

Effects of Social Media on the Environmental Protection Behaviour of the Public (Case Study: Protecting Zayandeh-Rood River Environment)

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Received 2 Oct. 2015;

Revised 12 Feb. 2016;

Accepted 20 Feb. 2016

ABSTRACT: Social media has quickly become an essential marketing and communication tool for private, public and non-governmental entities across the world to promote their organizational mission, daily events and publications. Many citizens use social media to post or share real time photos on a variety of environmental issues such as pollution or littering, forest fires, reported chemical spills in waterways, illegal dumping, and injured or deceased endangered animals. This simple, yet effective action can result in prompt awareness of an environmental incident and timely response from various agencies responsible for the environment. This paper presents a framework for evaluating the mechanisms that involve the public in environmental protection. It also investigates the role of social media in forming the environmental concepts. In this study, a systemic approach was adopted to investigate the environmental and social status of a target area and by preparing a suitable questionnaire and finally introducing theme and subtheme. According to the results, all the seven final themes showed the substantial impact of social media on attitude of the public and trend of participation in improving the status of Zayandeh-rood environment.

Key words: Environmental issues, Attitude, Isfahan, Participation trend

INTRODUCTION

Today, social media has been an interesting new interface of society. It has transformed the way that people lead their daily lives and altered human communication. In fact, according to Nielsen (1990), Americans spent 20% of their time using PCs and 30% of their time on mobile devices using social media networks in 2012. Bearing in mind how much time Americans spend on social media sites each day, they have become an integral new forum of outreach at all levels including corporate, non-profit and non-governmental. Social media also has multiple functions. Most visibly, it facilitates the branding of organizations; they are given great power to portray themselves as they want, which can often be limited in other forms of outreach like mailings. Furthermore, social media provides a simple venue to raise awareness and concern about important issues, and allows a wide variety of interests to be easily communicated (MHRC 2007). The 'quick' nature of Facebook and Twitter posts allows concerns to be stated succinctly, appealing to a more

general audience. Social media offers a way in which people can easily learn what is occurring within an organization and participate in its movements, initiatives, and activities. Organizations can use social media to develop their image and branding, increase the visibility of their concerns and goals, encourage social and political action, and engage a wider audience. In addition, free resources provided by social media sites as well as software allow organizations to determine the success of their outreach and if they are indeed reaching their preferred audience. (Janssen, R. 2001).

Generally, evolution of instruments on environmental policy went through three phases: 1) 1970's, Command and Control Policy, 2) 1980's, Market-based Policy, and 3) 1990's, Information Disclosure, Dialogue and Cooperation Mechanism. According to the World Bank, the classification of environmental policies is expressed by four types: direct regulation, market-based measures, market creation and public participation (Table 1). Among these, public

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participation is the newest tool for environmental protection.(UN,2003).

Table 1. Classification of environmental policies OECD.(2004)

Tayp	Instruments
Direct Regulation	Rules of law Standards Bans Licenses Limitations
Market- based Measures	Enviromental Tax Resource Price Pollution discharge fee Special Subsidy Green Credit
Market Creation	Property right establishment Emission Trading
Public Participation	Public Participation Information Disclosure

A similar study conducted by Curtis and Carrie (2010) confirmed the role of social networks in enhancing relationships between friends and acquaintances, especially strangers. Curtis *et al.* (2010) surveyed 409 practitioners of public relations and developed a model that allowed virtual social networks to communicate with colleagues in various departments of an organization. Kirakosyan (2014) confirmed the obtained results in a similar study. Hogan (2009) conducted a field work on 800 housewives of below 40 years old to assess their participation in social networks. The results showed that housewives are willing to participate in these networks, preferring to

use them to communicate with friends and relatives and benefit from membership in social groups.

Trust Laranza (2009) studied the importance of users' trust in loading their information in social networks. A high correlation was found between trust in social networks and providing personal information in the networks. In a similar study, Halivol (2005) reviewed 300 students and found out that they had much higher level of trust in the social networks and willingly trusted virtual networks in sending and receiving information. The results showed that social networks are not affiliated to the government and they are considered as public organizations. This issue contributes to people's trust in social networks (Dumbrell, 2014).

Personal characteristics of users are effective on type and rate of use of social networks as well as their trust in these networks (Carrie *et al.*, 2010). Carrie *et al.* (2010) conducted a study on adults in Norway and investigated the effect of personality traits in using social networks. They also investigated whether age and gender affect this relationship. The results showed that women are more willing to trust social networks than men.

Referring to Fig.1, government, enterprise and public form the cooperative environmental governance. Each party is equal and has its own environmental rights and obligations, while both of them can easily communicate interactively. In this model, the public not only have the right to participate in environmental issues, but also should bear the obligation of promoting their environmental consciousness and conducting green consumption. Thus the public shift from passive acceptance to active involvement in environmental governance.

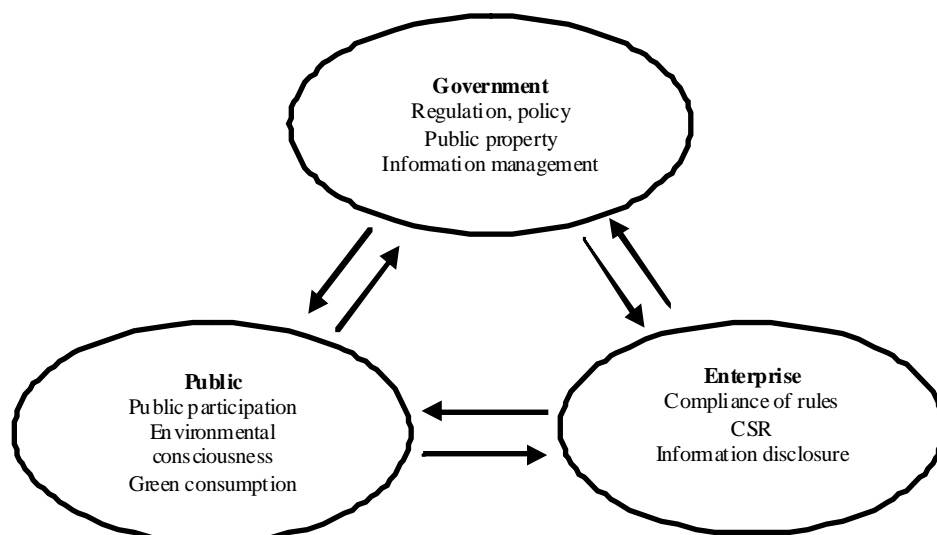


Fig. 1. Social environmental management system OECD.(2004)

MATERIALS & METHODS

Zayandeh-Rood River originates from the western part of the Zardkoohcity and after passing a curved way of 420 km, reaches Gavkhooni marsh in the east [TSY, 2012]. The amount of water increases before Zayandeh-Rood River reservoir due to the entering upstreams, and it gradually decreases when moving toward the river. The average annual flow in the first measuring station after the reservoir is 47.5 m³/s before arrival of the river to the city in the west. In Moosian station in the east, where the river leaves the city, the average annual flow is about 22.1 m³/s and finally in Varzane (the last station) it is 0.16 m³/s [TSY.2012]. Fig. 1 shows the study area.



Fig. 2. The study area

In this study, the main research method was based on usage of social media indicators. In this regard, a qualitative method of theme analysis was used to answer the main research questions. Theme analysis method determines, analyzes and expresses patterns (themes) within the data. Although this method organizes and describes data in details, it goes beyond data organization and interprets different aspects of the subject matter (Thomas, 2003). Formation and selection of themes largely depend on research structures (Ryan and Bernard, 2003). Context of a phenomenon is observed, the collected data is properly interpreted and qualitative data is analyzed in theme analysis method (Abediet *et al.*, 2011). Qualitative studies and particularly theme analyses are necessary when there is little information about the phenomenon under study or a comprehensive conceptual framework clarifying the issue is absent in the studies conducted in connection with the subject matter. Therefore, absence of a comprehensive theoretical framework for the relationship between new media (social networks) and environmental attitude of the public was the first reason for using theme analysis method in this study.

Another reason lied in objectives of the academics. The research questions were as follows:

- 1) How much social networks are effective in creation and development of environmental protection attitude of the audience?
- 2) What kind of behavior do social networks create or reinforce in these areas?
- 3) Which group of audiences is more affected by these behavioral changes?

In this study, a multi-criteria model was applied to select and prioritize indicators of sustainable urban environment quality. Each indicator is a pointer that makes the elements of causation and consequences of policies more understandable. To this end, a five-step approach was adopted to fulfil the following:

- i) Determining the research scope and objectives
- ii) Investigating the environmental and social status of the target area
- iii) Short-listing and preparing a questionnaire of the criteria by Delphi
- iv) Developing and classifying codes
- v) Determining theme and sub-theme

The steps for text analysis should also be considered in this method. Clark and Brown (2006) organized a six-step process for this purpose. Theme analysis is a timely process, which means that the scholar collects and analyzes the data in a certain period. The six steps in theme analysis approach presented by Clark and Brown (2006) are: familiarity with data, creating initial codes, search for selective codes, formation of secondary themes, definition and nomenclature of main themes and compiling reports. The participants were selected using a purposive sampling method (Strauss and Corbin, 2012). For this purpose, according to Delphi method, 20 audiences who were members of active environmental groups and channels were selected (Table 2). These groups were formed in the Watts Up or Telegram with the main concern of Zayandeh-Rood River environment protection in Isfahan.

Results of previous rounds were collated and then presented to participants to determine whether or not their responses were in line with other answers. With the completion of each round, the panellists' opinions on relative importance of indicators moved progressively towards consensus. Finally, consensus was achieved in a three-round iterative Delphi process. In this study, the consensus of the panellists was investigated through Kendall's Coefficient of Concordance known as Kendall's W (Eq. 1). Kendall's W is a scale to determine the degree of coordination and agreement among several categories related to the N individual rating. The scale can rank correlation

Table 2. The 20 audiences of social networks participated in interview Delphi panel

No.	Age	Sex	Educa tion	Job	Experience in virtual groups of Environmental Protection (year)	Location
1	22	M	M	ME	1	Isfahan
2	25	M	B	E	2	Isfahan
3	30	F	M	E	8 months	Isfahan
4	33	M	M	Teacher	1.5	Isfahan
5	21	F	B	H	1	Isfahan
6	28	F	B	E	2	Isfahan
7	37	F	B	E	3	Isfahan
8	34	M	M	E	9 months	Isfahan
9	26	M	M	ME	2	Flavarjan
10	43	M	B	E	1	Isfahan
11	28	M	M	T	3	Isfahan
12	25	F	M	H	2	Kho me ini Shahr
13	29	M	PhD .c	E	3	Isfahan
14	37	F	M	E	2	Isfahan
15	31	F	B	E	1	Isfahan
16	41	F	B	H	10 months	Isfahan
17	39	F	m	E	1	Isfahan
18	23	M	B	E	2	Chadeghan
19	36	M	B	E	3	Isfahan
20	24	M	B	Unemployed	3	Chadeghan

M: Men; F: Female; B: Bachelo; M: Master; E: Employed; H: Housewife; ME: Media Employee

between K complex ranks received. The scale value varies in the range of 0 when there is no consensus and 1 in a full agreement condition (Saty, 2008).

$$W = \frac{s}{\frac{1}{12}k^2(N^2 - N)} \quad (1)$$

S: The sum of squared deviations

N: Number of individuals

K: Kendall's Constant Coefficient Calculation of composite index

As described in methodology, coding is a very effective step, in which the scholars reviewed the existing data and ideas provided by the respondents and recognized 400 initial codes. A summary of these codes are given in the following Table 3.

In this step, various codes were classified as selective codes and all coded data were sorted out. In fact, when the scholars began analyzing the codes obtained through interviews, they wondered how different codes can be combined to create a broader and more abstract theme. Generally, 83 selective codes were obtained by the scholars at this stage. A summary of some codes are given in Table 4. At this stage, the scholars eliminated incomplete or irrelevant codes as well as duplicate codes to obtain the following selective codes. Describing the high frequency of a code in relation to the amount of information in social networks about Zayandeh-Rood River environmental

situation, the code with high frequency was selected as a selective code.

At this stage, scholars found 22 sub-themes based on text analysis using theme analysis method. Eliminating "traditional information networks" and replacing "internet social media" as a source of information about the environment were the sub-themes obtained. In many codes, the interviewees stated that their knowledge and attitudes toward Zayandeh-Rood River environment were modified since their membership in these groups. Similarly, other sub-themes were developed through the long-term and comprehensive study of codes. At this stage, scholars obtained seven main themes from the sub-themes through a comprehensive review. The themes had similar concepts and could be explained and implemented thoroughly in terms of subject matter. A report is given on main themes in Table 5.

The first theme: Changes in knowledge of audiences in terms of Zayanderood River environmental protection.

In highly frequent codes, academics witnessed that audiences in these groups provided some sort of information on Zayandeh-Rood River that they were not aware of before joining these groups. Some information provided by the respondents is presented here. Zayandeh-Rood River is located in the center of Isfahan with surrounding peripheral parks of 15 km length and 100 to 300 m width. The river as an environmental

Table 3. Primary codes derived from a sample of interviews

No	Primary codes
1	In this group, I understood political battles behind obstruction of Zayandeh-Rood River water.
2	I joined this group solely for fun at first.
3	Urban managers do not seriously attempt to protect Zayandeh-Rood River environment.
4	Zayandeh-Rood River is in critical condition.
5	Zayandeh-Rood River is the socio-cultural and economic artery [center] of Isfahan.
6	Public groups should be more united to protect Zayandeh-Rood River environment.
7	I would like to spend as much as my budget allows to protect Zayandeh-Rood River environment.
8	I have tried to invite my friends to this group.
9	I have gained valuable information on Isfahan environment in this group.
10	I am more attentive to urban environmental phenomena since I joined this group.
11	Zayandeh-Rood River dryness has reduced the urban-social interactions that took place at the bank of the river.
12	Members of the group have already gathered at the bank of the river, so that they can get familiar with each other.
13	This group has initiated social and political movements against Zayandeh-Rood River dryness.
14	I would certainly admonish whoever throws junks on the riverbank.
15	We protest against industrial plants that discharge their wastewater into the river.
16	Urban managers did not accept power of social networks in organizing public opinion.
17	We protested against Zayandeh-Rood River dryness in front of the Environmental Organization for several times.
18	Women are most active in these groups than men.
19	Most of the members are students.
20	The members' main demand is water flow return to the river.
21	Information given by this group has developed a valuable attitude in many cases.
22	Zayandeh-Rood River dynamic environment will be destroyed
23	Zayandeh-Rood River is no longer degraded at riverbanks due to increased awareness of the citizens.
24	Water and air pollution has threatened Zayandeh-Rood River aquatic life.

Table 4. Final selective codes

NO.	selective codes
1	Public protest against Zayandeh-Rood industrial pollution in front of the Environment Organization.
2	Public protest against poor performance in front of the Governor General Office.
3	Encouraging people to volunteer in cleaning Zayandeh-Rood.
4	Notification in online groups in terms of damages caused by Zayandeh-Rood dryness.
5	Encouraging group members to provide funding for restoration and preservation of historic bridges over Zayandeh-Rood.
6	Normalizing environmental admonition in society as for promotion of virtue and prevention of vice.
7	Avoiding the environmental degradation at Zayandeh-Rood riverbank due to the increased awareness.
8	Group members have found the courage to criticize anti-environmental behavior.
9	Group members have trusted environmental programs more than before.
10	Zayandeh-Rood is the main environmental concern of group members.

Table 5. Main themes

No.	Research main themes
1	Changes in knowledge of audiences in terms of Zayandeh-Rood environmental protection.
2	Changes in attitudes toward Zayandeh-Rood environmental protection.
3	Emotion and feelings of audiences in terms of Zayandeh-Rood environmental degradation.
4	Changes in behavior of audiences towards Zayandeh-Rood environmental protection.
5	Strengthening self-confidence of audiences with regard to environmental behavior.
6	Increased sense of criticism in audiences against environmental policies.
7	Increased willingness of audiences to provide funding for protecting Zayandeh-Rood environment.

component promotes tourism industry and induces the economic and cultural development. Isfahan and particularly eastern areas are facing limited water resources. Water resources Per capita in Isfahan is 1,520 m³, which is respectively 24%, 61% and 80% lower than water resources per capita in Iran, Asia and the world. Knowing that the critical water per capita is announced as 1760 m³ in water resource management, Isfahan is 14% below the critical state. Thus, water deficiency is the most important challenge in Isfahan and it seems illogical to transfer the river water to other cities.

The second theme: Changes in attitudes of audiences towards Zayandeh-Rood River environmental protection.

By review of the interviews, academics found out that the information given in environmental social networks to the audiences has changed their attitude towards Zayandeh-Rood River environmental protection as compared to earlier times. Almost all respondents had a positive attitude towards the necessity of environmental programs for preservation of the river as a lifeline of Isfahan. This shift in attitude can be observed in the interviews. Some information is given here.

In addition to economic and cultural benefits, Zayandeh-Rood River has developed a public domain for development of social interactions. In addition to being a local recreation and leisure spot, the river shows urban identity of citizens of Isfahan. Riverbank as a public sphere has a significant role in social interactions and elevates human exuberance and welfare. River dryness can decrease the social interactions between citizens and visitors of this location.

The third theme: Emotion and feelings of the audience towards Zayandeh-Rood River environmental degradation.

Audiences of environmental social networks intensely expressed their emotions against the

environmental damage to the river dryness. Emotional reactions were due to the information shared in these groups.

The fourth theme: Changes in behavior of audiences towards Zayandeh-Rood River environmental protection.

Attitudes and knowledge of audiences on social networks towards Zayandeh-Rood environmental protection have been significantly modified. Audiences are willing to adopt environmental measures to protect Zayandeh-Rood. The information obtained from interviews is given here.

Audiences tend to follow operational practices in this regard. Rapid growth of urbanization has significantly increased pollution in Isfahan, so that many historic bridges over Zayandeh-Rood River have been destroyed. All citizens need to take operational measures, react against environmental degradation and do not allow people to throw out junks at the riverbank. Voluntary groups should be formed to clean up Zayandeh-Rood, and people should protest against adverse environmental management in their city.

In total, citizens of Isfahan are now more responsible in terms of environmental behavior as compared to earlier times. The elderly and women have shown to implement the practices such as separation of waste and using environmentally friendly transport more than men.

The fifth theme: Strengthening self-confidence in audiences in terms of environmental behaviors.

In many codes, interviewees emphasized that they were not confident in representing environment friendly practices before membership in internet environmental groups as their main concern was not Zayandeh-Rood River environment. Therefore, the concept was regarded as a theme due to high frequency in codes, which could be completely observed in the

information provided by the interviewees. A part of information is given here.

For centralization and establishment of the lighter and safer industries, 19 industrial towns are being established in Zayandeh-Rood basin area. These towns have monopolized about 26% of the entire industrial towns of the country. Considering the total area of the mentioned zone which is about 2% of the entire country, Zayandeh-Rood basin can be called industrial. About half of these towns are located at the margin of the river or in a distance that can dominantly affect Zayandeh-Rood River. The main problems of these towns are the inexistence of appropriate and licensed spacing between the industrial zone and the neighboring cities as well as inexistence of occupancy level of installation in the lands applicable for the industrial purposes. The dominant industries such as Zobe Ahan factory of Isfahan, Mobarakeh Steel Complex, Poli Akiril factory of Isfahan, etc, are situated around Zayandeh-Rood River.

The sixth theme: Increased sense of criticism among the audience against environmental policies. Sense of criticism against environmental policies in the city and its impact on the river was the most important feeling of the members. All respondents seriously criticized urban management approaches in terms of Zayandeh-Rood River environment.

The seventh theme: increased audience's willingness to provide funding for Zayandeh-Rood River environmental protection.

In general, the insufficient application of appropriate refining technology or lack of the knowledge and suitable human source for accurate utilization of new technologies have led to entrance of a large amount of contaminants into the natural and environmental sources such as subterranean and surface water sources. Recycling of the industrial wastes and redundant materials can be applied as a national controlling system for the management of the industrial wastes and redundant materials. In Zayandeh-Rood basin area, more than 330,000 hectares of water lands are used for the agricultural purposes. According to the cultivation level and toxicant consumption per hectare (about 2 liters) extracted from the provincial studies, about 660,000 liters of pestilence killers are annually consumed in Zayandeh-Rood basin area. Accumulation of chloride toxicants in living tissues perishes the small living beings in the beneath levels of the nutrition pyramid and finally causes serious damage to the upper levels living organism especially human beings.

With respect to the changes in attitudes due to membership in the social networks relevant to environment, the members willingly desired to donate funds to protect the river environment. Most of the interviewees were motivated by the social networks to protect the river environment. When they are asked if they were willing to donate funds for environmental preservation, they said yes without any regrets. This shows the profound effect of social networks on audiences in terms of environmental issues. Obviously, when the audience is willing to pay for an issue advertised by the media, it can be concluded that the media has been highly effective on promotion of that issue.

CONCLUSIONS

Social media provides tremendous opportunities to encourage environmental activism. The most rewarding fact about social media is that, next to direct word of mouth communication, it is one of the most environmentally-friendly marketing tools out there. Isfahan is a historic city that has experienced several urban developments throughout its glorious past. Zayandeh-Rood is an important natural element in the city's landscape and plan. Many studies have been done on causes and consequences of Zayandeh-Rood River drought but majority of them regarded has viewed the issue from environmental and economic aspects. Moreover, these studies did not pay attention to the role of citizens in environmental preservation. Citizenship behavior in dealing with the environment is an important factor in reducing environmental hazards. In this regard, identification of the effective factors on environmental behavior of citizens is necessary. Certainly, many factors affect a particular behavior. However, given the undeniable influence of new media on lives of people, the role of new media on environmental behavior was reviewed in this study. For this purpose, the effects of social networks on environmental behavior of audiences towards Zayandeh-Rood River environmental protection were investigated in this study. The results showed that new media strongly affect audience behavior in terms of environmental protection regarding Zayandeh-Rood River ecology. Overall, seven themes were obtained, indicating the effectiveness of new media on environmental behavior. These themes were: 1) Changes in knowledge of audiences in terms of Zayandeh-Rood environmental protection; 2) Changes in attitudes toward Zayandeh-Rood environmental protection; 3) Emotion and feelings of audiences in terms of Zayandeh-Rood environmental degradation. 4) Changes in behavior of audiences towards Zayandeh-Rood environmental protection; 5) Strengthening self-confidence of audiences with

regard to environmental behavior; 6) Increased sense of criticism in audiences against environmental policies; and 7) Increased willingness of audiences to provide funding for protecting Zayandeh-Rood environment.

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