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How People Share Information about Food: Insights from Tweets Regarding two Italian Regions*

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ABSTRACT

Sharing information about food through Twitter contributes to the evolution of food cultures, accelerating the exchange of information and knowledge about food. The aim of this study is to describe the type of information regarding food shared on Twitter and what kind of network is established between Twitter users in those cases when the #food in question is associated to a geographical area (#Tuscany or #Sicily). Using two different methodological approaches, combining quantitative tools with Network Analysis, the study highlights the fact that there are differences between the two networks surveyed, both with regard to the actors involved and to the way in which they share information on Twitter.

Keywords: Twitter; Network analysis; Food; Hashtag; Italian Regions

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1 Introduction

Food cultures have always been influenced by their place of origin. They reflect a fundamental paradox, express a sense of 'collective authenticity' in national cuisines (Lindholm, 2008) but are also constantly open to creative practices that allow the mixing of new and traditional elements (Deuze, 2006). According to Wilson (2006), food and drink are symbolic of so much in society and culture, but also as commodities food and drink are elements in essential economic and social processes of production, distribution and consumption. Furthermore, eating as an activity figures prominently in many diverse private and public social behavioural processes, whether they be the everyday practice of social life or the stuff of extraordinary social events, either unpredicted or recurrent such as, for example, might be found in the rituals that involve feasting, fasting or in the particular uses of food and drinks. Finally, the food ingested says something meaningful about people; to themselves and others, in the processes of social identification, that are at the heart of ethnic, national, class, gender, sexual, local and other identities. In other words, food cultures distinguish national identities but at the same time are means of "cultural transmission" (Lee et al., 2014) and sharing food is an important aspect of culture. People share food in their daily lives – for example, family dinners or lunches with colleagues - as well as on special occasions and celebrations. They also share food as a means of welcoming new people to their homes and communities, and often visitors bring food to be shared as a gift (Lofgren, 2013). Food sharing is a traditional feature of human civilization, both as a mechanism through which livelihood is guaranteed and as a means of cementing social relationships (Kaplan and Gurven, 2005). Sharing food unites communities and is a central component of the sense of collective belonging (Fischler, 1988). According to Montanari (2006) and Belasco (2008), sharing food helps to give it meaning, to elevate it to its status as culture, and forms communities and cultures. Food is a driver and an early adopter of new technology – for production, preparation, distribution and consumption (Santisi et al., 2015). If sharing food, and sharing recipes, are fundamental aspects of cultural identity and key communication tools, it makes sense to investigate how this sharing occurs in new media and through new technology (Lofgren, 2013).

Social media's involvement in the evolution of food cultures accelerates the exposure and transmission of food practices to a wider audience, thus enabling the growth of food knowledge (Choi and Blevis, 2010; Choi and Blevis, 2011; O'Hara et al., 2012; Lee et al., 2014). Sharing information about food through Social Network Sites (SNSs) contributes to the evolution of food cultures, accelerating the exchange of information and knowledge regarding food, while at the same time expanding possibilities for hybridization. On the one hand, such virtual spaces provide a platform for sharing original versions of food practices, while on the other, the participation and interactivity of users allow hybridization of food practices (Hebdige, 1979; O'Hara et al., 2012; Barker, 2003; Foth et al., 2011) and facilitates greater awareness of them. The sharing of news and images about food is not just an information- sharing practice, but also a process that reflects the expression of self-identity in online and offline environments (McGaughey, 2010), alongside personality attributes.

In view of the above premises, the authors want to investigate whether: 1) there is a specificity on the part of users of social media, such as Twitter, in the use of some words to share their own attitudes/food experiences, depending on the region in question; 2) tweets regarding food could make up specific networks of relationships among all the actors who send them to refer to food a particular region.

This paper is structured into four sections. The first is related to food sharing and the social media (and particularly Twitter). In the second, the aim and design of the research is introduced. It is articulated in distinct phases, linked to the search of those conversations on Twitter that are about food in some territories, and to the formation of a database on which the Network Analysis has been applied. The third section shows some quantitative results that are related to the search modality that is operated on Twitter and the results of the Network Analysis applied. Finally, we conclude with show some suggestions and limitations of the study.

2 Sharing food

The starting point of this research is the exponential growth in social media and connections which fosters an increase in the relationships between people. This growth offers an opportunity to broaden our knowledge of people's intentions and behaviour, as it provides access to information connected to real-life situations (Citrin et al., 2003; Meixner et al., 2015) even though it is influenced by the digital environment in which they operate (Ngai et al., 2015; Stephen, 2016).

The importance of social media in participation and interactivity is evident because their different features allow people to share information and build an identity based on their goals.

As data provided by WeAreSocial (2017) show, on average 37% of the world's population have an active Social Media account (52% for Italy of whom 25% use Twitter) and spend 2.4 hours per day on Social Media (WeAreSocial, 2015). Social-media-generated networks are based on the sharing of interests and imply both information exchange and the creation of relationships between the different users belonging to them (Ellison et al., 2007; Brown et al., 2007; Lee, 2013; Zhao et al., 2012). Indeed, as a survey from Globalwebindex (2017) shows, among the main reasons for the use of Social Media are: contact with friends and other people, sharing pictures, videos and opinions and searching for entertaining content and products to buy.

According to a study on the state of social media (Nielsen, 2012), 70% of the interviewed consumers indicated that they trust online consumer reviews. People who post online feedback had generally extremely positive or negative experiences (Litvin et al., 2008). The widespread diffusion of Social Media, including Social Networks (Eurobarometer, 2016) and their ability to generate and share a vast amount of information (Carr et al., 2015; Meyer et al., 2015), expands the possibilities to carry out empirical researches in social sciences (Whelan et al., 2016).

Amongst the different Social Network active on the web, Twitter is one of the most popular micro-blogging services (Peters et al., 2013; Duggan et al., 2015; Twitter, 2015; Rains & Brunner, 2015) and has provided an impulse to the use of microblogging as a research tool with different objectives (Williams et al., 2013).

The choice to use Twitter for the analysis of human behaviour has been made considering many aspects. The shortness of the posts (max 140 characters) reduces the complexity of interpretation of the text to be analysed but at the same time limits neither the variety of topics nor the types of relationship between the users (Pochampally and Varma, 2011). Moreover, being able to highlight some words (hashtag) to stress a message boosts its sharing possibilities.

The spread in the use of #hashtags throughout social networks is of key interest to both academics and industry professionals. Twitter is the first SNSs to use the hashtag as an instrument to index its contents, and its hashtags are more versatile than those of other sites.

There have been various researches involving analysis of twitter applications and the opportunities they offer. Vidal et al. (2015), Bruns and Stieglitz (2013), Boyd et al. (2010) and Java et al. (2007) focused on the research issues that could occur using twitter as a source of information. Chae (2015) studied supply chain analysis and the role that Twitter plays in the relationships between the different actors. Barry et al. (2015) and Öztamur and Karakadılar (2014) investigated the role which twitter plays in business and marketing strategies and finally Gaither and Austin (2016), Sashittal et al. (2015), Kim and Park (2014) and Jansen et al. (2009) considered brand analysis and consumers' opinions.

Furthermore, Twitter has been used as an instrument for the analysis of geo-localization effects (Widener and Li, 2014) and for the description of tourism phenomena (Mich, 2011; Kavoura and Stavrianea, 2014). Nevertheless, analysis of Twitter as an instrument for sharing information, news and different events (emergencies, health, politics, etc.) is the most studied (Meyer et al., 2015; Shan et al., 2015; Williams et al., 2013; Rutsaert et al., 2013).

Food represents one of the key themes discussed on Twitter and consequently there are various topics related to food and twitter in scientific research. York and Brewster (2013) considered the extent to which each section of the food supply chain is represented in Twitter. Using exploratory research, the authors found that consumers are the segment of the food chain which is most represented and logistics the least represented. Abbar et al. (2014) examined the potential of Twitter in providing insight into US-wide dietary choices by linking the tweeted dining experiences of users to their interests, demographics, and social networks. They also proposed a model to predict region-wide obesity and diabetes statistics and demonstrated that areas with higher education levels tweet about food that is significantly less caloric. Harris et al. (2014) carried out more in-depth studies regarding the use of social media as a tool for communication about health. They examined communication about childhood obesity on Twitter and their results showed that more individuals use the network than organizations. Few government and educational tweeters were in the network, but they were more likely than private individuals to be followed by others. Widener et al. (2014) examined Twitter for geo-located messages to look into the possibilities of monitoring and mapping outbreaks of diseases like influenza, and to understand how geo-located tweets can be used to explore the prevalence of healthy and unhealthy food. Vidal et al. (2016) proposed research into emotional responses to food and beverages, analysing consumers' spontaneous expressions regarding food-related emotional experiences. Their results suggest that emojis and emoticons seem to be an easy and intuitive way to express emotions in a food context. Finally, Vidal et al. (2015) presented a case study on the topic "what people say when they tweet about different food situations". The results of their research explained past food choices, information on what was consumed,

when, where, with whom and why it is contained in the tweets, confirming the potential of Twitter data as a source of information on food choice decisions.

As highlighted in the literature, Twitter shows considerable potential as an easily-available source of information for researchers. Information that can be analyzed using different approaches. It is on the basis of these considerations that this study uses conversations on Twitter, a particularly contemporary information-sharing tool, to analyze links between culture, food and territory.

3 Methodology

The starting point for the research method (figure 1) was the choice of which social platform to use in order to carry out the study.

Figure 1. Overview of the research method

In this study, and after comparing with others (Barry et al., 2015; Williams et al., 2015; York and Brewster, 2013; Gaspar et al., 2014; Yang and Rim, 2014; Kim and Park, 2014), it was decided to choose the social microblogging platform Twitter (http://twitter.com). In this paper the tweets' content has been analysed through both content analysis and network analysis.

Subsequently, the regions where the survey was to be carried out were chosen. The choice fell on two "sample" areas Sicily and Tuscany. These two territories are known for their attractiveness to tourists (ENIT, 2017) and are identifiable within the web for their food and gastronomic traditions (Reputation Manager and Networklab, 2015). Sicily, especially, lends itself very well to this type of analysis, because its geography (it is an island), are immediately and easily identified. Tuscany was chosen not only for its international reputation but also because it is renowned for its fine food and wine production. The final decision of the researchers was also dictated by the need to be able to compare regions with very different food traditions and which were geographically distant from each other. This choice provided a perfect comparison between the centre-north and the south Italy.

From a methodological point of view, a tweet research was carried out in order to analyse conversations related to food in the regions to be studied. The keywords that were entered in the search engine provided by the twitter.com website were the words, "food" and "sicily", and then, "food" and "tuscany", in the form of hashtags (the hashtag filter).

In total, for both researches, nearly a thousand tweets were examined in the period between November 2014 and February 2015. Each tweet, in addition to the text in the message, included other information. For instance, the username of the user who had posted the tweet, the classification, whether the message was tweeted or re-tweeted; and finally, the date of the tweet. Images and videos were not considered.

During the initial phase, all the tweets that were collected that contained the hashtag filter were placed in a text file, after "cleaning" the data (meaningless hashtags were eliminated). From this file a database was constructed for each area, and this was used to identify the characteristics of the post, using a classical Content Analysis approach (Humphreys et al, 2013; Dooley, 2016).

Content analysis is one of the main methods for obtaining an overview of what people talk about when tweeting (Hambrick, et al., 2010; Humphreys, et al., 2013). In the literature the studies on food using data obtained from Twitter that indicate word counting are common (Carr et al., 2015; Fried et al., 2014; Worch, 2014; York and Brewster, 2013), but few researchers used the geographical area connected to food as a research key.

Necessary codification procedures were adopted to classify the content of the tweet into categories by applying an inductive codification approach (Krippendorff, 2004; Bengtsson, 2016). During the screening of the data, an analytic process was developed in order to define the categories in which the data were classified (Thomas, 2003; Vidal et al., 2015). The final categories were discussed among the research

team. Twelve categories of hashtag were designated (table 1). In the table the names of the 12 categories are stated together with some examples (in English and in Italian to represent the real characteristics of the dialogues investigated), to understand better the motivations which guided the authors in their choice of the 12 categories.

Table 1.
Identified categories and designation examples (English translation in bracket)

Category	***Example of hashtag***	***Example of tweet***
Events	#AnnoNuovo (newyear)	"L'Antica Vigna" vi augura Felice #AnnoNuovo ("L'Antica Vigna" wishes you Happy New Year)
Geographical reference	#Lucca*	#Lucca gioiellino Toscano… bella in tutte le #stagioni #Toscana (Lucca gem of Tuscany ... beautiful in all seasons Tuscany)
Qualitative reference	#sweet	Cannoli: chi non li ha mai assaggiati? #sweet (Cannoli: who has never tasted them?)
Physical distribution of food	#mercatorionale (local market)	Sicilia bedda! #sicily #sicilia #catania #palermo #mercatorionale #fiera #feradicatania
Sensations (comments)	#delicious	A #delicious tuscan snack to enjoy the flavors of #Pruneti #Extravirgin #Oliveoil #gnam #yummy #food #Tuscany #oil
Specific food	#chianina**	InstaPic by wine_passion: #tbone #bistecca #toscana #tuscany #italy #food #chianti #chianina #qualità #quality #pas…
Actions, words and information related to food and tourism	#cooking	One of these #cooking #classes in #Tuscany will make you want to be a chef!
Neologisms, tags	#foodporn	Pasta e fagioli: italian winter bean and pasta soup. #food #foodies #foodporn #italy #Tuscany #tuscanygram
Company or brand advertising	#Macelleriabacci ***	#Hamburger #Chianina #Italy #Tuscany #shareflorence #Ecommerce #Food #Macelleriabacci
Social references (local, regional, Italian, etc…)	#italianFood	Something to die for #food #italy #italianFood
Category of food (wine, pasta, meat, etc.)	#vino (wine)	Thousand Faces of #Tuscany Mai stati a Montescudaio? #Montescudaio #pisa #vino #food #borgo#bellezza #borghitosca.. (….Did you never gone to Montescudaio…)
Other	#relax	#Pisa #Tuscany #travel #blog #Italy #relax #summer #joy #wine #food
(*) name of a town (**) an Italian breed of cattle raised mainly for beef (***) a famous butcher shop in Florence		

To definitively allocate each hashtag to its category a cross-checking procedure (Barbour, 2001) was used. Each researcher autonomously conducted this categorisation in the different regions and later with a final joint analysis session, conclusive results were defined. Only in a few cases was it necessary to compare the different interpretations of word meanings by checking the context. As stated above, the key words were analysed for each defined category in order to capture the differences between the two chosen regions.

Subsequently, all the tweets that contained a mention* were identified. This allowed for a reconstruction of the network of relationships through a Network Analysis (N.A.). A Social Network Analysis (SNA), aims to analyse, collect, process and propose hypotheses, based on relational data (Scott, 1991). It bases its of study on some aspects similar to social reality. The structure of the social network certainly influences the

* A mention is any tweet that contains the @ symbol, followed by the username of the user. Through a mention, it is possible to send a public message.

behaviour and the choices of the individual (see for example Arentze & Timmermans, 2008) but in turn, the actor contributes through his or her actions, in order to change the surrounding framework. The network, therefore, was analysed as a network of relationships. The basic assumption was that each actor (each element in the reticulum) interacts with other individuals and this process changes the behaviour of both.

The term “social actor” indicates distinct types of entity which together make up a specific network and which may be represented by people, groups, organizations, or aggregates. The links, however, are used to represent the flow of resources, relationships of friendship, transferal, or other structured relationships, between the nodes.

For a better understanding of relations within the network, a structural change was made in the two networks under investigation. It consisted of a grouping of the various accounts that formed the two networks according to their nature, so as to form homogeneous classes[†] through a coding procedure that sorted group users into categories using an inductive coding approach (Krippendorff, 2004). The two networks were encoded (Table 2) to the group users uniformly, according to 12 categories, and thus, made a distinction between the different types of accounts (consumers, public institutions, tourism services, transport, or communication subjects, etc.). Among these, several users were identified (especially bloggers and journalists), who were particularly followed by a number of followers, and who were grouped into a category called "Stars".

Table 2.
List of Categories by which the Accounts that had received or had sent a Mention were grouped

Categories
e-commerce
Consumers
Public Institutions
Media: Instruments (blog, magazine, newspaper)
Media: Subjects (blogger, writer, journalist)
Wine Producer
Public Institutions
Restaurants, Bars, Bakeries
Tourist Services
Stars
Accommodation
Other

This choice was dictated by the idea that the presence of individuals with many followers, could "pollute" the evaluation of the results. In other words, an analytical process was developed, by means of which the categories into which the data were grouped were defined by the researchers during a reading of the same data in a raw form (Thomas, 2003; Vidal et al., 2015). The final categories were then established by a consensus among the authors after a first "blind" revision.

It was noted that in networks of this kind, it was difficult to identify, without using location-based systems, where the they were tweeted. In studies on social capital that are generated in specific areas, this could be an important consideration. In the case of our research, in whatever way the final message was seen or viewed, it was considered that the "origin" of the tweet would not substantially change the considerations upon which the analyses were made. However, it can be said that over half of the categories that were identified in our study could be traced to those individuals who resided, worked, or had a direct influence on that region. Only for the categories related to media and consumers could the "physical" link with the territory not be established with certainty.

The data was put together using a new matrix that permitted the application of N.A. For processing the density and the centralization indices, UCINET software was used (Borgatti et al., 2002). For the network’s graphical representation, NetDraw software was used (Borgatti 2002). We presented two sociometrical networks (one for each territory) that represented the relationships in terms of the mentions that arose within twitter.com between the "homogeneous" subjects. Each relationship was represented by an arrow,

[†] This choice was made necessary after a first analysis of the networks. They were disconnected and dispersed. The density value for both of the networks was extremely low (0.0047 for the network of Sicily and 0.0050 for the network of Tuscany). That is why we opted for an analysis of the data that was grouped into classes, while recognizing that this procedure involved an inevitable loss of information.

because the relationship was considered to be asymmetric. We have made the arrows of different thicknesses in order to highlight the strength of the relationship that was expressed by the number of mentions.

The descriptive indicators for the N.A. were an analysis of density and some measurements of centralization. Density was one of the main descriptive statistics, often used as the main indicator of the degree of network cohesion. As for the notion of centrality, this was particularly useful as it allowed us to define the position of an actor within his/her network in relational terms, enabling us to highlight the degree of each account's propensity towards the others and the degree of its popularity. For the measurement of centralization, we use the "OutDegree", the degree of propensity towards others, and the "InDegree", that is the degree of popularity, in a standardized form (NrmOutDegree and NrmInDegree), in order to allow for a comparison of measurements between the different sized networks.

4 Results

Hashtag analysis

Research using twitter.com enabled us to identify 456 tweets for the filter hashtag for Sicily (3,339 hashtags in total) and 442 for Tuscany (3,037 in total). The total number of hashtags cleaned and with the key words of the research removed (food, Tuscany, Sicily) is slightly higher for Tuscany (2,073) compared to Sicily (1,903) (table 3). Considering the first 5 hashtags (excluding the key words and the name of the regions in Italian) in both regions "#italy", "#travel" and "#wine" were found. It should be specified that there are similarities in the language used in the two regions, as a matter of fact 110 common hashtags were discovered between the two databases.

Table 3.
Main statistics about hashtags

	Filter Hashtag	
	"food" AND "sicily"	"food" AND "tuscany"
Number of tweets	456	442
Number of total hashtags	3,339	3,037
Number of clean hashtags (with research keys)	2,887	2,914
Number without research keys, of which:	1,903	2,073
First five hashtags (not considering Sicily and Tuscany)	#italy (95) #foodporn (56) #italian (44) #travel (43) #wine (38)	#italy (126) #wine (98) #travel (74) #florence (68) #ecommerce (67)
Number of hashtags present in both groupings	110	

Tables 4 and 5 report the data for each region (number and percentage of the column) related to total hashtags (which defines how many times those categories of hashtags have been used) and "unique" hashtags (which highlight the importance of each words) and finally to the index of "repetition" of the "unique" hashtags within the group, divided into distinct categories. By observing these results it is possible to state that between the two regions the distinct categories have a different weight, considering the number of hashtags derived from the tweet in question. In Sicily the most popular categories are those which contain "neologisms and tags", "actions, words and information related to food and tourism" (both around 15-16% of the total) and, with a slightly lower percentage, those which contain "geographical reference" and "specified food".

Regarding the first category there is a net prevalence of hashtags which refer to images related to food, whereas for the second category the most frequent hashtags are #travel and #cooking; regarding the third (Geographical reference), it is not possible to highlight a net prevalence of a specified place in the region. This could be mean that for this region communication regarding location and food uses new words or more modern images aimed at the most active users.

Table 4.
Sicily: Distribution of hashtags

Categories	Hashtag total no. (A)	% column A	N. of "unique" hashtags (B)	% column B	Ratio A/B
Neologisms, tags	308	16.2	113	15.8	2.73
Actions, words and information related to food and tourism	290	15.3	108	15.1	2.69
Geographical reference	254	13.4	66	9.2	3.85
Specific food (carbonara, arancino, etc)	246	12.9	106	14.8	2.32
Sensations (comments)	172	9.0	55	7.7	3.13
Other	170	8.9	101	14.1	1.68
Category of food (wine, pasta, meat. etc)	146	7.7	24	3,4	6.08
Social references (Catania, sicilian, Italian, etc)	101	5.3	24	3.4	4.21
Events	89	4.7	23	3.2	3.87
Company or brand advertising	77	4.1	57	8.0	1.35
Qualitative reference	25	1.3	22	3.1	1.14
Physical distribution of food	23	1.2	16	2.2	1.44
Total	1,901	100.0	715	100.0	2.66

Table 5.
Tuscany: Distribution of hashtags

Categories	Hashtag total no. (A)	% column A	N. of "unique" hashtags (B)	% column B	Ratio A/B
Geographical reference	453	21.8	86	12.9	5.27
Actions, words and information related to food and tourism	285	13.7	109	16.3	2.61
Neologisms, tags	252	12.1	66	9.9	3.82
Category of food (wine, pasta, meat, etc)	240	11.5	56	8.4	4.29
Other	225	10.8	142	21.2	1.58
Specific food (carbonara, arancino, etc)	134	6.4	49	7.3	2.73
Company or brand advertising	129	6.2	50	7.5	2.58
Physical distribution of food	103	5.0	19	2.8	5.42
Sensations (comments)	81	3.9	32	4.8	2.53
Social references (Catania, sicilian, Italian, etc)	71	3.4	22	3.3	3.23
Qualitative reference	66	3.2	30	4.5	2.20
Events	39	1.9	8	1.2	4.88
Total	2,078	100.0	669	100.0	3.11

By observing the mean of the repeated hashtag it is possible to observe a deviation from the mean (2.66) of the category "food categories" (6.08). In this case the most repeated hashtags are #wine and #fish, two characteristic products of the region's food tradition.

Regarding Tuscany, the most important category is "Geographical reference" with 21.8% of the total hashtags (12.9% if it is not the total but single words being considered); in this case the reference is to Italy and Florence, the capital of the Region, (#firenze, #florence). The category with the second most words is "actions, words and information related to food and tourism" with 13.7% of the total (16.3% if the difference between the words is considered).

The importance of tourism in the region is confirmed by the frequency of the words #travel, #holiday #relax. The other two categories in order of importance are "neologisms" and "food categories" both with a value around 12%. It should be noted that almost half of the food category is #wine. From this data it is possible to demonstrate clearly the strong connection between food and region. Another strong element

is the category “physical distribution of food” which has a words percentage of 5%. This data is higher than in Sicily (around 1%); this could indicate a lower level of performance on the part of retailers in promoting the products via Twitter or that the consumer is not used to posting where he has purchased the food.

Network analysis

As previously explained, the survey was used to evaluate the network that was generated in twitter.com, with dialogues on food and on the regions that were being studied, using the ‘mentions’ that were inserted in the messages (Table 6). The searches by using the hashtag filter generated an adjacency matrix of multi-valued types that consisted of 154 members for Sicily and 138 for Tuscany, who received or sent a mention. Overall, the mentions were 123 for Sicily and 114 for Tuscany. In both of the networks, less than a third of the tweets included at least one mention (Sicily: n = 100; 22%; Tuscany: n=96; 22%).

Table 6.
Main Statistics about a Mention

	Hashtag Filters	
	“food” and “sicily”	“food” and “tuscany”
Number of mentions	123	114
Number of tweets with at least one mention	100 (22%)	96 (22%)
Number of users who received or sent a mention	154	138
Maximum number of mentions submitted to the accounts	11	12
Maximum number of mentions received for the accounts	6	6

An in-depth analysis of the two networks has enabled a more detailed reading[‡]. From a statistical point of view, we have been able to see how both networks (which for convenience of presentation, we have called the "Sicily Network" and the "Tuscany Network") show quite similar values (Table 7; Figure I and II, in appendix). The density of the "Sicily Network" was 0.30, while the "Tuscany Network” was 0.33. This meant that both of the networks presented approximately 30% of all possible links. This value is not particularly high (as is well known, the index ranges from 0 to 1), but it has demonstrated how in the two networks they did not present adequate levels of cohesion. In addition, for both networks, the values of the standard deviations were close to optimal (with the binary data, the maximum variability obtained had a density of 0.5).

Another index that was considered was centrality. It enabled us to understand which actors were active when sending mentions, or conversely, how popular they were when receiving (Table 7). The corresponding values of centrality (“OutDegree”, the degree of propensity towards others and “InDegree”, the degree of popularity), have been displayed in a standardized form[§] (NrmOutDegree and NrmInDegree). The network centralization values of “InDegree” showed a low level of network centralization for the network of Tuscany (30.0%). This is quite unlike the Sicily network (66.2%). This means that the “InDegree” indexes for each account category for the first area are quite homogeneous. With regards to the “OutDegree” values (the degree of propensity towards others), the results are different. In fact, it was the Tuscany region network, in this case, which showed significantly higher values (52% compared to 46.3% for the network of Sicily).

Statistical information on the degree of centrality measured the mean centrality, which was quite similar for the two networks (30.3 for Sicily and 32.8 for Tuscany), but it was modest, especially when considering the number of actors in the two networks, the standard deviations and the variances, describing the levels of homogeneity or heterogeneity of these accounts within the networks.

Table 8 shows the standardized values of “OutDegree” and “InDegree” for each category of accounts (Freeman's Degree of Centrality Measures). The centrality of each node depended on the number of mentions that it received (NrmInDegree) and sent (OutInDegree). Looking at the two networks, it is possible to see that in the Sicilian network, the main category of emitted mentions was in "Media: Instruments”, while in the Tuscan network, it was Consumers. These results enable us to make some

[‡] To calculate the density and the centralization indexes for each territory, the database was dichotomized, in order to simplify the type of ties (in this study, the ties were the mentions) into "present" or "absent" (thus, not considering the number of received mentions, but only considering the existence of a mention). This has obviously produced some loss of information, but the use of binary data has provided for a greater simplicity for the analyses (Hanneman and Riddle, 2005).
[§] These values were divided by (n-1) and then were multiplied by 100 (the percentages)

initial remarks. The type of users that started up conversations in the Tuscan network were more familiar with twitter.com, while probably the Sicily network users were on the contrary, "domestic."

Table 7.
Network indices calculated on the networks of mention (*)

	Sicily Network	Tuscany Network
Density (Std dev)	0.30 (0.46)	0.33 (0.47)
Network Centralization – OutDegree **	46.3	52.0
Network Centralization – InDegree **	66.2	30.0
Std dev – OutDegree **	17.5	19.6
Std dev – InDegree **	27.4	22.9
Variance – OutDegree **	307.6	383.5
Variance – InDegree **	748.4	528.9
Mean **	30.3	32.8

(*): dichotomized networks
(**): standardized values

Table 8.
Freeman's degree centrality measures

Nrm OutDegree			
	Sicily Network		Tuscany Network
Media: instruments	72.7	Consumers	80.0
Media: subjects	45.5	Media: instruments	50.0
Restaurants, bars, pastry shops	45.5	Media: subjects	50.0
Consumers	36.4	Restaurants, bars, pastry shops	30.0
Other	36.4	Accomodations	30.0
Public institutions	27.3	Tourist services	30.0
Stars	27.3	Public institutions	30.0
Wine producer	18.2	Wine producer	20.0
Accomodations	18.2	e.commerce	20.0
Tourist services	18.2	Stars	10.0
Food productions	9.1	Other	10.0
e.commerce	9.1		

Nrm InDegree			
	Sicily Network		Tuscany Network
Media: subjects	90.9	Consumers	60.0
Media: instruments	72.7	Media: instruments	60.0
Consumers	54.5	Media: subjects	60.0
e.commerce	36.3	Restaurants, bars, pastry shops	50.0
Accomodations	27.3	Tourist services	50.0
Stars	27.3	Stars	30.0
Wine producer	18.2	Accomodations	20.0
Tourist services	9.1	e.commerce	20.0
Food productions	9.1	Wine producer	10.0
Restaurants, bars, pastry shops	9.1	Other	0.0
Public institutions	9.1	Public institutions	0.0
Other	0.0		

For both of these networks, there were very active "Media: Subjects" and "Restaurants, bars, and pastry shops" (45.5% for both). For this category in the Tuscany network, it had a very high value relating to the degree of popularity (50.0%), rather than propensity (30.0%).

When considering the degree of popularity within the two networks, Sicily's "Media: Subjects" network had a very high value (90.9%), whilst in the Tuscany network it was high for "Consumers", "Media: Instruments" and "Media: Subjects", all with the same value (60.0%). It was interesting to note that the Sicily indices showed a degree of centrality within the Stars category. That is to say, those individuals who had a Twitter account with many followers had the same value (27.3%), while in the Tuscan ones, it was higher in degree of popularity (30% compared to 10%). Among the identified categories, public institutions, including local government departments, municipalities, along with institutional deputies who have been promoting their territories, showed similar behaviour in both territories. They had an average value of low propensity toward others and a very low value with regard to popularity.

Worthy of note were the results of the "Tourist Services", category which included those companies that offer such services as sightseeing. This category in the Sicily network had a low level of popularity and had a propensity towards others (respectively, 9.1 and 18.2), while in the Tuscany network it was surprising to note that the highest value of popularity (50.0%) was greater than that of propensity (30 %).

Finally, the category of food production was absent from the Tuscan network.

5 Conclusion

The study has clearly demonstrated that the word "food" in twitter conversations regarding the two regions is used with different connotations. In posts regarding Sicily, "food" is mostly paired with general-use hashtags written by users to exalt the shared content (be it text or multimedia file); in this way the word, used together with "food" comes very close to the concept of "advertisement". For "Tuscany", however, "wine" is the word most paired to "food" and "geographical reference" the most popular category. Additional hashtags are added with reference to either the place in which the food mentioned in the post is produced/consumed or another category of food, in this case wine. It may be assumed that in this context, in fact, surrounding hashtags are due to the user's experience while in a precise place or while accompanying wine with food. Then, the purpose could be also the exaltation of one's own post, the user does it by using real references based on his/her experience, and thus words are given a descriptive meaning. Some studies highlight how this tagging of experiences done using hashtags makes the experiences themselves unnatural (Eugeni, 2010). Using certain hashtags in post sharing does not mean that the words used always represent an authentic experience: indeed, they can also be words that represent an experience that the user has not had.

Another element that must be considered for a better reading of the information conveyed by the study is that a qualitative inquiry, more connected with the overall analysis of tweet texts, could have helped to understand what kind of contents (texts, multimedia contents) are more tied to the word "food"; whether the post was made to describe an action or a shared experience or something else. In general, there is an advantage in using data from SNSs for research, related to cost and timeliness, and this study also offers the chance to understand the relationship between food and other activities. The disadvantage lies in the use of keywords that are not durable with the passage of time. It suffers from vocabulary changes and low recall. It is not easy to understand if the food that people talk about was actually eaten, when, or even if it belongs to the person that talks about it (Abbar et al., 2014).

Regarding the network characteristics, these are evanescent and influenced by the actions of some of the types of "tweeter". Thanks to Network Analysis, it was possible to make a comparison between the two Italian regions of Tuscany and Sicily, both having particular and peculiar characteristics from the point of view of the objectives of this research.

Firstly, the low level of density in both networks. Considering the economic and social values that are derived from a dense relational network, the results are surprising, comparing, as they do, two regions that are internationally known for their gastronomic specialties. It can be assumed that the choice to use twitter.com might have influenced the data, considering that the use of this microblogging platform by firms of various kinds and by public institutions still seems limited. Few are the firms that use tweets as a tool for relationships and communication, and even less in the case of public institutions. Tweets are often linked to influencer, the public person or individual people that in 140 characters want to share a judgment, information, or a feeling. This is evident in the second item considered regarding popularity indexes when emitting and receiving mentions. This has shown how different the behaviour is of some categories of subjects. Considering the degree of popularity inside the two networks, in Sicily's network, bloggers have a very high value, while in the Tuscan network, the first categories are consumers, blogs

and bloggers. In this sense, the low involvement of both territories when regarding public accounts (cities, local offices, and public institutions must be pointed out). In theory, they should mainly be interested in animating discussions on such topics as we have indicated. This is why firms could use this tool as an opportunity for the creation of synergies between subjects, in order to advertise products, events, etc.

In conclusion, the attention of researchers towards Social Network Sites is justified not only by their huge, world-wide penetration, but also by their inevitable economic and market implications. But there is an awareness that the analyses that have been conducted have an exploratory nature. They require further deep discussion, looking for any peculiarities of Twitter users and their behavioural differences, in terms of the typology of information that is managed. The information/knowledges exchange conveyed by SNSs regarding food and territory can contribute in some cases also to the promotion of individual economic actors operating inside it. Commercial companies – but this is true also for all the subjects interested into the economic and social development of a territory – operate in SNSs by looking for wider-ranging relationships that enable exchange or partnership, both between themselves and with others able to lead them to a wider "recognisability" and competitiveness (Aspasia and Ourania, 2015). The relationships of various types that arise should help to face up to an increasingly complex and competitive environment in which the important thing is to stand out from the crowd.

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Appendix

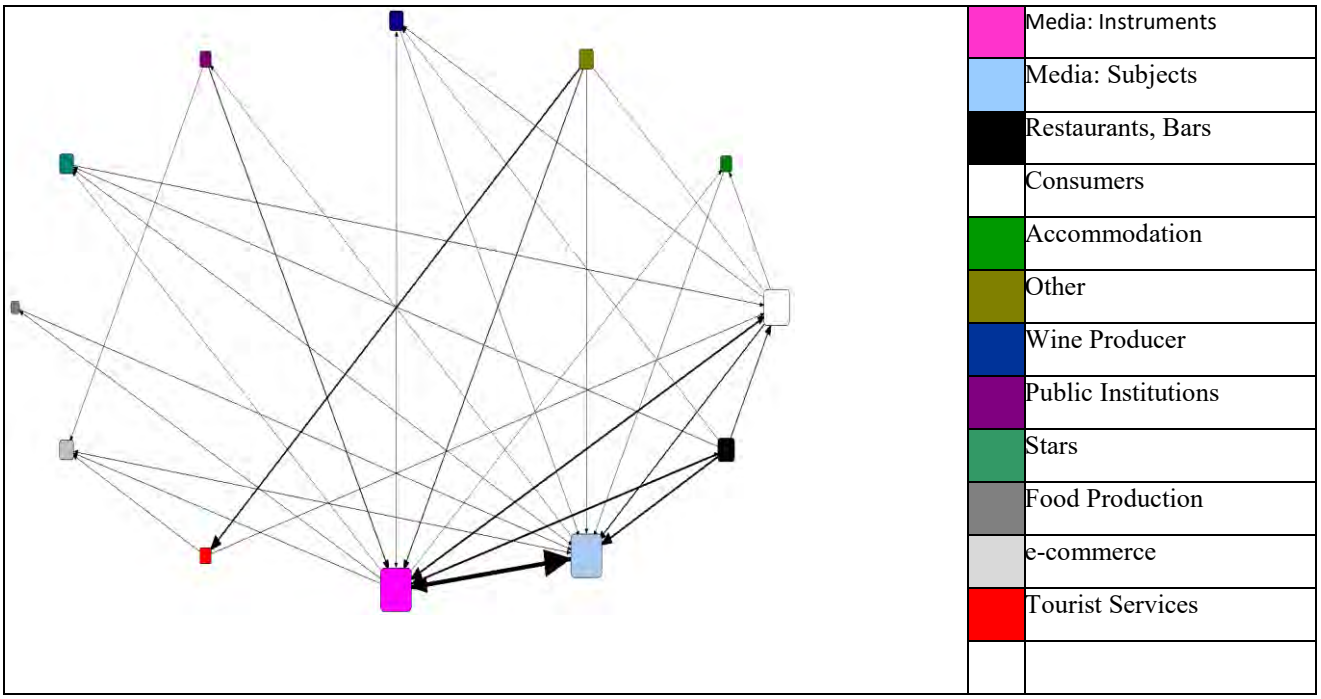

Figure I. Graphic network of mention relationship between Sicily and food hashtag

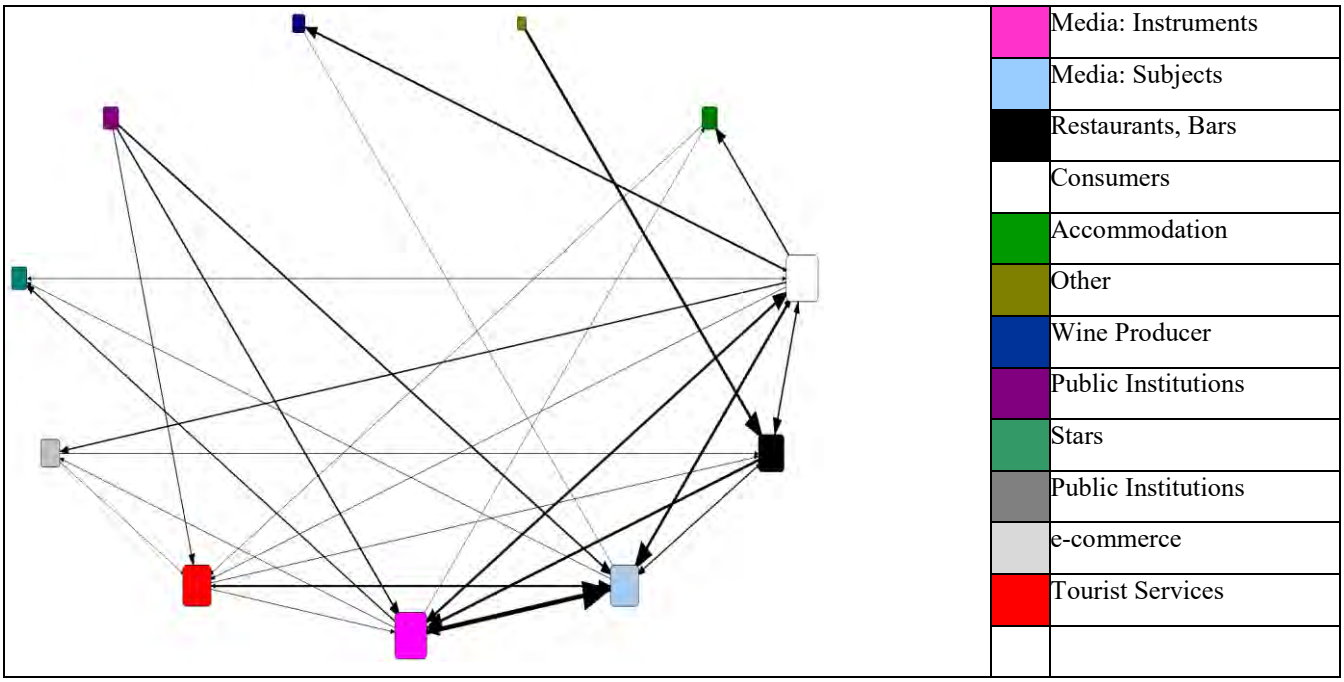

Figure II. - Graphic network of mention relationship between Tuscany and food hashtag