

Developing Sustainable Process in Water Economy Using Social Media

Karim E. Fraoua^{1,3}, Christian Bourret^{1,3}, and Eric Sotto^{2,3}

¹ Université Paris-Est, 77454 Marne-la-Vallée, France
{Karim.Fraoua, Christian.Bourret}@u-pem.fr

² Novancia Business School Paris
Eric.Sotto@novancia.fr

³ Equipe Dispositifs d'Information et de Communication à l'Ere Numérique (DICEN),
Conservatoire national des arts et métiers

Abstract. The main idea developed here is how to involve people to promote a new behavior to economize water as supported by the local authorities process. Usually, the population is affected by the cities policies when they are subject to fines related to high water use during times of crisis. Then the local authorities impose solutions without consultations of concerned communities. This top-down process is often considered as imposed by the mayor or the local authority and may lead to bad feeling by the population and is not corresponding to a new societal behavior in the social web era. We will suggest a new way to involve the population using the social media as a new approach to imply them in this process. This information can be conveyed and shared with the public in such way to support mayor or authorities policies. In other way we will propose a new approach using social media processes as a node in the first hand to encourage the population to participate to the debate and to fit a new solution encouraging all population to get part of the policies adopted based on a bayesian approach.

Keywords: Sustainability, social media, Bayesian recommender system.

1 Introduction

Social networks are scrambling more decision-making processes, particularly in France, heavily influenced by the Colbert model and hierarchical relationships between all actors. The Colbertism, corresponds to the state interventionism in the economy and in all social relationships. This politics remains valid in France, although the role of citizens in decision-making has emerged. Everywhere we see flowering social networks as a means of dissemination of information. The structure of the social web can be a great asset in the development of new public policies. This "bottom-up" approach allows to create acceptable, realistic and desirable policies, especially in the case of sustainable development. A particular interesting case concerns issues which concern citizens who are directly affected by phenomena due to climate change. The "Bottom-Up" policy is now possible, due to the emergence of various

participative tools where the community manager of the animation starts over perceptions and initiatives at the level of the citizen who is on the ground where the policy will be in place. So these messages can be published and taken into account by the "decision makers".

2 Citizen Social Network : A Participatory Place for Local Democracy

We can consider now that social networks are territories or organizational forms which include enough participants, which have a critical size for the formation of groups [1] on which it can build links and operate forms of collaboration between people connected and interconnected in a virtual social space. Social networks are "a relational advanced technology" [2] as collaborative form and conversational device available are 2.0 services to promote link building. In this digital territory, participants act independently and publish across hierarchies, resulting egalitarian relationships between all actors, and thus rebalancing the power between experts, decisions-makers and "amateurs" that are common [3] citizens.

These exchanges are similar to conversations "face to face", improvised, non-profit and pleasant. [4] Thus, we believe that citizens have a platform for reproducing usual conversations, in public, neighborhood. In addition, we see the introduction of "moments of discussion" [5]. In other words, it is a form comparable to the agora or the forum, where each citizen can debate any topics of general interest. What is also interesting on social networks? It is also an opportunity to build links without the need for a real involvement of the participant. We hold that a social network is a form of urban sociability characterized by small research links [6]. We believe that social networking is a space to perform a specific activity, collective and unifying, but without commitment.

3 Forum about Water Economy Practices

In the theoretical framework of social interactionism and mobilizing floating concepts of conversational interactions and usual one [7,8,9], we highlight the specific and salient features of exchange occurring in this spatiotemporal framework diffused in a wide audience. The interpretation of the results suggests that in a public forum, participants evolve rapidly towards egalitarian relationships, proximity and show a cooperative behavior and caring, especially in ensuring auto regulation inside the forum in case of conflict. A participative platform as the forum dedicated to the citizens, requires few resources or technical skills and work without supervision. As such, it contributes to the reduction of costs associated with the operation of a neighborhood committee especially for the less endowed municipalities. Within the Public forums, we identify "lead users" [10]. These suppliers of innovation appropriate a product, service, or project topic and suggest ways to original improvement, based on an individual experimentation with imagination and small means. To conclude, the lack of

supervision of forum is considered as a source of "surprises" from the part of citizens [11]. These innovative practices match those identified by Michel de Certeau [12] when he considers individuals as "poachers" in search of flaws and shortcomings of a product to act in unexpected way. Taking this as read, our point of view is that the citizen forum is a reservoir of ideas and practical uses encountered in different contexts of achievements likely to improve the supply of "water saving practices" proposed by the municipality [13]. We can conclude that the forum of discussion shows clearly and formalizes the popular knowledge, this little everyday actions related to water economy and allows to legitimize the actions of the municipality

4 How to Assess Proposals, a Bayesian Approach

Kahneman et al. [14] demonstrated that many mistakes are made by people in the judging process as mental operation during the estimation of a probability of an event. Systematic errors related to the Bayesian standard, highlighted by their experiences are explained by mental shortcuts, more accessible, less costly in time and concentration. When the cost of normative Bayesian computation is important, the agent tends to use examples of the problem that have marked his experience which enable him to make approximations. Therefore, the decision is made via arbitration of the payoff between these shortcuts and more rigorous calculation [15]. The information system will aim in our work to help user to better define our rational capabilities reasoning in uncertain situations, as in water consumption and its impact on our future. Although we believe that climate change is perceptible, our behaviors are often irrational in view of the advent of the crisis yet present. . Public perception is mainly driven by climate change science, still considered with uncertainty about the timing of future warming

The Bayesian theory allows us to define two approaches [16]. The first one assumes perfect knowledge of the specific and unique probabilities of the event and the second assumes that probability is the result of a dependent human judgment based on his own knowledge. The issue of the social web and the contribution of experts who will address at this level of knowledge are often imperfect and thereby improve the degree of belief in the coming of climatic change. In this regard, Bayesian standard is defined according to three criteria [17,18, 19], the first epistemic, consider our capacity to define a probability of realization of an event according to predefined scheme depending of each individual and obtained or calculated in subjective priori way that can vary from one individual to another. Thus, a probability represents the degree of belief in the event of an H level with individual having a level of knowledge K, at a given time. We note:

$$P = \left(\frac{H}{K}\right) \quad (1)$$

When a person acquires a new complementary information partition D, he is able to revise its degree of belief H and then estimated probability will be

$$P = \left(\frac{H}{D}\right) \quad (2)$$

It is also possible that the degree of knowledge K at a given time is low or the degree of belief H is limited. From this point of view, the social web goal will have a dual purpose, an informational component capable of raising the level of knowledge K and a raising impact on the component related to a beneficial future result. The role of the social web and experts is to increase the probability related to the dynamic consistency as a result of new information D that would influence Bayes formula, knowing that the information would be given a priori to evaluate a correct probability, is given subsequently to revise this probability. The main problem that arises when we offer a service, is how to properly evaluate it and in our case how to reach a consensus. More and more tools now allow e-commerce websites to anticipate the needs of potential buyers and provide them services or products that match their needs [20]. What are the right choices in our case and how to evaluate it? We see that with these societal changes that are combined with use of increasingly intense social networks, every citizen can propose an idea or evaluate it, previously validated by the technical services or at expert level. When an idea is rejected, it must be explained why. This obstacle overtaken, we see that this web space locally sponsored at the political level will enable every citizen to express themselves.

In order to construct an efficient system, we can use evaluation models and make them close of e-commerce model, here it is a policy proposal at the service of citizens. Recommender systems are generally classified into three categories [21]: the content-based models, collaborative filtering and hybrid models. System based on the content descriptions use to match the need or at least the user preferences. In general, the model uses the opinion of the group to predict the interest of another user or to generate interest. This approach will allow each user to be sure that its proposal will be viewed and evaluated by other users. In the case of management of water consumption, where the needs and behaviors are not the same, it should appear groups according to the customs and then headlights and ideas can so be born. The consensus issue from these exchanges will create a normative law or rule accepted by all citizens. The profile of the citizen is an important parameter to consider. A preliminary questionnaire can place citizens in the context of its proposal. Every informed citizen and subject to prior exchange with others is able to accept a coherent proposal. Users define a relationship of trust and thus we can eliminate the so-called psychological biases.

There are rules that could help define the reliability and support of an idea but it will be based on a general rule of thumb and not of consensus. Indeed the relevance is based on the number of recommendations a mixed idea on the total number of recommendation. The reliability is the number of recommendations of one idea on the number of total recommendations. It is the mining rule [22], so we see that the level of information is essential so the individual may be in a Bayesian normative approach and considers that the collective interest as essential in the light of the group's interest

5 Conclusion

We see through this presentation that the political process has really changed in the field of decisions that involve active participation of citizens, Colbert and the

hierarchical model has lived. This participation can be controlled through social web which have become an accepted practice and used by citizens. The difficulty of evaluating an idea is increasingly mastered as incentives for participation. Better information through the use of social web can lead to concrete proposals and which may correspond to the policy due a strong involvement of citizens in processes that affect them. This dual acceptance will lead to better control choices that do not compromise the future of the citizens in situation previously considered as uncertain.

References

1. Balagué, C., Fayon, D.: Facebook, Twitter et les autres..., 2nd edn. Pearson Village Mondial, Paris (2012)
2. Stiegler, B.: Le bien le plus précieux à l'époque des sociotechnologies. In: Réseaux sociaux: Culture politique et ingénierie des réseaux sociaux. FYP éditions, Paris (2012)
3. Flichy, P.: Le sacre de l'amateur. Sociologie des passions ordinaires à l'ère numérique. Editions du Seuil et La République des Idées, Paris (2010)
4. Tarde, G.: *Ecrits de psychologie sociale*. Editions Privat, Toulouse (1973); Goffman, E.: *La mise en scène de la vie quotidienne*. 1. La présentation de soi. Les Editions de Minuit, Paris (1973)
5. Gaudin, J.P.: *La démocratie participative*. Armand Colin, Paris (2007)
6. Moulier-Boutang, Y.: Les réseaux sociaux numériques: une application de la force des liens faibles. In: Réseaux sociaux: Culture politique et ingénierie des réseaux sociaux. FYP éditions, Paris (2012)
7. Goffman, E., Winkin, Y.: *Des moments et des hommes*. Seuil/ Minuit, Paris (1988); Goffman, E.: *Les cadres de l'expérience*. Les Editions de Minuit, Paris (1991)
8. Kerbrat-Orecchioni, C.: *Les interactions verbales*, tome 2. Armand Colin, Paris (1992); Kerbrat-Orecchioni, C.: *Le discours en interaction*. Armand Colin, Paris (2005)
9. Traverso, V.: *La conversation familière*. Presses universitaires de Lyon, Lyon (1996); Traverso, V.: *L'Analyse des conversations*. Armand Colin, Paris (2004)
10. Von Hippel, E.: *Democratizing Innovation*. The MIT Press, Cambridge (2005)
11. Crepon, M., Stiegler, B.: *De la démocratie participative: fondements et limites*. Mille et une nuits, Paris (2007)
12. De Certeau M.: *L'invention du quotidien*, t. 1. Art de faire. Gallimard (Folio / Essais), Paris (1980, 1990)
13. Moati P.: *L'économie des bouquets, le marché des solutions dans le nouveau capitalisme*. Editions de l'aube, Paris (2008)
14. Tversky, A., Kahneman, D.: Availability: A heuristic for judging frequency and probability. *Cognitive Psychology* 5(2), 207–232 (1974)
15. Tversky, A., Kahneman, D.: Judgment under Uncertainty: Heuristics and Biases. *Science, New Series* 185(4157), 1124–1131 (1974)
16. Baratgin, J., Politzer, G.: Is the mind Bayesian? The case for agnosticism. *Mind & Society* 5(1), 1–38 (2006)
17. Hacking, I.: Slightly more realistic personal probability. *Philosophy of Science* 34(4), 311 (1967)
18. Hacking, I.: *The emergence of probability*. Cambridge University Press (1975)

19. Seidenfeld, T.: Why I am not an objective Bayesian; Some reflections prompted by Rosenkrantz. *Theory and Decision* 11(4), 413–440 (1979)
20. Schafer, J.B., Konstan, J.A., Riedl, J.: E-commerce recommendation applications. In: *Applications of Data Mining to Electronic Commerce*, pp. 115–153. Springer US (2001)
21. Burke, R.: Hybrid recommender systems: Survey and experiments. *User Modeling and User-Adapted Interaction* 12(4), 331–370 (2002)
22. Tan, P.N., Steinbach, M., Kumar, V.: *Introduction to data mining*. Addison-Wesley, Cloth (2006)