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## **Internet Politics: Resist, Die, or Exploit?**

**Leiwen Deng and Aleksandar Kuzmanovic**

### **Abstract**

In this paper, we disclose and explain *Internet politics*, an “invisible hand” that inherently affects Internet research. We show that it could cause significant underutilization of constructive research ideas and a vicious cycle of bias in mainstream research ideas. However, we also expose that it is possible to gradually alleviate effects of the Internet politics by well understanding it. To this end, we propose *Internet politics analysis*, a systematic approach that can potentially well address the research dilemmas caused by the Internet politics. In addition, we propose a simple but effective model for the Internet politics which can significantly facilitate the Internet politics analysis. As a result, it may lead to dramatic gains for the future Internet research.

**Keywords:** Internet politics, politics graphs, anticommons

# Internet Politics: Resist, Die, or Exploit?

Leiwen Deng and Aleksandar Kuzmanovic

## 1. INTRODUCTION

*What is Politics? On hearing the word politics, what usually spring to mind are images of government, politicians and their policies or more negatively the idea of corruption and dirty tricks. The actual definition seems to have been obscured and almost lost by such representations and cliches that tend not to pinpoint the true essence, which defines the thing, called politics.*

*The word politics comes from the Greek word “polis,” meaning the state or community as a whole. The concept of the “polis” was an ideal state and came from the writings of great political thinkers such as Plato (428 BC–348 BC) and Aristotle (384 BC–322 BC). In his novel “The Republic,” Plato describes the ideal state and the means to achieve it. Hence, the word politics originally has connotations in the ways to create the ideal society. An ideal society is in practice a rather difficult aim and even an impossible aim to achieve. The very fact that Plato and Aristotle saw imperfections in societies prompted them to write their political philosophies. These philosophies provided the first written recognition of politics. In his writing “The Politics,” Aristotle states that “Man is by nature a political animal,” in another words, it lies deep within the instinct of man. It is almost primal. Due to his nature, man should consider and realize his role within the “polis.”*

*Politics in its very essence can be defined as a means to resolve conflicts among all kinds of values of the society through various means. Different people by their nature take values differently according to their expected “roles.” Major conflicts among values of different people are common and solutions to compromise all of them are usually extremely hard to find. Therefore, too often we see politics gives “inferior” solutions which result in people’s unpleasant experiences with politics.*

**What is Internet Politics?** In technical research about the Internet, we often face tradeoffs among conflicted values (or technical concerns), *e.g.*, a tradeoff between security and efficiency. When the tradeoffs are among a small number of values, we solve them by well balancing the values. However, if the tradeoffs are among a large number of conflicted values, it can become a completely different story because it now turns into a situation essentially the same as the politics, for which a satisfactory solution could be extremely hard to find.

We term such a situation *Internet politics*. Informally, it can be considered as solutions to the question “what do we do when we face the situation that we have to compromise many conflicted values (or technical concerns)” and with the rule that “we are forced to do something acceptable within a given time period, *i.e.*, not doing is not an option.” We will give a more formal definition and a detailed explanation of the Internet politics in Section 2.

**Why is Internet Politics a Big Issue for Research?** The great success of the Internet to a large extent ascribes to its neutrality. The Internet by

its nature simply connects the world together and does not take sides on who can be connected and what can be connected. This is the very reason why even countries with completely different cultures and people that favor distinct values were able to be connected, and why diversified services can be deployed. Although it is an extraordinary success, it also implies that the Internet has tied up a large number of distinct values and it will continue to tie up even more. As a result, research work trying to solve major problems of the Internet has a high chance to face many conflicted values. The Internet politics therefore becomes a non-trivial issue.

The Internet politics significantly complicates the objectiveness in evaluating research ideas. An idea that is potentially very useful but has touched quite a number of conflicted values can easily be trapped into an “anticommons” [5] situation, *i.e.*, *too easily to be vetoed* by others. Such situation could significantly discourage creativity and impede research development for the Internet.

**What Do We Do?** The Internet politics is an “invisible hand” behind the research. Regardless of being recognized or not, it is always there. It affects the research the same way the politics affects human lives. Then what do we do?

- *Resist?* We may choose to resist it by selecting research ideas (or dividing an idea into smaller ones) that do not involve too many conflicted values such that we avoid being trapped by the Internet politics. However, a major concern is: How many golden ideas (*i.e.*, the most useful research ideas) involve only a small number of conflicted values? And will we lose too many golden ideas by doing so?

- *Die?* It is possible that some idea could be extremely hard to further divide into smaller ones due to the inherent synergy among its components. And if divided, it may easily lose its meaning. Therefore, when such an idea is trapped by the Internet politics, we may have to “face the reality, choose to die,” *i.e.*, give it up (or at least suspend it for a long time). This is more or less a sad thing.

- *Exploit?* The key point of this paper is that we can do something better for the research if we become capable of better understanding the Internet politics. This is much like the way that the economy was significantly improved when a society recognized and exploited the “invisible hand” of the market (*i.e.*, the supply and demand law).

**How Can Internet Politics Analysis Help?** In this paper, we propose a systematic tool, *Internet politics analysis*, which can help us understand the Internet politics in a both concise and compre-

hensive way. We will show that the Internet politics analysis can help us with the following:

1. To predict whether an idea will be trapped by the Internet politics or not (such that we can decide whether we should divide it or not).

2. To answer fundamental questions of the Internet research, *e.g.*, (i) Is clean slate research essentially the same as evolutionary research? (ii) Can major problems of the Internet be solved via technical means? (iii) What is the best that we can do via the technical means to solve them (or to partially alleviate them if unable to completely solve)?

3. To encourage creativity by improving the objectiveness in evaluating research ideas.

4. To provide an effective learning system for the state of the arts of the Internet research.

5. To provide common standards for evaluating Internet practices, which might help to reach practical solutions for regulation on the Internet.

**Modeling the Internet Politics.** To facilitate the Internet politics analysis, we propose a model for the Internet politics — *politics graphs*. The Internet politics analysis can be significantly simplified using this model. In addition, we will show how we can exploit this model to derive an *objective* view for the Internet politics shared by the commons from *subjective* views of individuals, which is a key step to allow the Internet politics analysis to benefit the commons.

The rest of this paper is organized as follows. In Section 2, we explain the Internet politics both via examples and systematic evaluations. Next, in Section 3, we elaborate the methodology of the Internet politics analysis and show how useful it could be. Finally, in Section 4, we draw a conclusion.

## 2. INTERNET POLITICS

### 2.1 Basic Concepts

We first introduce several basic concepts related to the Internet politics, which include a formal definition of the Internet politics itself.

*Value.* In this paper, a value denotes a generalized concept. It includes the traditional concept of value, a technical or scientific concern, a natural law, or a social issue — every *primary* and relatively *perpetual* thing that we respect or recognize.

*Bottom Line of a Value.* The bottom line of a value is the least acceptable level (or the inherent nature) of a value. Take the value of economic condition for example. Its bottom line for a person could be that she should at least be able to afford the expense for food and lodging. And for a company, such a bottom line could be that its income should at least cancel its expense. However, for different persons or companies, their views of the bottom line can differ a lot.

*Major Conflict.* A major conflict (between two values), a.k.a. *major tradeoff* or *irreconcilable con-*

*flict*, is a situation that we are unable to retain the bottom line of one value without undermining the bottom line of the other value.

*Internet Politics.* Internet politics is the situation when we face a number of major conflicts when trying to solve a specific Internet problem under the constraint that we are forced to come up with some *acceptable* solution within a given time period.

*Internet Politics Dilemma.* An Internet politics dilemma is a situation when we are unable to compromise well among the major conflicts that we face, *i.e.*, no *acceptable* solution is available. It is not acceptable because it will necessarily result in an “anticommons” [5] situation, *i.e.*, too easy to be vetoed by others. Indeed, this dilemma is exactly what we meant by “being trapped by the Internet politics.”

### 2.2 Examples

Here we show some examples to help understand the above concepts.

*Values and Major Conflicts.* Figure 1 depicts some popular values and major relationships among them. The relationships are classified into two types — positive impact and major conflict, *i.e.*, negative impact. Let’s consider a traversal for a part of this graph with an emphasis on the major conflicts:

The Internet by its nature hides a user’s real identity, *i.e.*, favoring *anonymity* (value *A*), which is an essential factor that leads to the Internet’s great success. *Censorship-free speech* (value *B*) is a typical example. With the Internet, everyone can freely express their ideas which yields a faster than ever *democratic progress* (value *C*) of the society. In addition, it leads to an extraordinary thriving of ideas, free thinking, and *creativity* (value *D*) [6, 7].

However, the anonymity significantly complicates the aim to retain important values that our society and our lives rely on, *e.g.*, *trust* (value *E1*), *liability* (value *E2*), and *regulation* (value *E3*), on which our fundamental *social order* (value *F*) and stability rely. Liability is hard to enforce because we even do not know “who” is liable. Trust is hard to establish among unknown users when they do not bear liabilities. Regulation becomes a fantasy when there is neither liability nor trust. Typical examples of regulation problems include: email SPAM, threats from DDoS attacks, online pornography, *etc.*

Anonymity favors *security* (value *G*) in the sense that it can well protect privacy of each individual. However, anonymity also bears a major conflict with security in terms that it significantly complicates countermeasures against malicious attacks from anonymous users. We may develop robust countermeasures to retain both security and anonymity, however, it might result in formidable *costs* (value *H*), including huge monetary cost, huge processing overhead, poor scalability, poor compatibility, *etc.*

*Internet Politics Dilemma.* Suppose that a spe-

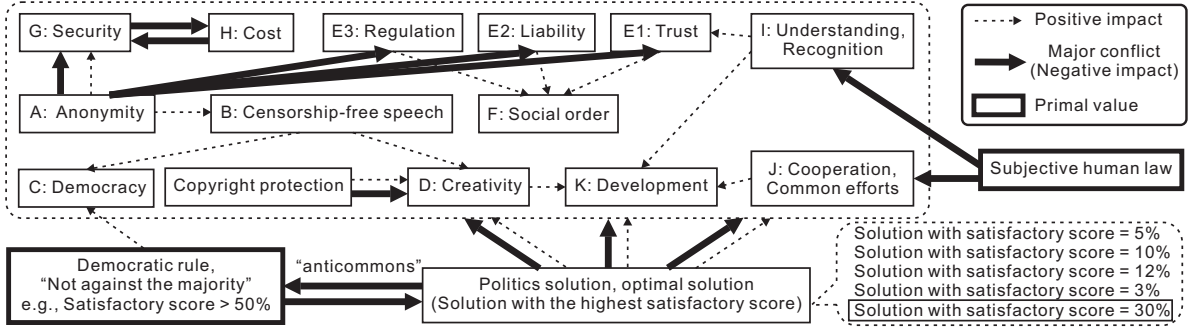


Figure 1: A typical example of Internet politics — values, major conflicts, primal values

cific Internet problem ties up the following four values: anonymity, regulation, security, and cost. Due to the above major conflicts, we can imagine that it could be very hard to find an acceptable solution to this problem by well balancing these four values.

In addition, even if someone could find an effective way to balance these four values, it does not necessarily mean that it will be acceptable by others. This is because the idea can still bear major conflicts with *primal values* of the Internet politics, as we explain below.

### 2.3 Primal Values

*Primal values* of the Internet politics are values that will inevitably be involved in every research idea as long as we attempt to utilize the idea effectively. There are at least two primal values: (i) *subjective human law* and (ii) *democratic rule*, which can be described as “not against the majority.”

*Current Practice: Underutilization of Ideas.* The current Internet fosters an extraordinary thriving of creativity. However, it does not provide a proper way to effectively utilize the abundant idea resources such that they can well contribute to the Internet *development* (value *K*). This is because most ideas (for the Internet) do not automatically turn into benefits without two important values: (i) *understanding and recognition* (value *I*) by others, (ii) *cooperation and common efforts* (value *J*), both of which bear major conflicts with the primal value — subjective human law.

*Subjective Human Law.* Humans are subjective by nature. Everyone can have a different view on the same value<sup>1</sup> and the difference can be huge. Although each of us has sufficient freedom to express our ideas, we do not have the freedom to control whether others will understand or recognize the ideas. Without being understood and recognized by the commons, the use of the idea is limited since most ideas (in particular, ideas for the Internet) need common efforts to make it useful.

<sup>1</sup>In psychology and philosophy, this is a long confronted problem called “qualia” [3] — “the ways things seem to us,” whose archetypical exemplar is “redness” — “Is my experience of redness the same as yours?” “How would we know?” Subjective experiences are not merely per-

The objectiveness in evaluating ideas is crucial to understand and recognize ideas, which in turn can help alleviate the underutilization problem of idea resources. However, to achieve the objectiveness is very hard due to the subjective human law. People have made a lot of efforts to improve the objectiveness of their evaluations, but the current state of objectiveness is still far from being able to alleviate the underutilization of ideas.

Consider the paper or proposal reviewing process for example (regardless of whether it is for government funded projects, for collaborative research projects of corporations, for conferences, or for journals), which is the mainstream approach nowadays to evaluate and recognize new ideas in the Internet research domain.

A tacit rule that many reviewers follow is to check the “technical depth” of an idea, *e.g.*, whether there are sufficient experiment results supporting the idea, whether mathematic approaches are used, or whether there are well-known theories behind the idea. This rule is reasonable because it uses the most objective standards (*e.g.*, mathematics is perfectly objective because it is immune to the subjective human law).

However, many reviewers have also recognized that they should not stick too much to the “technical depth” rule, otherwise they could underestimate the “major contribution” or “broader impact” of many ideas. This is because Internet has mixed so many values, and solutions to balance these values can not always have enough “technical depth.” But this causes significant difficulty for them to become objective. They might resort to the mainstream ideas in related work to address this. However, the mainstream ideas could be *significantly* biased due to the underutilization of ideas caused by the Internet politics. Therefore, this could lead to a vicious cycle of bias in idea recognition.

*Democratic Rule.* We may think it is reasonable to accept an *optimal solution*, *i.e.*, the best one

ceptual. Even if two persons had effectively identical genetic and experiential histories, they can have different experiences of “redness.” Subjective experiences can include any emotional, cognitive, or conative experience reaching the consciousness of a subject.

among all solutions for the same topic. However, this might not be the case due to another primal value of the Internet politics — the democratic rule, which considers an idea as acceptable only when it is not against the interests of the majority.

Consider a measure called *satisfactory score* which quantifies the percent of people that are satisfied with the idea; more precisely, it should be the percent of people that are *not fundamentally against* it. Figure 1 shows an example in which we have five solutions and the one with a satisfactory score equal to 30% should be considered as optimal. But this solution might still not be acceptable if the democratic rule requires the satisfactory score to be at least 50%. We call such an optimal solution the *politics solution* in the sense that it contradicts with the democratic rule. A politics solution is not likely to be accepted by the commons and this indeed is the aforementioned “anticommons” situation.

## 2.4 Fast Mutation of Internet Politics

Although the values and major conflicts are relatively perpetual, they still could mutate. Internet politics has a significant difference from the traditional politics in that its involved values and major conflicts *mutate much faster* than those of the traditional politics. This is due to the Internet’s innovative nature — brand new technologies, brand new services, and brand new ideas of life are coming out every now and then.

The Internet continues to bring about many new values and new conflicts. Many precious values that we desired but were never made possible have now become the very truth. Censorship-free speech (or behavior) is a typical example, which contributes to the democracy and creativity as we showed in Figure 1. However, it also brings about new kinds of major conflicts. The conflict between censorship-free speech and regulation for the Internet is a typical example. Another good example is the major conflict between creativity and copyright protection, which was a minor issue before the Internet became popular. The Internet makes the intellectual property more like an essential *input* of creativity than mostly an *output* of creativity as it previously was. Copyright protection causes a severe side effect to impede creativity in the cyberspace [6,7], though its original purpose was to encourage creativity.

Meanwhile, the Internet continues to change existing values and existing conflicts dramatically. For example, the conflict between creativity and copyright protection motivated the dramatic change of people’s value on copyright. Twenty years ago, the idea of free software was considered a mere absurdity by the commons. However, nowadays the free software movement has achieved popular recognition, in which the great successes of the GNU public license and Linux are typical examples.

## 3. INTERNET POLITICS ANALYSIS

### 3.1 Sketchy Internet Politics Analysis

We can perform sketchy Internet politics analyses on many Internet related questions based on the understanding of Internet politics. Basically, we can do this by evaluating the following three questions in sequence: 1. *What are the main values involved in this question?* 2. *Are there any major conflicts among these values?* 3. *Can we find an acceptable way to reconcile the major conflicts?* Consider the following two example questions:

*Question 1: Is clean slate research essentially the same as evolutionary research?* Clean slate research projects such as *NSF FIND* [2] allow us to aim at major problems of the Internet by relaxing us from many state-of-art constraints (which were values involved in the Internet politics) of the current Internet. However, it does not relax us from many perpetual values such as trust, regulation, creativity, and the two primal values of the Internet politics. Therefore, there are still a large number of major conflicts that we have to face.

One of the major conflicts that clean slate research can not avoid is between the *recognition* and the *cost*. The value of cost determines that people will always try to reuse the current Internet infrastructure as much as possible such that they can minimize the cost. This means that the clean slate research will more or less turn to an evolutionary research if we want to finally deploy its solution in practice (though we may not concern the evolution issue too much when it still stays at research stage).

*Question 2: Can major problems of the Internet be solved via technical means? What is the best that we can do via the technical means to solve such problems (or to partially alleviate them if unable to completely solve)?* Technical means are approaches that require “a change only in the techniques of the natural sciences, demanding little or no change in human values or ideas of morality” [4]. The Internet politics shows that many major problems of the Internet involve quite a number of human values and ideas of morality. Some of them are believed to have no complete solution via technical means, *e.g.*, trust, regulation, and “anticommons.” Therefore, many major problems tend *not* to be solvable via technical means only.

However, technical means, in particular, technical means surrounding the Internet, can enable non-technical means. The fast mutation of the Internet politics is an evidence, of which changes in people’s value on copyright and free software enabled by the Internet is a typical example. Therefore, we may seek solutions about how to use technical means to enable non-technical means to reach more complete solutions. This paper might be one example of such solutions, which propose a technical means

that can enable non-technical means to alleviate the “anticommons” as we will show in Section 3.2.

*Learning the History, Serving the Future.* We can also use the Internet politics to explain why some well-known ideas in history (e.g., *PKI*, *QoS*, *ATM*, and *ubiquitous computing* [8]) did not work as people once expected. Such explanation can disclose major conflicts that are fatal for frustrations of these ideas and such major conflicts *will not change much* for a long time. It therefore can improve our understanding of the Internet politics and help us avoid the similar frustrations in our future research.

### 3.2 Fine-grained Internet Politics Analysis

An in-depth Internet politics analysis that involves a number of values and major conflicts could be complex if we do not have a good tool. In this section, we introduce a systematic tool that can significantly simplify the Internet politics analysis and allow us to perform fine-grained analysis.

#### 3.2.1 Modeling the Internet Politics

We can model the Internet politics using *politics graphs* as exemplified in Figure 2.

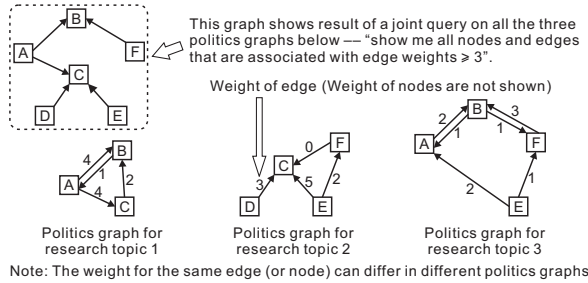


Figure 2: A simple example of politics graphs

*Components of Politics graphs.* Each politics graph is designed to describe the main values involved in a specific research topic and how these values conflict with each other in a *concise* and *precise* way. It consists of the following components:

- *Nodes.* Each node in the graph corresponds to a main value involved in the specific research topic. It is annotated with two attributes: (i) *weight*, which indicates the importance of the value; (ii) *comment*, which describes why it is of such importance. The weight takes an integer value between 0 and 5, which indicates six levels of importance (e.g., trivial, slight, moderate, considerable, major, extreme).

- *Edges.* Each edge in the graph corresponds to a conflict between a pair of values. It is annotated with two attributes similar to those of a node: (i) *weight*, which indicates the conflict extent between the two values; (ii) *comment*, which describes why they conflict this way. The weight takes an integer value between 0 and 5, which indicates six conflict extent levels.

Different research topics can use different politics graphs because the main values, the importance of

each value, the way and the extent that the values conflict can differ much among the topics.

*Manipulation Operations.* The politics graphs supports 10 manipulation operations as shown in Table 1. We use these operations to revise and evolve the politics graphs based on our improved understanding on the Internet politics for the research topics.

1. <i>Merge two graphs:</i> It happens when we find two graphs are very similar, or one graph is similar to a subgraph of the other. The merging is performed by taking unions for all nodes and edges, and taking averages for weights of nodes and edges.
2. <i>Split into two graphs:</i> It happens when a research topic has derived two very different sub-topics, therefore we need to split them and let their politics graphs evolve separately. The split is performed by simply duplicating the graph.
3. <i>Merge two nodes:</i> It happens when we find two values have very similar conflict relationships with other values. The merging is performed by taking unions for their edges and taking averages for weights of edges and weights of the node.
4. <i>Split two nodes:</i> It happens when we find a value have two distinct parts. The split is performed by simply duplicating the node and corresponding edges.
5. <i>Add a new node:</i> It happens when we recognize a new main value involved in the research topic. The weight of the new node is set to a proper initial value.
6. <i>Add a new edge:</i> It happens when we recognize a new important conflict between two values. The weight of the new edge is set to a proper initial value.
7. <i>Raise a node’s weight:</i> It happens when we find that we have underestimated a value’s importance in a research topic.
8. <i>Lower a node’s weight:</i> It happens when we find that we have overestimated a value’s importance in a research topic.
9. <i>Raise an edge’s weight:</i> It happens when we find that we have underestimated the conflict extent between two values.
10. <i>Lower an edge’s weight:</i> It happens when we find that we have overestimated the conflict extent between two values.

Table 1: Manipulation operations

*Query Operations.* The politics graphs can support both per-graph query and joint query on multiple graphs similar to what we can do using a database. For example, a user can query: “show me a graph that displays only nodes and edges associated with node weights larger than 2 and edge weights larger than 3.” This query will result in a concise view on the *major* conflicts among the *relatively important* values for the specific research topic.

For a user doing interdisciplinary research across several topics, she might use a joint query on the graphs corresponding to these topics to help understand the Internet politics related to her research. A user can even issue a joint query on all graphs to get an outline for the overall Internet politics. For example, she can query: “show me all nodes and edges in all graphs that are associated with edge weights no less than 3.” A simple example for the result of this query is shown in Figure 2.

#### 3.2.2 Exploiting Politics Graphs

The politics graphs can be easily implemented as a software tool with a database as its core and a GUI (e.g., written in Java) as its front end. Researchers can use this tool as a *memorandum* and an *assistant* for the fine-grained Internet politics analysis. However, in this section, we are aiming at a more ambitious goal — use politics graphs to help reach

an objective view (*i.e.*, consensus) on the Internet politics from subjective views of each individual.

#### **Gains from Objective Internet Politics View.**

An objective Internet politics view can help with the following:

First, it can help improve the objectiveness in evaluating research ideas. A reviewer can now use this objective view of Internet politics (in form of politics graphs) to guide her review process on others' ideas. This objective view of Internet politics actually visualizes the current state of the arts for the related research area. For example, when one finds that the idea favors value *A* a lot and the politics graphs tell that value *A* bears a major conflict with value *B*, she then knows that she should pay attention *not to overemphasize* the idea's limitation on value *B*. This is because such limitation might be inevitable due to the current state of the arts and no similar solutions could do anything better.

Secondly, it can yield an effective learning system for the public. Novices can use the system to quickly learn about the state of the arts in their expected research areas. Experts can use it to keep updated about the current state of the arts (changes can frequently happen due to the fast mutation of Internet politics) and learn about areas beyond their current expertise. This favors interdisciplinary research which tend to be more and more common for future Internet research (due to the increasing number of distinct values involved in the Internet).

Thirdly, since this objective view is a consensus, it could be used as common standards to evaluate people's Internet practices, which may help to reach practical solutions for the Internet regulation.

**Internet Politics Forum.** An Internet politics forum is one solution to reach the objective Internet politics view. Instead of implementing the politics graphs as a single-user software, we may deploy it as an Internet forum. The forum maintains a consensus version of politics graphs (in its database) for major Internet research topics. Users can view and query the politics graphs via the Web interface. They can post to the forum their opinions on the parts of politics graphs that they *disagree*. Such posts will be linked to the related nodes and edges as *comments* (as defined in Section 3.2.1) of the nodes and edges. Users can click on a node or an edge to see related posts.

The posts can be conveyed in any creative forms, *e.g.*, text that tells a funny story but well explains a major conflict, a flash animation or a video that visualizes an explanation. Then some posts that really hit the public concerns will become popular in terms that they incur a lot of *debates* on the forum. The forum automatically highlights the most popular posts for each node and each edge, thereby helping others to get quick ideas on values and conflicts (that they are not familiar with). For exam-

ple, why a specific value is of such importance, why two specific values bear such a major conflict, why a value or a conflict seems to be underestimated (or overestimated) in the politics graphs at the forum.

The Internet politics forum can hold an annual or biannual workshop for revision of the politics graphs that it maintains. Prior to the workshop, forum users can make proposals for the revision. The format of each proposal is uniform, it is simply a choice among the 10 manipulation operations listed in Table 1. The workshop invites experts in related research areas to vote for the most popular proposals (in terms of the number of users that propose them). The voting results will decide whether the forum will revise the politics graphs as each proposal specified.

To prevent spamming, the forum may only accept people from the research community as its registered users and adopt a *PI*-based registration and approval process similar to that of the *PlanetLab* [1]. Other users, *i.e.*, guest users, can read the forum but are not allowed to post comments or to propose revisions for the politics graphs.

## **4. CONCLUSION**

In this paper, we disclosed and explained *Internet politics*, an “invisible hand” that inherently affects Internet research. We showed that it could cause significant underutilization of research ideas and a vicious cycle of bias in mainstream research ideas. However, we also exposed that it is possible to gradually alleviate effects of the Internet politics by well understanding it. To this end, we proposed *Internet politics analysis*, a systematic approach that can potentially well address the research dilemmas caused by the Internet politics. In addition, we proposed a simple but effective model for the Internet politics which can significantly facilitate the Internet politics analysis. As a result, it may lead to dramatic gains for the future Internet research.

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