, most answers on the questionnaire pointed to this hope as a motivation for retweeting. Thus, referrals in retweets create both visibility and credibility, and help build a reputation. Although creating new content may increase the amount of visibility (if retweeted), there is a competition for attention and many users, for lack of time to seek for information, simply retweet information they think will interest his/hers followers.

Information access is mostly a side effect of users seeking for social capital. Thus, most users explained they retweet information they believe will interest their followers and information and thus, will increase their chances to be also retweeted. This means that public benefits associated to social capital are less important to users than private benefits. However, because users engage in these behaviors, retweets are able to make information travel within social networks, thus, creating the values the majority of respondents associate to Twitter.

While timing is also an important value for users, by examining the tweets we found out that depending on the type of retweet, their behavior in time may change. Thus not all retweets fade in time based on the novelty factor.

Retweets are thus a form to gather some social capital without having to invest so much time in searching for news. While few users benefit more from retweets, the search for individual values seems to be a motivation that guides part of these practices. Even though, how users'

perceive the content of the retweet also seems to influence what is retweeted and how it spreads.

This paper reflects an exploratory approach showing that retweets are closely linked to the perceptions and motivations of the users who retweet. Thus, understanding these motivations and their related behavior may be key to understand also, how retweets construct value in Twitter.

This study also has limitations. The results are limited to the studied cases and obviously, are not valid to every retweet in Twitter. However, it has answers from users who actually do retweet information. Even though not everyone in Twitter is active and most users are passive, as Romero et al. (2010) pointed out, the results may show a glimpse of the motivations among users who actually engage in information diffusion.

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