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## Expo Milano 2015: Legacies in Tweets

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### ABSTRACT

Expo is the Universal Exhibition that the city of Milan hosted from May to October, 2015, under the theme: “Feeding the Planet, Energy for Life”. Nevertheless, if the big event is important for awakening the world's interest and attracting investment, much attention is dedicated to the “Expo after Expo” phase, with the aim to keep alive the public discussion on these crucial issues even by the end of the exposition period.

In summary, what will be the legacies of Expo 2015? This work takes an innovative approach to this question by analysing Twitter data focusing on the “after Expo” period. More specifically, the analysis of the distribution in the Twitter sphere of a set of food-related topics (right to food, sustainability, food losses as examples) is performed. Results can represent an opportunity to understand if the discussion of the global challenges linked to the theme of Expo Milano 2015 can also bring lasting benefits in terms of public awareness.

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### 1. INTRODUCTION

Expo is the Universal Exhibition that the city of Milan hosted from May 1 to October 31, 2015. Under the theme: “Feeding the Planet, Energy for Life”, 140 participating countries contributed to the creation of a platform for the exchange of ideas and shared solutions on the theme of food, innovation and sustainable future. In addition to the exhibitor nations, the Expo also involved international organizations and civil society participants. With over 20 million visitors, Expo Milano 2015 provided an opportunity to reflect upon, and seek solutions to, the contradictions of our world: though global hunger has continued to decline, approximately 870 million people were undernourished in the period 2010-2012 (FAO, 2015) and, by contrast, 2.8 million people suffer from diseases related to obesity or overweight (WHO, 2009). In addition, about 1.3 billion tons of foods are wasted every year (FAO, 2011). For these reasons, the main issues raised by the Expo theme are related to conscious political choices, sustainable lifestyles, and the use of the best technology to create a balance between the availability and the consumption of resources.

Probably the main output of Expo2015 is the drafting of the Milan Charter<sup>1</sup>, a “*manifesto that engages everyone, men and women, citizens of this planet, in the fight against undernourishment, malnutrition and waste, while promoting an equal access to natural resources and a sustainable management of production*”. The Milan Charter explores the theme of Expo through four interconnected perspectives: food, energy, identity and the dynamics of coexistence. The document has been formally delivered to the Secretary-General of the United Nations, Ban Ki-moon, on October 16, on the occasion of World Food Day. Maurizio Martina, the Italian secretary of Agriculture, commented: “This tool,

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<sup>1</sup> <http://carta.milano.it/en/>

which is designed to be shared, is the outcome of the work of 500 experts: ordinary people, government officials, business people, representatives of international organizations and academics, all of whom have worked selflessly for a common objective”.

Nevertheless, if the big event is important for awakening the world's interest and attracting investment, much attention is dedicated to the “ Expo after Expo” phase, with the aim to keep alive the public discussion on the these crucial issues even by the end of the exposition period. In summary, what will be the legacies of Expo 2015? This work takes an innovative approach to this question by analysing Twitter data.

The application of social media analysis to food-related issues is an emerging trend, due to their potential in terms of volume of data, accessibility and interaction. Twitter, inter alia, has gained scholarly interest in the field of risk/benefit communication and consumer behaviour in food consumption.

Table 1 summarizes the main features of food-related studies dealing with Twitter data, enabling the identification of the strength and limits of this brand new type of analysis. First, it is a recent technique, being the majority of studies dated 2014-2015. Second, data collected are spontaneous expressions of Twitter users: therefore represent a true sample of actual/unsolicited opinions expressed on SNS in terms of language use and content. Third, the possibility to collect enormous amounts of data: sample sizes can reach millions of observations. Finally, part of Twitter data are geo-referenced, allowing research at different national, regional or urban levels.

More generally, Twitter data are extensively used to sound public opinion on a particular topic or event, from scientific conferences (Parra et al. 2015, Bombaci et al., 2015, Desai et al., 2012) to citizens’ political preferences (Ceron et al., 2014)

Author(s)	Year	Journal	Location	Aim	Method	Sample Size	Main Findings
Vidal et al.	2016	Food Quality and Preference	?	Consumer’s spontaneous expressions of food-related emotional experiences – emoticons and emoji.	TwitterR Package (R software)	12.260	Emoticons and emoji use is tailored to the content of the tweets. Non-verbal methods to measure food-related emotions.
Fried et al.	2014	2014 IEEE International Conference on Big Data	USA	Use tweets on food to predict state-level characteristics	Twitter public streaming API CoreNLP Software Latent Dirichlet Allocation (LDA)	3.5 million tweets	Tweets predicts overweight rate, diabetes rate and political leaning
Harris et al.	2014	American Journal of Public Health	USA	Examine communication about childhood obesity	NodeXL	1.110 Tweets	Twitter as opportunity to increase exposure to evidence-based public health information
Widener and Li	2014	Applied Geography	USA	Use of geolocated twitter data to monitor prevalence of healthy and unhealthy food references across the US	Twitter public streaming API Georeferenced Alchemy API for sentiment analysis	148.553 Tweets	Negative correlation between a tweet being about healthy content and located in a “food desert” tract.

<b>Chen and Yang</b>	2014	Applied Geography		Columbus, Ohio (USA)	Does food environment influences food choiches?	Python library Geocoded	81.543 Tweets	The prevalence of stores that stock fresh produce within neighborhood may significantly influence food choices
<b>Meyer et al.</b>	2015	Int.J. System Dynamics	Food	Germany	Social media analysis in Food Safety Crises (EHEC outbreak 2011)	uberMetrics Delta	3.931 Tweets	Crisis communication can benefit from web mining and social media analysis
<b>Vidal et al.</b>	2015	Food and Preference	Quality	Not specified (English language)	Explore the main topics included in tweets about eating situations (breakfast, lunch, snack and dinner)	TwitterR package (R software) Manual content analysis on a subset	16.000 for each eating occasion	Twitter has the potential to provide information about food-related behaviour – it is not a panacea (many limitations)
<b>So et al.</b>	2015	Health Communication		USA	Analysis of Re-tweets in dissemination of health information	Manual coding for common themes and emotions	1.25 million Tweets	Implications for designing social media based obesity-related messages
<b>Rutsaert et al.</b>	2014	Food Policy		Six European Countries	Social media as tool in food risk and benefit communication?	Interviews of stakeholders and experts	/	SWOT analysis
<b>Gore et al.</b>	2015	PlosOne		USA	Relationship among obesity rate and twitter content	Twitter Streaming API Mitchell et al. 2013 measure of happiness	25 million geo-tagged Tweets	Areas with lower obesity rate have happier tweets, frequently discuss about fruits and vegetables and physical activity

**Table 1. Review of Twitter-based, food-related studies.**

## 2.METHODS

In this work, we focused on the “after Expo” period analysing the persistence of the Expo-related issues of the Milan Charter in the Italian Twitter scenario. More specifically, we picked out a set of topics from the Milan Charter (right to food, sustainability, food losses as examples) and the analysis of their distribution into the Twitter sphere was performed.

TOPIC	Main issues
Research and innovation	<i>Increasing resources for research, transferring results, training and communication</i>
Nutrition	<i>Malnutrition, undernutrition, right to food, obesity, food paradox</i>
Environment	<i>Conserving biodiversity, clean energy, water and land management, organic food</i>

Food waste	<i>Recycling, regenerating and reusing, donating food in excess</i>
Others	<i>Typical products, local, GMOs</i>

**Table 2. The Milan Charter – Main Topics**

The Milan Charter proposes a global concept of sustainability: social (access to food), economic (innovation, yields), environmental sustainability. However, it should be noted that the document also contains strong commitments on many other issues, as combating child and unregulated labour, together with gender equality. This aspects goes beyond the purpose of this work, which focus on food-related issues only, and the full list of the topics considered is displayed in Table 2. Apart from the four main aspects of the Milan Charter (Research and innovation, Nutrition, Environment and Food Waste) an additional category was added to track in the Italian debate the interaction among the Milan Charter, tradition (typical products, local product, made in Italy) and innovation in food (GMOs). Indeed, the Special Eurobarometer 2014 (Special EB 419) on Public Perception of Science, Research and Innovation stated that Italy has the lowest proportion of respondents who think that both science and technological innovation will have a positive impact on the availability and quality of food in the next 15 years.

The methodology used to collect and analyse Twitter data is composed of a multi-step procedure:

1. Data collection

To download the data employed in the present paper, we relied on the Opinion Analytics Platform **VOICES from the Blogs** (<http://www.voices-int.com/>), a spin-off company of the Università degli Studi di Milano which develops analysis tools based on the R statistical engine. Data are directly downloaded from Twitter Streaming API, filtering for Italian as language and “expo, expo2015, expo 2015, expomilano, expomilan” as keywords. For the period November 1st- December 31 the final data set is composed of 138.671 Tweets.

2. Coding

The **iSA**<sup>®</sup> technique (Ceron et al, 2015) was used to analyse tweets, both in terms of contents and sentiment analysis (positive, neutral or negative opinions). iSA<sup>®</sup> is a human supervised statistical method consisting in 2 main step:

- In the first step human ~~just~~ read a text and associate a topic or opinion to it. This supervised part is essential in that this is the step where information can be retrieved from texts without relying on dictionaries or specific semantic rules, by enabling the identification of humour or double meaning expressions otherwise lost by traditional text-analysis software. This human coding activity has been applied on a training set of 563 tweets. As this coding process is sequential, the number of hand coded tweets is sufficient to obtain statistical significant results (see Ceron et al, 2015)
- During the second step of the procedure the computer, learning from the training set, extends the same semantic rules to the rest of the texts to be analysed, and the output is the direct estimation of the aggregated distribution of opinion in the data set. For a more formal description of the technique see Ceron et al. (2015).

### 3.RESULTS

#### 3.1 Tweeting about the Milan Charter after Expo

The official Expo Twitter account reached 729k follower, and posted 52k tweets during the six months Expo period. In terms of number of search per day, the trend shows its peak in the day just after the closing ceremony of Expo2015, November 1st. Then the number of tweets regarding the exposition rapidly decreased in the first week of November. Afterwards, the daily share of Expo-related tweets remained pretty stable until the end of December, always beneath the 5k tweets/day. Quite obviously, data show that the Expo debate quickly ceased to be a trending topic on Twitter. For comparison, the volume of Expo-related tweets/day in October was 12k (10k in September), while the peak of Tweets was registered in May, 2015 (27k tweets/day).

In parallel, the public discourse on the Milan Charter (Table 3) represents just a tiny fraction of the data set: the 90% of the tweets have been coded as off-topic (not on the topic of discussion: the word “Expo” is present but the text do not convey contents related to the Milan Charter).

MILAN CHARTER (WITHOUT OFF TOPICS)	Estimate	Std. Error	z value	p-value
No	87.512	15.654	5.591	0.000
Yes	12.488	15.900	0.785	0.432
Total	100.000			

Table 3. The Milan Charter - Distribution of Tweets, Sept/Oct 2015.

Excluding off-topics, the 87% of tweets at least refers to one of the main issues of the Milan Charter (see Section 2), but only the 12.5% directly mentioned the document. Nevertheless, the general sentiment toward the Milan Charter is mostly positive (86%) or at least neutral (14%): “We cannot come back from Expo. Milan Charter, innovation and metropolitan area”, or “Dissemination, shared knowledge and citizen awareness: the challenges of the Milan Charter”. In many cases Twitter users recognize the document as the real inheritance of Expo2015: “The moral and cultural legacy of Expo2015 go through the Milan Charter”, and even though the document has not been drafted without critics (“Slowfood e Caritas will not sign the Milan Charter: it is a document written by rich people for rich people”) they did not received a significant echoes by Twitter users.

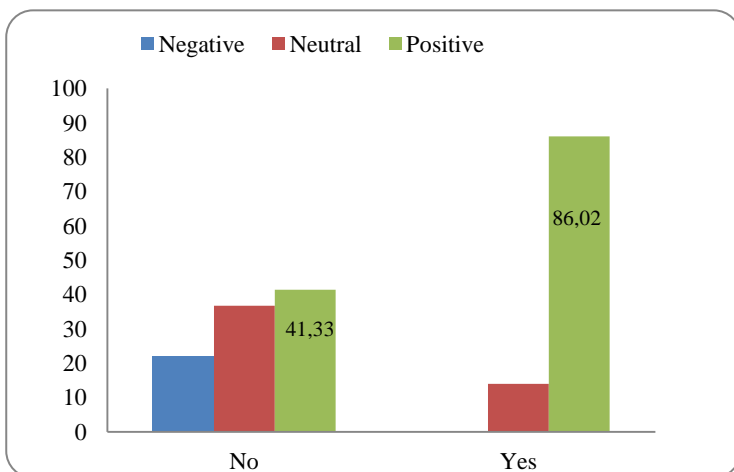
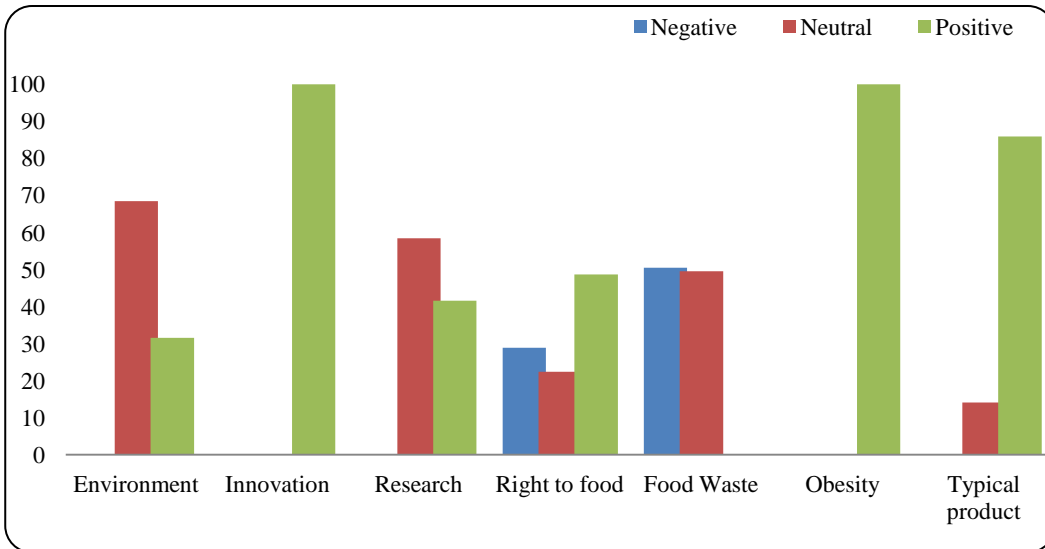


Figure 1. The Milan Charter, sentiment analysis

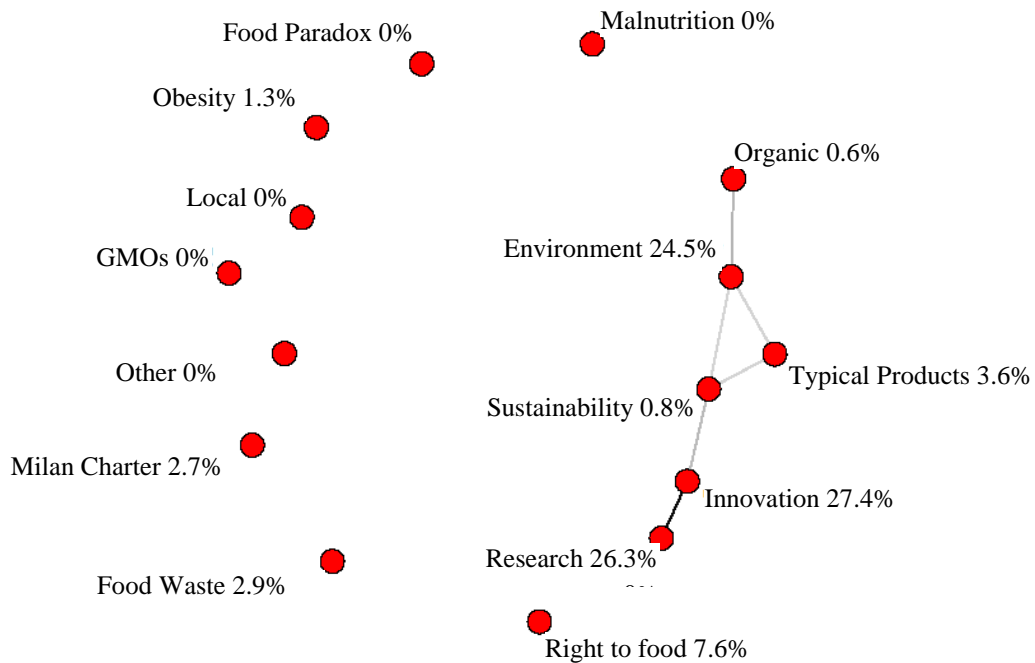
### 3.2 Main Topics

With regard to the focus of this work, Table 4 presents the results concerning the distribution of the food-related issues of the Milan Charter in Twitter, and the related sentiment analysis in Figure 3. The first point of interest relates to research and innovation issues: they together account for the 50% of the public discussion. Nevertheless, the analysis revealed that the majority of tweets related to these two topics actually refers to the after-Expo period discussing the future destination of the area. Indeed, the Expo location is most probably going to be dedicated to the creation of a genomic research centre, «Human Technopole. Italy 2040». The Italian Prime Minister, Matteo Renzi, has announced this intention declaring “It will be a world leading research centre, the symbol of a new humanism”. As a consequence, sentiment analysis reveals that the general opinion on these issues is positive (100% for innovation, 68.5% for research).



**Figure 2. Main Topics - Sentiment Analysis**

The second theme for prevalence is the environment (23.7%), also characterized by a generally positive sentiment analysis. Quite surprisingly, the only themes that received a negative perception are “right to food” and “food waste”, perhaps partially be due to several critics to the Expo events itself for the big amount of resources invested and food waste created during the exposition period. With regards to the nutritional issues, right to food (undernutrition) is the one that mostly received attention in the Twitter sphere (7.6%), followed by obesity (1.3%). The latter, in particular, is characterized by a 100% positive sentiment analysis: obesity – related tweets often report about combating obesity actions or projects. For Italy, as example, the secretary of Education signed an agreement with the Italian National Olympic Committee (CONI) and the food company Ferrero with the aim to promote sport activities in schools. More interestingly, the iSA<sup>®</sup> technique gives the opportunity to draw a “mind map”, namely the description of the way different topics interact in tweets. Figure 3 shows, quite obviously, that the strongest linkage is between research and innovation (2.83%). It also identifies a thematic cluster including environment, sustainability, typical products and organic products. In particular, the theme of sustainability is linked to innovation (0.52%), typical product (0.32%) and environment (0.32%), whereas environment show connections with organic food (0.52%) and typical product (0.32%). Right to food, food waste, obesity and the Milan Charter are instead stand-alone subjects.



	SUSTAINABILITY					
SUSTAINABILITY		INNOVATION				
INNOVATION	0.52		ORGANIC			
ORGANIC				TYPICAL		
TYPICAL	0.32				ENVIRONMENT	
ENVIRONMENT	0.32		0.55	0.32		RESEARCH
RESEARCH		2.83				

**Figure 3. Main topics – mind map**

## Conclusion

The results of the analysis revealed that Twitter data can successfully help in tracking the spread of information at multiple levels. Given the large amount of data related to public opinion available online (and its growing relevance), monitoring this flow of preferences becomes an important task per se. In this case especially, the output of the Expo2015 event in terms of public debate, and public awareness consequently, clearly emerged. In summary, what are the legacies of Expo 2015 in the public debate? Twitter results suggest that the Milan Charter can hardly be included in them. Moreover, among twitter users the main topics of discussion are about environmental issues, sustainability in particular, in terms of awareness and recognition of the priorities of the contemporary world. The Milan Charter is reduced to what we ought to do for a more sustainable world, understanding and protecting the environment through responsible behaviour and sound practices, such as recycling, regenerating and reusing consumer goods. In opposition, food-related issues were quite forgotten. Nevertheless, we define “sustainable agriculture as practices that meet current and future societal needs for food and fibre, for ecosystem services, and for healthy lives, and that do so by maximizing the net benefit to society when all costs and benefits of the practices are considered (Tilman et al., 2002). Moreover, the fact that environmental topics has been perceived as strictly related to organic food and typical product indicates a potential bias in the communication of the Expo message, as niche food productions cannot represent the solution to reach the goals of the title “Feeding the Planet, Energy for Life”. The second aspect of interest of the Twitter sphere is “Research and Innovation”, mainly related to the “after Expo” use of the area rather than the application of innovative techniques to food production. However, the project for the realization of a research center can surely represent a concrete legacy of Expo for Italy.

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