

A Social Contract for Virtual Institutions

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Abstract Computer-mediated social groups, often known as virtual communities, are now giving rise to a more durable and more abstract phenomenon: the emergence of virtual institutions. These social institutions operating mostly online exhibit very interesting qualities. Their distributed, collaborative, low-cost and reactive nature makes them very useful. Yet they are also probably more fragile than classical institutions and in need of appropriate support mechanisms. We will analyze them as social institutions, and then resort to social contract theory to determine adequate support measures. We will argue that virtual institutions can be greatly helped by making explicit and publicly available online their norms, rules and procedures, so as to improve the collaboration between their members.

Keywords Virtual institutions - Social institutions - Social organizations - Social contract - Wikipedia

1 Introduction

The remarkable development of electronic networks has given rise to novel forms of social life online. The internet with its numerous applications (email, the web, social media, etc) allows people to communicate and to socialize quickly and easily without meeting face-to-face. Various types of virtual communities have thus emerged in the past twenty or thirty years: notably forums, newsgroups, web-based associations, and lately groups of "friends" or "followers" on social media (such as Facebook or Twitter).

These virtual communities are by now almost as varied as real-life social groups in size, nature and goals (Kollock and Smith 1999; Memmi 2006), but they often exhibit particular characteristics: they tend to be more impersonal, goal-oriented and more functional than classical communities. In this way, they probably participate in the general trend toward impersonal and abstract relationships that is typical of modern society.

More recently (in the past decade or so), one has observed the advent of a new phenomenon: some virtual communities have become even more impersonal and goal-oriented, taking the form of a durable abstract construction that is more than the mere union of group members, and which can survive the usual turnover of participants. Wikipedia is a very good example, but we could cite a few others. In other words, these virtual groups have become social institutions, a fundamental construct of sociology. As social institutions are the building blocks of society, the emergence of virtual versions is noteworthy.

We will argue here that virtual institutions are likely to develop further, and that they deserve to be examined carefully. We will see that they possess very interesting qualities in comparison with classical institutions: their collaborative and virtual nature makes them naturally flexible, adaptable and cheaper to operate. Yet they are also potentially more fragile than traditional institutions, and appropriate support mechanisms should be devised and provided to ensure their functioning and durability.

In fact, when pondering the conditions for the smooth operation of virtual institutions, one is led to pose the same questions that have been asked about social institutions in general: how can a social organization be justified and made legitimate, how to ensure the co-operation of its members with a minimum of coercion. This has traditionally been discussed by using a theoretical fiction, the social contract. We will review the history of this convenient notion, and then use it to examine the conditions under which virtual institutions could thrive and elicit the goodwill of their members.

This will allow us to propose practical recommendations to improve the efficiency and durability of virtual institutions. Making norms, rules and procedures explicit and posting them on the web should facilitate regular operation and minimize potential conflicts. We will then offer general advice on this theme as well as more specific guidelines.

2 Social institutions

To begin with, we ought to define the notion of social institution (Greif 2006; Miller 2012). This represents of course a group of people, but it is much more than a collection of individuals. An institution is a social organization with a structure of relations (often hierarchical) that embodies and fulfills an abstract pattern of functions. People enter institutions and leave them regularly, but an institution endures as long as it maintains its overall pattern and functions. In theory, every member in an institution could be replaced and the institution would still be the same (and fulfill the same functions).

A social institution is then an overall pattern consisting in fairly abstract concepts: goals, norms, functions, organizational structure and management rules. To describe an institution, it is by no means sufficient to list its members and the structure of their relations. And the fact that many institutions are associated with a particular building or location (e.g. the British Parliament, the Church of Rome, the White House...) is not essential to their function. But they usually result from socio-historical processes, which may explain their present structure and norms (see Berger and Luckmann 1966; Searle 1995).

Examples of social institutions would be banks, firms, universities, museums, hospitals, churches, non-governmental organizations, trade unions, political parties, armies, etc. Their goals and functions vary widely and are not always easy to determine: if the goals of a university are obviously teaching and research, what are the exact goals of a church? But they all exhibit a goal-oriented, purposive behavior that transcends the details of their organization.

One could distinguish between institutions and organizations (Mintzberg 1979; Scott 2001), for example by considering organizations as concrete groups fulfilling particular tasks, and institutions as abstract patterns of rules or customs. There is also a frequent tendency in sociology to consider institutions as rule systems or customs that apply to society as a whole (i.e. marriage, religion, the legal system...). We will, however, consider institutions and organizations as two sides of the same coin (abstract vs. concrete), and speak mainly of institutions in order to emphasize their abstract character.

Looking more closely, we can list the main components of institutions (or organizations), roughly in decreasing order of abstraction:

- goal or goals
- norms and values
- specific functions
- rules and procedures
- arbitration mechanisms
- social structure
- members and roles

To sum up, a social institution is an abstract organization, fulfilling functions and tasks toward some goals, following specific rules and norms, and composed of members with particular roles.

Note the fundamentally functional and impersonal character of institutions: they are focused on their goals and functions rather than on their human members (who are replaceable). This tendency has been present in social institutions from the very beginnings of history when complex societies started to arise. In this way, the recent emergence of virtual social institutions online is but a continuation of long-term trends.

3 Virtual institutions

A virtual institution is a new type of social institution operating online. As far as we know, both concept and name seem to be recent (Orman 2010; Memmi 2012). A similar expression, virtual organization, covers a looser and more diverse set of online collaborations or groupings, often of a temporary and technical nature (e.g. Pang 2001; Camarinha-Matos et al. 2004). We will therefore focus here mostly on virtual institutions.

The expression is problematic, however. The traditional meaning of *virtual* implies a lack of reality or completeness, and by extension has been used to denote software simulations (e.g. *virtual reality*). But virtual institutions are not any more unreal than other social institutions, except that they operate mostly online. So *virtual* here seems simply equivalent to *online*. Still, this expression is already well established and we will use it without further discussion.

Communication between members of a virtual institution is then achieved mainly or exclusively through electronic media, usually by means of some web-based application. It is clearly a social institution because it shares most of the features of "classical" institutions we have just reviewed: abstract character, goal-oriented and rule-following behavior, functional operations, long-lasting purpose and stable structure...

But virtual institutions also exhibit innovative features that make them a very interesting organizational model. To begin with, they are of course situated online, without a physical base. They are not centered on a particular building or location, and their members are dispersed in cyberspace, apparently without body or face. Communication is text-based and largely impersonal, consisting mostly in updating some common document or database. Direct personal exchanges are kept to a minimum, and are usually lower than in classical institutions.

Virtual institutions are often voluntary and collaborative. Participation is free and unpaid, resulting in very low operating expenses. Contrary to most classical institutions, there are basically no buildings to maintain and no wages to pay. There is neither hiring nor firing (one of the major headaches of traditional organizations) and work is simply done piecemeal as necessity

arises. And social structure is deliberately kept simple and informal for even more flexibility and adaptability.

This collaborative and highly distributed model has proven to be both cheap and efficient, because the repeated contribution of numerous participants achieves good results in the end, provided the whole process is well regulated. And the model is highly reactive, adapting easily to new input, so that continuous output update is possible within the same mode of operation. A kind of flock behavior focuses work continuously where it is needed.

The structure of a virtual institution can also be rather easily altered to deal with a new task or changing circumstances. Hierarchy is informal and rules are more fluid than in classical organizations, so that changes are possible without major struggles. This flexibility is not unlimited of course, but still quite noticeable when compared with older institutions.

In short, virtual institutions are disembodied, informal, highly distributed, collaborative, low-cost, adaptable and reactive, with the potential for delivering a continuous output of good-quality results. These are very positive traits indeed.

Of course, for this model to work successfully a few conditions are required. As in any organization, the coherence and purpose of operations must be maintained without too much overhead. So some social structure, however informal, must be in place for regulation and decision-making purposes, and rules of operations should be made clear. Norms of behavior and arbitration procedures must also be available to deal with inevitable conflicts.

In other words, virtual institutions require in fact much of the same structure and organization as any other social institutions. Although their appearance is very recent (around 2000), they are fully-fledged institutions and should be analyzed as such. They also need some kind of economic base to survive. Even if their operating expenses are low, their contributors must be able to support themselves (usually with regular wage-paying jobs elsewhere).

A detailed example: Wikipedia

A good example of virtual institution would be Wikipedia, probably the best-known and most successful incarnation so far of this model (Wikipedia 2012). Wikipedia is an online encyclopedia (started in 2001), which is written and edited collaboratively by many anonymous, voluntary contributors. A wiki application is used to edit articles: texts are posted online and worked over by contributors till articles reach a satisfactory form. Anonymous contributions are unusual among virtual institutions, but the other features are fairly typical.

An article (or entry) is thus edited repeatedly by various contributors until the entry stabilizes. In the process, entries usually improve in content and style within weeks, though it might sometimes take months. The process never really stops (updating is always possible whenever new information becomes available), but a slowdown indicates that a reasonable consensus has been reached about an article.

Wikipedia has been a remarkable success in a short span of time (about 10 years). At this moment (end of 2012) more than 4 millions entries have been written in English, about 1,430,000 in German and 1,270,000 in French. In other important languages (Italian, Spanish, Polish, Russian, Japanese) the number of entries ranges between 800,000 and 900,000. We will base our analysis here mainly on the English version as the most developed, but results hold for other languages as well.

Wikipedia has been faced with two main problems: how to offer objective, reliable and verifiable information, and how to solve conflicts between contributors ("edit wars"). To deal

with these issues, Wikipedia has gradually developed detailed norms and rules about writing style and conflict resolution. It has also put in place a hierarchical structure among contributors and devised elaborate arbitration procedures.

Norms, rules and procedures have been explicitly formulated and are easily available on Wikipedia's website. They are used to solve problems and disputes, but also to socialize new contributors about the customs and etiquette of the Wikipedia community. Writing guidelines are particularly detailed in order to ensure the quality of information and readability of entries, but conflict resolution advice is also elaborate and thoughtful.

Remember that contributors to the encyclopedia are volunteers working for free, and not employees who must obey orders. To ensure orderly co-operation, the only available mechanisms are voluntary adherence to explicit rules and norms, as well as the peer-pressure implicit in the editing process: contributions deemed unacceptable are rewritten by other contributors till some consensus is attained. Only in case of protracted disagreement does the hierarchy intervene, and formal arbitration is the last recourse if all else fails.

Social order is maintained and goals are achieved in this fairly democratic manner, as the impersonal and collaborative editing process tends to enforce the will of the majority in the end. Yet consensus is preferred to simple majority rule and reasoned, factual argumentation is the proposed norm. Similarly, hierarchical positions are attained mostly with time and experience, subject to peer-review and approval by the community.

More technical mechanisms also help focalize contributions to observe common standards. Unpolished articles are tagged with remarks asking for explicit modifications (of content, style or references), and the systematic hyperlink structure between entries encourages a common format. Articles have been increasingly placed within taxonomic categories, wider tables and domain portals, which in another way to foster implicit adherence to general norms.

In short, Wikipedia has become within ten years a fully-fledged social institution in order to achieve its goals. It has developed norms, rules, operating procedures, a clear social structure, as well as explicit arbitration mechanisms. And the project has been amazingly successful: the encyclopedia offers an enormous quantity of pertinent and reliable information online for free in a useful hypertext format.

All this has been achieved at very little cost by the massive online collaboration of voluntary contributors. Co-ordination has been efficiently ensured without recourse to oppressive controls and article quality is quite decent overall. Wikipedia is indeed a very good example of a mostly self-organized virtual institution, exhibiting the main novel features of this new type of social organization.

Although Wikipedia is a good example of virtual institution, there are others, each with its own peculiarities. Free software projects function along similar lines: collaboration is voluntary and interactions take place mostly on the internet, although projects are more highly structured and contributions are not anonymous (Feller et al. 2005). The W3C consortium supervising the development of the internet is another example of online institution, regrouping in this case various technical organizations rather than individual members (W3C 2013).

4 Support mechanisms

Social institutions are not eternal or immune from change, however. They emerge, develop, endure or fail to survive. Virtual institutions might then be left to survive or fail on their own. After all, many social institutions have collapsed throughout history when they could not maintain

their coherence, purpose or viability. Commercial firms in particular go bankrupt every day, and this is a normal occurrence for the economic system we live in.

Yet most established institutions benefit from a wider environment explicitly designed to help them survive. For example the workhorse of economic activity in Western countries, i.e. the limited-liability private company, is not a gift from heaven, but an elaborate social construction designed to improve economic efficiency and limit the risks of failure. It took time and effort to reach its present form, and companies are surrounded and supported by a whole structure of commercial laws and regulations.

Companies are also part of a wider economic system (featuring notably banks and stock exchanges) without which they could not work properly. In particular they could not easily raise the capital they need to survive and develop without supporting institutions and without a legal system designed to regulate the relations between relevant economic actors.

Similarly virtual institutions could benefit from a favorable environment and adequate support mechanisms. Though potentially very cheap to operate, they need a minimum of cash to cover their expenses. For example Wikipedia employs so far about a hundred regular (salaried) employees for its administration and must maintain hundreds of servers. And virtual institutions need to be protected from legal challenges or commercial appropriation of their output.

Virtual institutions are still very young, without much support system, and we simply do not know how they will pass the test of time. Will they last or will they collapse as quickly as they have emerged? Virtual institutions seem particularly fragile precisely because of their virtual nature. The fact that they do not have a mass of salaried employees means that few people have a vested interest in the survival of the organization. Volunteers may simply walk away when conditions get too difficult or unrewarding, and the organizational structure could be too light and too loose to deal with prolonged difficulties.

These potential weaknesses are the other side of the very qualities of virtual institutions, so they seem at first difficult to fix without endangering the model. In the choice between stability and flexibility, there is a risk that flexibility may result in fragility. But a supporting environment would certainly help, notably in the economic and the legal domains. In particular, public licenses such as GPL have been successfully devised to protect free and open-source software, and similar licenses have been used for Wikipedia.

Internal support mechanisms can also be considered. If the environment is not very supportive, an institution should at least be coherent enough to survive. The main question is how to motivate participants to fulfill the goals of an organization and to respect its rules, when concrete awards or formal sanctions are not easily available. Such an issue is crucial for virtual institutions, but it happens to be a fundamental question for all social organizations. This question deserves careful consideration in its own right, and this has often been done by using the notion of social contract.

5 The social contract

Instead of dwelling on the specificity of virtual institutions, we will now take a fundamental stand by considering virtual institutions first and foremost as social organizations. In this respect, they pose the same problems as any social organization: how to ensure regular and efficient co-operation, how to have participants obey the rules and respect the norms of the institution, how to reach a decision in case of disagreements or conflicts. It is often thought that institutions cannot function without sanctions, but sanctions are costly to enforce and prejudicial to goodwill. Moreover, sanctions are particularly unrealistic in the case of virtual institutions.

The central problem of social institutions is then how to ensure social co-operation with a minimum of coercion. To address this issue, the notion of social contract may be used to clarify what is at stake here (Russell 1945; D'Agostino et al. 2012).

Introduced in the 17th century, the notion of social contract was a theoretical fiction used to find a rational foundation for social life, and to legitimate a government's authority without resorting to religious beliefs such as the divine right of kings. The basic idea is that men choose to enter into a covenant, a social contract between themselves, in order to establish a common government which will protect them from "the war of all against all" and from the resulting insecurity and violence. This hypothetical contract is the foundation for the legal authority of government and the moral justification for its power.

This is of course a fiction, a convenient myth: throughout history, the power of governments of all kinds has usually been established by military force, not by citizens agreeing freely to a political contract. But it is also true that most governments do not have to use or threaten to use constant force, because their subjects consent to established authority most of the time. This is the actual state of affairs that social contract theory attempts to elucidate and justify.

There are significant variants to this basic idea. In modern European thought, the notion was introduced by Grotius and Hobbes, and later developed by Locke, Rousseau or Kant. Hobbes and Rousseau for instance tend to consider that the power of government is unlimited once established, while Locke retains individual rights and proposes a system of checks and balances. Hobbes prefers the "sovereign" (governmental power) to be a monarchy, whereas Locke advocates a division of powers between king and parliament, and Rousseau appears to favor some form of democratic assembly. Yet they usually fail to take into account the diversity of interests and opinions among citizens, and thus do not seriously tackle the practical problem of determining a common policy. There is a tendency to consider the "general will" as unanimous, which is far from evident.

Contemporary discussions of this notion have shifted the emphasis from consent and obligation to agreement and justification (D'Agostino et al. 2012). As befits our democratic age, recent authors (e.g. Buchanan or Rawls) focus on the public justifications that could form the basis for the agreement of citizens with social structure and general policy, rather than on the obligation to obey established authority. This also makes it possible to consider the diversity of opinions which is part and parcel of real social life. This evolution is interesting because it suggests a way to ensure co-operation without sanctions.

This shift from obligation to justification of social rules might be seen either as a democratic advance or a decline of traditional authority (though we do not have to take a stand on the issue). But this is obviously an important phenomenon: rules will no longer be blindly accepted if they cannot be justified, and there is a growing demand for explicit justifications and discussions about public policies, especially in the case of policy changes. The social contract nowadays seems to include a requirement to explain and justify public decisions, and we propose here to extend the notion further by considering that public justifications could actually help society function better.

To sum up, social contract theory states that men give up willingly (part of) their individual freedom of action in order to ensure common goals, notably peace and security. They consent or agree to social obligations in exchange for the protection of government. But this contract being in fact hypothetical, the concept is nowadays used mainly by philosophers to analyze the reasons people would have to conform to social structures and regulations if they were asked about their motivations.

Application to virtual institutions

Going back to our original concern (supporting virtual institutions), what can we learn from social contract theory? What could be of practical use to help institutions function better? First, the idea that most people accept social obligations willingly as long as they appear to protect their interests and needs. Second, that explicit justifications are probably more relevant today (and more efficient) than social obligations. Third, that formal sanctions are maybe not so important as is often thought.

Note that our goals here are more practical than moral. We do not have to decide whether social rules must be obeyed simply because they are useful (Hobbes's view), or for fundamental moral reasons (Kant's position). Moreover, social institutions are partial organizations, not whole societies, whereas the social contract was meant to apply to society as a whole (or at least its basic structure). Our problem is much more narrowly circumscribed: helping specific institutions to function and endure.

We may now reasonably suppose that making explicit and publicly available the motivations and goals of a particular institution, the reasons for its norms, rules and procedures, should help to obtain the agreement and co-operation of participants. As it is so easy to evade the obligations of a particular institution (e.g. a church or a union) simply by leaving the institution, public justifications would be useful. And in the case of virtual institutions, sanctions are unlikely even when participants stay within the institution. Ensuring the agreement of participants is thus crucial, in practice as well as in theory.

As a matter of fact, the problem is probably less acute that it would seem at first sight. Because we are social animals, most people tend to conform to social norms most of the time, be it out of habit, conviction or fear of sanctions. Most people will instinctively obey the rules of any social group they belong to, because of the implicit social contract they have entered into when joining the group, because they agree with the goals of the organization, and because they wish to be accepted and fear ostracism. But one must still find ways to deal with disruptive behavior as well as with cheating and free-riding.

In the case of cheating and free-riding, i.e. people deliberately using the system without giving enough in return, sanctions are probably unavoidable, but they do not have to be formal. Ostracism, blackballing, or simply withdrawing normal social intercourse and co-operation are already powerful means to signal and discourage self-serving behavior. For instance in Wikipedia, individuals who repeatedly use the editing process to promote their pet cause without considering the opinions of others will see their contributions rewritten and their subsequent interventions ignored.

Simply disruptive behavior is much more common: disrespect for rules or ignorance of norms, actions incompatible with the goals of the institution, uncivil and obstructive behavior... In such cases, reminding participant of explicit common rules and goals usually goes a long way in preventing many forms of asocial behavior. Explaining the reasons for rules and appealing to common sense avoids confrontation and the need for coercion with all the unpleasantness that is usually associated with formal penalties.

So in order to obtain voluntary agreement rather than having to resort to sanctions, one must make explicit the goals, motivations, norms, rules and procedures of an institution as much as possible. Justifying the operations of an organization and posting these justifications online should help virtual institutions to function smoothly and to retain their structure through time.

Another consequence of explicit public justifications is to encourage debate about the rules and values of an institution. This is both beneficial and potentially costly. In a democratic atmosphere, public participation in setting the rules improves the chance that they will be respected (and may result in better rules). But one must be prepared for lengthy debates at times before agreeing to common rules and guidelines.

6 Sanctions and motivations

We can now reconsider the issue of sanctions in more detail. Formal sanctions are unlikely or impossible within virtual institutions, because participants are usually volunteers and not paid employees. Virtual institutions do not (as yet) have the necessary legal status to enforce or request any kind of civil or penal sanctions in case of undesirable behavior. There is no officially recognized contract between a virtual institution and its participants, which could be invoked to apply sanctions when the contract is breached.

There is however an implicit social contract between participants that would justify taking appropriate measures to deal with offenders if need be. The implicit contract is to co-operate toward a common project, and consequently to refrain from any behavior harmful to common goals. So sanctions would be socially (and morally) acceptable in principle, if realistic sanctions could be devised online.

Punitive sanctions, such as dismissal, withdrawing wages, imposing fines or even prison, are obviously not available here (as long as no ordinary laws have been breached). But a softer kind of sanction is possible: withdrawing the possibility for participants to fulfill the goals that led them to participate in the first place.

To design efficient sanctions on the internet, one should first perform a careful analysis of the motivations of participants to virtual institutions. The motivations of participants are usually among the following (this is an open list):

- contributing to a common project
- advancing a common cause or values
- gaining personal prestige or expertise
- pleasure of social interaction

Denying the fulfillment of these motivations would then be tantamount to imposing sanctions. Any measure that achieves such a denial could serve as a soft sanction. In concrete terms, refusing interaction with offenders and ignoring their contributions would discourage most harmful behavior. For instance, revoking access rights to a common interface, or simply ignoring interventions from offenders should be good enough to signal social disapproval and to limit the effects of disruptive behavior.

Still, one must not forget the existence of truly malicious behavior. In any social group, there are people whose main motivation is to do harm for harm's sake. Vandalism and hacking are well-known examples. In the case of such negative motivations, social disapprobation is not enough, and stronger (and more costly) defensive measures must be taken, such as firewalls, security checks, blacklisting, etc. Because the cost of vandalism is potentially high, such measures are unfortunately necessary, even though they usually apply to a very small number of people only.

7 Practical recommendations

In order to encourage good behavior and avoid misunderstandings, virtual institutions should therefore make as explicit as possible their structure, norms, rules and other components. Let us review the main components mentioned earlier:

- goal or goals
- norms and values
- specific functions
- rules and procedures
- arbitration mechanisms
- social structure
- members and roles

These components should be formulated, debated if need be, written down, and possibly formalized. They should then be clearly posted (and regularly maintained) on the institution's website, so as to socialize newcomers, to answer questions, to help older members in their tasks, to prevent or arbitrate disputes... This would improve the appeal, efficiency and durability of the institution.

This is more or less what Wikipedia has done over the years, in a rather informal manner at first, in order to deal with questions, problems, uncertainties and conflicts. The guidelines posted are by now precise and elaborate, but they have obviously been developed piecemeal to solve recurrent problems about norms, procedures and conflict resolution. We think this issue should rather be dealt with as early as possible, to avoid unnecessary communication problems.

Formalization may also be attempted when feasible, for maximum clarity and because it could open the way for further processing (this would make indexing more efficient for example). The Semantic Web movement with its formal languages is an obvious source of inspiration (Antoniou and van Harmelen 2008), and formalizing institutional components would facilitate computer access to virtual institutions. Current formalisms such as RDF, RDFS or OWL might then be good candidates for formalization efforts. At this stage, however, natural language is still the most likely medium of expression.

Whatever the language of expression, a software tool could be devised to prompt for the formulation of institutional components and to post them on a dedicated website. Such a tool must be flexible enough to allow input in natural language about any component in any order, but may also suggest a specific terminology, formalisms and an input sequence by default.

Let us now examine the main components in more detail and suggest some possible formulations for each of them:

- goals

General terms (such as public/private, profit/non-profit, governmental, associative...) are often relevant and should be proposed before listing more specific goals. But a high-level description in natural language is probably inevitable here.

- norms and values

Again some general terminology could be suggested about decision style (top-down, consultative, consensus-oriented...) or social structure (hierarchical, distributed...) before a more specific discussion.

- specific functions

Functions and tasks are more idiosyncratic, because they are particular to a given domain and institution. But there could well be standard functions and a common terminology in a particular domain of expertise.

- rules and procedures

Rules may be quite detailed and procedures can be formalized and even programmed. Yet it remains an open question whether informal rules should always be made explicit (because formal rules are apt to be less flexible).

- arbitration mechanisms

They must be precise and detailed to avoid unnecessary conflicts. Care should also be taken to maintain some coherence with the norms and rules that define institutional culture. For instance top-down arbitration is probably inadequate in a consensus-oriented community.

- social structure

The relations between members of a community can be formalized as a graph, i.e. a social network. The structure of this graph is significant (it reveals influential central members), easy to formalize and may be made available to participants.

- members and roles

Listing the members of an organization, possibly with their roles and expertise within the institution, is obviously helpful for newcomers (and others as well) looking for advice and collaboration. The position of members in an organization's social network is also relevant to find useful advice.

Specific tools can be designed and proposed for institutions. For instance looking for advice or help is a common problem in organizations, and not only for newcomers. Relevant members can be located and recommended according to their roles and skills, but also their more or less central position in the organization's social network, their social distance (number of steps in the graph) from the questioner, etc. There is a wealth of social network formalisms and software available for such purposes (Wasserman and Faust 1994).

To sum up, virtual institutions should plan to formalize and publish their structure, rules and norms on the web as early as possible. This would also make it easier for institutions to reflect upon themselves and to tune up or revise their goals and rules of operation. Beside its practical usefulness, formalization is often the first step toward a deeper reflection about the domain or entities considered, and this probably applies to social institutions as well.

8 Conclusion

We have described here a recent phenomenon: the emergence of virtual institution, i.e. of computer-mediated social institutions operating mostly or exclusively online. Social institutions are social groups conforming to an abstract pattern of goals, norms, rules and functions. They are more complex and durable than mere groups or communities, and require a more detailed analysis. Because social institutions are one of the basic concepts of sociology, the advent of virtual versions is certainly noteworthy.

Virtual institutions are clearly social institutions and should be analyzed as such, but they also possess interesting, novel qualities, which make them an attractive social model: they are highly collaborative, distributed, low-cost, flexible, adaptable and reactive. They have already proven very useful (Wikipedia is a very good example), but their virtual, disembodied nature might also make them more fragile than classical institutions. Virtual institutions probably require appropriate support mechanisms, both internal and external, to become truly durable.

We have then used social contract theory to understand the motivations of human beings in consenting willingly to social rules and norms. In modern society, explicit public justifications seem to be a crucial factor to ensure the consent and collaboration of participants to an organization. We therefore propose that virtual institutions should make their goals, norms, rules and functions as explicit as possible, and post them on an institutional website. In this way misunderstandings and conflicts could be greatly reduced, and the co-operation of participants could be rendered more efficient and more durable.

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