



**Global
Challenges
Foundation**

Enumerati: Community decision making system for human beings

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The submission is a proposal for a hierarchical structure for discussions and decisions composed of ideally sized groups of people, with the structure and procedures ensuring that the signal-to-noise ratio remains low, allowing informed participation, and democratic values are observed. Groups are the building blocks of a structure, metagroups are groups composed of groups, with groups forming locally or to address specific issues. The improved flow of information in the groups provides the opportunity to counter economic power within the political system. Crowdsourcing within the structure increases decision quality of the decisions, as well as judging the quality of emerging solutions. As every individual have the right to initiate discussion about alternative approaches to problems at hand, good solutions have a better probability to be discussed. As the structure grows higher nodes, dealing with increasingly global problems get formed. The increasing size of the structure makes it relatively easier to draw in resources, while keeping information local and open in the structure.





1. Abstract

THE PROBLEM

Global challenges are hard to solve, because the decision-making mechanisms are not adequate for today's tasks from the ground up. The root of the problem is that Homo Sapiens have evolved through the millions of years as an animal which lives in small herds. Our communication and social skills are optimized for that group size, and we perform rather suboptimally in groups which have sizes orders of magnitudes larger, like cities, countries or federations of states.

This leads to bad decision making and individuals in key positions motivated to screw up large quantities of other people. In this structure there are positive feedback loops between political and economic power. Income inequality is but a relatively benign sign of this. Positive feedback loops are leading to resonance catastrophe which destroys the structure which is hosting the process.

There are a couple of theoretical advances in the last two millennia, which were not seen as relevant, practicable or desirable by those who were setting up today's decision-making structures and procedures. We have just put those theoretical advances together, analyzed the problem, and came up with a solution which hopes to answer all of the challenges identified.

THE SOLUTION

Dunbar's findings can be analysed from an information theory standpoint. This analysis tells us that ensuring proper information flow is the key, formal procedures are needed, and information technology is an indispensable part of the solution.

The unique, new idea of our proposal is to **form a hierarchical structure with ideally sized groups of people, with the structure and procedures ensuring that the signal-to-noise ratio remains low** (so everyone involved can participate in decisions in an informed manner), **and democratic values** (ability to participate, equal rights) **are observed**.

While the underlying ideas and main properties of the model are quite clear and simple, the reader might find the model quite elaborate in places. This is because we tried to come up with solutions for each problems identified, and the problem space is quite complex.

Control of decisions is in the hand of people, while anyone can decide on the level of participation and amount of information received, based on personal preferences, abilities and the severity of situation.



2. Description of the model

1. STRUCTURE

The basic structure is a tree containing ideally sized groups (around Dunbar's number [1]) of people as leaves, and the degree of other nodes ("metagroups") are also in the ideal range. Nodes of the structure can (but not necessarily) be civil organisations, local, country level or international governing bodies. Those nodes can be associated with the resources managed (e.g. city, country), and membership of their subtree can be limited by membership/citizenship/etc. Otherwise members and groups are free to move around in the structure along some rules, and the structure reacts to those movements to ensure properties which in turn provide good communication and reasonable decision times.

1.1 Groups

Groups are the basic building block of the structure. To ensure that good communication and decision making – organized around genuine human ties – is possible, the size of a group has a lower and higher limit, somewhere around Dunbar's number, e.g. 30 and 90. If the size of the group exceeds the maximum, it splits into two groups. The cut algorithm can be along preferences toward the new name and goal of the group or a minimum cut algorithm along the preferences of members towards each other as stated, or a combination of thereof. If membership shrinks below the minimum, then the group ceases to exist in the formal structure.

One individual can participate in multiple groups, so different interests can be pursued. E.g. someone is a local citizen of a municipality, interested in preserving the environment, collects postal stamps, and likes to fly airplanes, so she is member of four groups, each formed around one of those interests. There is a limit of how many groups one can participate in, in order to limit the extent of an individual's abilities to disrupt the structure.

An individual can, at any time, choose to discontinue membership of a group, or apply for membership for one.

By default the group membership is automatically accepted, but there are groups which accept only eligible members. Examples of eligibility requirements: groups concerned with the issues of a local municipality might allow only local citizens, the flight club might accept only members who have paid the membership fee used to operate their airplanes. If the eligibility of someone ceases to exist, she will automatically discontinue to be the member of the group.

Also, there is a "default" group, which holds people who have not yet joined any groups and those who were in only one group and that group ceased to exist. This is a point where activities aiming to help out people having problems with using the system can be concentrated.

1.2 Nodes, metagroups, organising nodes

The Node is an abstraction of the model. The group is a type of node. The group of groups – called metagroup – is also a type of it. Nodes are the same notion as it is used in graph theory. So the nodes can have parents and children, they define a subtree, and the whole formal structure itself is a tree with exactly one root node. We use "up" to signify the direction towards the root node. Nodes can capture different organisations of people: local, state or federal governments, clubs,



movements, even companies (though that would be rather socialistic to do in the formal structure).

Nodes can have properties, eligibility requirements, rules and officials.

Metagroups however cannot have direct members, just groups or other metagroups. The number of members in a metagroup must be more than one, and there is also an upper limit, e.g. 90.

When a node splits, the descendant nodes will both be members of the original parent node if the eligibility requirement is the same. Otherwise a new metagroup will form in the place of the node, and the descendant nodes will belong to that.

An “organising node” is a node which is the top node of a subtree with the same eligibility requirement. The root node is an organising node.

Nodes can choose (using the decision making procedures described below) to move within the structure. In order to keep the tree balanced, movements are restricted to those who do not cause a group to be closer to organizing nodes than the closest group before the move.

A node automatically inherits from its parent metagroup the eligibility requirement and all rules applicable to the group, if not overridden locally.

1.3 Informal structure, executive organisations

The above part described the formal structure. All nodes in the formal structure must adhere to the rules described in this document. There is also an alternative tree, where all the rules of the formal structure are optional, and decisions are only binding to members of the subtree where the decisions were made, so people are free to try out solutions outside the current system parameters of the time.

Nodes in the informal structure do not participate in the formal decision making process (but individual members can initiate decisions in their formal groups based on needs arising there).

Nodes of the formal structure can own nodes of the informal structure. This allows to build non-democratic organisations, like offices and companies to support the democratic organizations, while giving them all the tools in case they are needed.

2. KEY INDIVIDUALS AND OFFICES

The key goals in designing the role of key individuals and offices were the following:

- Avoid concentration of power
- Key posts should be filled in by individuals with high probability of having the necessary skills and expertise for the job
- The motivation of the key individuals should primarily be towards the mission of the office

Therefore we propose a system, where:

- Branches of power are separated. We propose to use at least legislative, executive, judicial and auditory branches. This adds the auditory branch to the



classic trias politica, as procedural accountability is the way to ensure efficient operations throughout the organisation.

- While procedural accountability cares for operational efficiency, strategic alignment is achieved by indirectly controlling branches through legislation and election of top official. Institutional integrity is protected by minimal terms for top officials and by fact that legislative branch can only set rules and goals (what, opposed to how) for other branches, which is in turn controlled by the judicial branch.
- The motivation of key individuals is ensured by financial ways (see 5 Finance), and by the fact that they are indeed accountable to the legislative branch.
- Expertise of key individuals and a level of independency is achieved by minimum qualification (with the exception of legislative branch), and a career path where experience in lower levels is necessary to be elected as a higher level official. This also brings stability to the system as a whole.

2.1 Representation (legislative branch)

Representatives are elected officials responsible for the quality of legislative procedure. Their role and responsibilities are described below in the legislative procedure.

The number of representatives of a node is low enough so election ballots are not overly long, and high enough to represent different agendas, as dissent is an important driver of good decisions [2]. (e.g. 5)

A property of the decision-making procedure is that each proposal have an issue representative. The issue representative is the one initiating the given proposal. The issue representative have the same powers as elected representatives, related to the run of the decision-making procedure, and in the node where the run is currently in.

The individuals eligible to be elected as a representative are:

- The elected representatives of the node below
- Individuals who have been elected or acted as issue representatives in the node before

2.2 Other branches

Organizing nodes also have one elected official for each of the other branches of power. They include at least the following: executive, judicial and auditory.

There is a minimal and maximal term associated to each type of the elected officials.

For each of the offices there are minimum qualifications for the elected official. These qualifications should be chosen in a way which makes it probable that the individual have the needed expertise, but makes it possible to find more candidates considered by the members to fit the office. For example only judges can be elected to be official of the judicial branch.



In higher level nodes experience in the same office in a lower level is also required.

2.3 Elections

Elections can be initiated as a normal decision making procedure after the minimum time in office is elapsed. When the maximum time reached, elections are automatically initiated.

2.4 Values and long-term strategy

Some of the authors of this paper argue that there should be a branch of power responsible for values and long-term strategic alignment, with the top-level official representing the unity, values and traditions of the organization with long minimum and no maximum term, or even with hereditary office. This branch should have mostly consultative, representative and some very limited, largely overridable veto powers.

The idea of this branch is drawn from historic examples of modern european kingdoms, the office of Dalai Lama, and weak presidential systems.

3. LEGISLATIVE PROCEDURE

3.1 Legislations

Each node have its own legislation, in the usual hierarchy: Legislation of nodes in higher level are binding for rules and decisions made on lower levels.

As legislation includes the rules of decision-making and the structure itself, everything can be changed as the need arises. To make sure that basic values are not violated and there is a possibility to recover from bad changes, there are two immutable legislations related to the top level node:

1. The Universal Declaration Of Human Rights should overrule any other legislation
2. Rules of decision making and related to the structure can always be overridden by a Debian Standard Resolution Procedure with the minimum number of sponsors being \sqrt{n} and discussion period being $\lceil \ln(n) \rceil$ weeks, where n is the number of people under the node.

3.2 Decisions

People are entitled to directly initiate discussions and vote in legislative matters, which includes setting goals and budget and choose from eligible candidates to fill leadership positions for each branches of power. Decisions are initiated in nodes of the tree, and “bubble up” until they reach the node they are meant to be relevant for. Anyone can initiate decisions in their own group, legislative representatives can initiative decisions in the metagroup they are elected in.

The building block of decisionmaking is based on the Debian Standard Resolution Procedure[3] with appropriate parameters. It is a proven process which includes formal decision preparation and designed using both relevant theoretical results and experience gathered by the open source movement for decades.

The decision preparation consists of gathering a menu of alternatives for the decision. An alternative decision will get into the menu if it meets certain criteria



(a quorum of supporters in groups, the ability to bubble up in metagroups). The individual proposing an alternative becomes an “issue representative”.

Decision preparation in groups is conducted directly, while in metagroups the elected and issue representatives are entitled to conduct the debate and expected to gather feedback.

Vote is conducted with Condorcet method [4], employing a dummy alternative “the choices below are unacceptable” in order to cover the whole decision space, and provide a way to signal the boundaries of acceptability.

When voting for a committee, the CIVS proportional representation method [5] is used to determine members.

Every member of the subtree is entitled to one vote (even if member of multiple groups).

In order to enable people to choose their level of their participation while ensuring good decisions, votes can be delegated in liquid democratic manner, but only to legislative or issue representatives.

3.3 Resolution procedure

The resolution procedure is an adapted version of the Debian Standard Resolution procedure [3]. A proposal starts either in a group as a grassroots initiative, or in a metagroup by a representative. There is a designated node, or an already running decision-making procedure above to the initiating node. (For example someone can initiate a change of air traffic laws to allow flying broomstick without permit in the flight club.) The proposal bubbles up in the tree, discussed, possibly amended with alternative choices and voted upon in each discussion. (For example it is discussed in the flight club association, the association of motor sports, the sport association and in the state level, while the association of sailors add an amendment of the original wording in the sport association node to ban broomsticks above lakes, and based on the initiation of someone in a local neighbourhood, an alternative is raised to ban flying broomsticks altogether.)

The vote in each node is conducted among all who belong to the subtree of the node, and there is always a dummy alternative “the choices below are unacceptable” in order to cover the whole decision space, and provide a way to signal the boundaries of acceptability.

A successful vote – where there is a Condorcet winner, and it is not the dummy alternative – is needed for the proposal to bubble up, and become a decision in the designated node.

As we go up in the tree, the discussion periods get longer, to allow for amendments to catch up with the original proposal.

3.3.1 Proposal

A proposal is issued on the official channel of the node, with a designated node or issue where it will be effective.



The designated node can be the same node where the proposal is issued, or any of its ancestors.

In groups, any member of the group can issue a proposal at any time.

In metagroups, there are two ways to issue a proposal:

- Representatives of the metagroup can issue it at any time
- As a result of successful vote in a child node at the end of the voting period

The one proposing an alternative becomes the issue representative for that alternative, and expected to participate debates and prepare documents related to the issue as long as the alternative is still considered.

3.3.2 Introduction

A proposal is considered formally introduced if either

- it is a result of vote in a child node, or
- in a group there are at least K additional sponsors of the proposal from the group members (e.g. K being 5, or $\sqrt{N}/2$, where N is the number of the members)
- In a metagroup there are at least k additional sponsors from the representatives of the node (e.g. k being 0 or 1)

3.3.3 Discussion

A proposal is in discussion initiation for at least D_m and at most D_M days (e.g. 14 and 28).

The representatives of the node can ask for lengthening the period, and call to end it within the above limits.

This is the time provided for amendments of the original proposal to be created in the node's subtree.

If there is an amendment of the original proposal is in progress anywhere in the subtree, then another amendment to the same can be initiated in any node where the expected time for reaching the target node is less than equal than that of the existing amending proposal, using D_m as the estimated discussion initiation period length.

In the discussion period, the representatives of the issue and the node, and the elected officials should create a document for each alternatives, containing the following:

- Short, space-limited summary of the alternative, with possible links to longer explanations.
- The lists of strengths, weaknesses, opportunities and threats related to the alternative

The document should contain a consensus. Where consensus cannot be reached, minority opinions should be noted.

3.3.4 Voting

When the discussion period is over, the dummy alternative is added to the list of alternatives and the voting begins. The vote period is V (e.g. 14 days). Every



individual in the subtree of the node have one vote, even if they are member of multiple groups.

Votes can be delegated to representatives in a liquid way: if the voter does not choose to vote, then her vote is counted as the vote of the delegate, otherwise her cast vote counts.

One can delegate to one representative in each of the ancestor nodes, and one issue representative in each of the issues. Delegation can be withdrawn at any time.

When someone delegates to multiple representatives, the following rules apply:

- If there is a delegation to an issue representative of the issue, then that is counted, otherwise
- The representative in the highest level node at or below the vote which have cast a vote.

Votes are counted using Condorcet Schulze method. There is a decision if there is a condorcet winner, and it is not the dummy alternative.

If there is a decision, and the node of the vote is not the designated node, then the proposal is introduced in the parent node, with the first maximum 3 alternatives above the dummy alternative with no compromise proposal (see below) based on them already on the palette. If this was an amendment to an existing proposal, then the alternatives are added.

3.3.5 Amendments, compromises, shortcuts

Amendments are in the form of decision alternative. Amendments can be initiated the same way as a decision, designating the original decision process as target.

When there is a compromise based on more different decision alternatives, then a new decision alternative can be initiated with the compromise text and noting the original alternatives as compromise sources. In this case all of the issue representatives of the original proposal will be representatives with regards to the new proposal.

We deviate here from the debian resolution procedure by not allowing changes to a proposal text or withdrawal. This is to ensure that grassroots initiatives cannot be preempted by coercing the issue representative. In case of meaningful compromises it is expected that the original proposals will drop out as the issue bubbles up.

An elected representative can pick up proposals in discussion at lower level nodes to her node. In this case the elected representative picking up the proposal will be added to the issue representatives of the proposal. The reason for this rule is to make it possible to shorten the time needed for a discussion.

3.4 Norm control

Decisions contradicting higher level regulations are invalid. The judicial power of the node or a node above it (in case the node does not have one, or there was an appeal) is entitled to decide on validity. If there are questions raised about the validity of a decision, norm control can be asked proactively. Norm control can be



initiated by any of the representatives of a node or its ancestor, the elected official for the auditory branch of the node or its ancestor, or based on a decision of a group in the subtree.

Norm control is exercised by the judiciary branch, and the result can be

- nullifying a decision
- finding out that a need to legislate is not fulfilled

In case when a need to legislate is not fulfilled, the representatives of the node should initiate a decision to fulfill the need. If there is no procedure is initiated within $2 \cdot D$ time, a new election is held.

4. COMMUNICATION

As we have seen, communication is the key. The challenge is to provide relevant, high quality information within the comprehension of the individual, where this ability itself vary widely among people. The relevance requirement also means that everyone should have a reasonable opportunity to participate in the communication, whereas the quality requirement means that offtopic or even just excessive amount of information should not be allowed. Well, these are conflicting requirements.

The good news is that in ideal sized groups we can count on our naturally evolved skills to come up with a reasonably good balance.

In metagroups, the official communication is made by the officials and issue representatives of the metagroup, and as a result of the formal decision-making procedure of a node directly below. A form of communication is a non-binding vote, where the one communicating is free to name the alternatives, but the dummy alternative must present.

Informal nodes owned by formal nodes must work transparently, all financial transactions and all documents which do not contain sensitive data are being public and searchable by all individuals having the same eligibility as the eligibility requirements of the owner node. This rule is recursive: nodes under or owned by owned nodes should also adhere to it.

Representatives are expected to have over the average communication and negotiation skills, as they are selected to the task by people based exactly on these skills.

The approach to formal communication is that it is categorised based on the initiator and the properties of the issue at hand, and each individual can select which categories they choose to receive on which device. There is of course also a choice of what to actually overview. Categories could include

- notifications about different phases of the decision making process in nodes (a notable example being decision making process initiation directly in a metagroup by an individual),
- all or topic-specific official communication of nodes or representatives,
- communications related to a specific decision-making process,



- messages from individuals, further subdivided based on friendship or membership
- financial transactions filtered on initiating and receiving entity and amount
- documents issued by owned nodes, filtered by office and type
- for representatives based on whether the individual is represented, and whether it actually delegates the representative

The above formal communication is augmented with the ability to comment every information in the system, including proposals, alternatives, financial transactions and documents. Comments are organised in threads and can only be deleted by the commenter, but can be up- and downvoted and flagged by different aspects (like offtopic, inadequate language, etc), and individuals can choose which comments to show and how, based on this information.

All of the information in the system (down to individual comments) can be cross-referenced.

5. FINANCE

This part describes the approach of finance in the mature phase of the life-cycle. Considerations for earlier stages are in the part about implementation path.

Incomes come from the following sources:

- Membership fee, used to sustain and operate the structure
- Taxes imposed by nodes
- Voluntary contributions for projects

Nodes imposing rules on citizens should pay membership fees of all citizens affected by the rules and wanting to participate. For example a municipal or state government should pay membership fees of all of participants who are the citizens of the municipality or state from the tax income.

High level metagroups can impose relatively benign taxes only on members (like 1 percent of membership fee) and generate a sizeable revenue to solve global problems. This kind of income is against the budget of individual groups, legislated in a higher level, and as such enjoys priority against decisions made in lower levels against the same budget.

As fundamentals of tax-based public finance will not change (except the requirement to be absolutely transparent), we do not discuss it further here.

Membership fee is small and universal. We propose 1% of income here as an initial value, the exact parameters – as all of the parameters of the model – should be tuned.

The membership fee is equally divided and paid among the groups the individual is a member of. Half (a parameter again) of the membership income of any node should be used as a membership income of the node above. The other half should be paid to the elected officials of the node above as personal income. The division of the salary budget of a node can be done based on position, number of



delegations for legislative representatives, and other parameters, the main rule is that 100% should be paid off for a given time interval.

The membership income of the top level node is used to finance the development and operation of the IT infrastructure used by the structure.

This way salaries are exponentially growing as we go up in the tree, with even first level metagroups being able to pay multiple individuals above the average salary. In higher levels, officials afford to have a personal team focused on her job responsibilities and/or not think about the chores of daily life.

6. IMPLEMENTATION PATH

6.1 The bootstrapping problem

Please note that in the first and second phase the structure provides only a low level of selective incentives, which in itself probably not enough to sustain growth. This is basically the same problem what Participatory Budgeting (PB) is facing: to provide enough level of incentives, the system should gain enough resources, but this is only possible over a certain size, where it can become embedded in the local governance. Proponents of PB used to put the problem as “the political will of the government is essential to start a PB process”. We however would like to draw attention to the following other possibilities:

- When already enough incentive exists, this structure can provide a way to more easily achieve the goals. So this structure – once the IT support exists – could be a choice for NGOs, neighbourhoods or other organisations as a democratic decision-making platform.
- With well-aimed external help, an incentive structure might be created to “bootstrap” the organisation artificially.
- As ideological drive and social bonds are strong motivators, a group of people organized along the common goal of “changing the world for the better good” might be able to put through the organization in the first stages. Admittedly this is a rather idealistic approach, we just list this option to show our naivety.

The single most important stumbling stone of the system is its need for an elaborate IT support. The Community Digital Tools Foundation [6] is working toward these goals, but with the current level of activity and funding it will take approximately a decade to build it.

6.2 The roadmap

We assume here that there is no external help is received to build the structure. In case of help, some of the following steps can be shortened.

A more or less incremental approach is desirable because rules and parameters need fine-tuning, and introducing a global governance system is a very high risk task (as evidenced by our current one), so it must be confirmed that it actually works(as opposed to the current one).

The implementation is done in phases focusing on different goals. The goals are related to obtaining political momentum, tuning the rules, and implementing IT support for the procedures. These goals are interrelated, so just paying



membership for a lot of people without sponsoring IT development or making sure that the current rules are adequate for governance is a bad idea of helping the growth.

In the initial phases there are temporary measures to compensate for lack of resources and sophistication. The temporary measures are lifted when meaningful. For example the member citizens will pay 1% of the country's average income until the whole country is covered and from then on the payment will be a state obligation to maintain the system.

The envisioned phases are the following:

6.2.1 Initial growth

The objective is to have an organisation which is able to sustain itself and grow.

Goals:

1. Momentum: 1000 members
2. Rules: The most important structure, legislative procedure and finance related rules have an initial, discussed and voted version in the top node.
3. IT: Support for basic finance and legislative procedures in a way that power users can use it

Temporary measures:

- All of the income is allocated as personal income of the officials, starting with the executive. The cap for this rule is the income equalling the normal rules for 900 members.
- The membership fee is 1% of the mean salary for the country the member lives in.

6.2.2 Local issues

The objective is to keep the growth potential and enhance execution experience by dealing with political issues. (As opposed to technocratic issues of the previous phase.)

Goals:

1. Momentum: win three local issues
2. Rules: Legislation is wetted and amended based on actual combat experience. The rules can be formally modeled and without self-contradiction.
3. IT: Support for basic procedures in a way most people are able to use it

Temporary measures:

- The monthly membership fee is 1% of the mean salary for the country the member lives in.

6.2.3 Municipal government

The objective is to integrate the governance structure of a municipality.

Goals:

1. Momentum: capture three municipal governments, use the new system for governance including fiscal management.
2. Rules: rules of the municipal government are reviewed, formally modeled, without contradiction, and voted in the node.
3. IT: Support for new procedures related to municipal government. Meaningful security certificate for the IT support made in the previous phase.



Temporary measures:

- The membership fee is paid by taxes for citizens of the municipality.
- The membership fee is the average membership fee of the above for all with the same state citizenship out of the municipality.

6.2.4 State government

The objective is to introduce the governance structure in the state level

Goals:

1. Momentum: capture three state governments, use the new system for governance
2. Rules: all of legislation is reviewed, the important ones are formally modelled, without contradiction and voted in the node. This should include constitution, laws related to elections and popular referenda, and tax.
3. IT: support for all of the procedures related to state government with easy to use and accessible user interface. Legislated rules directly control automatic execution of most important procedures. Meaningful security certificate for all of the IT.

Temporary measures:

- None in the captured state.

6.2.5 World Peace

The objective is to solve all global challenges

Goals:

1. Momentum: capture the most important players in global politics
2. Rules: International agreements are reviewed, formally modelled, without contradiction and voted in the top level node.
3. IT: Goals for the previous phase, implement needed changes

Temporary measures:

- None

3. Motivation

1. CORE VALUES

The distance of the judicial branch from the legislative branch, the special status of the Universal Declaration of Human Rights[7], and norm control ensures that basic human values are observed. Actually this control is just a failsafe, as the effect of Condorcet voting method is that the winning strategy for elected officials is to integrate views and find meaningful compromises. This is the opposite of the winning strategy of most of the current plural voting methods. The winning strategy fundamentally influences political climate, in this case towards less extremities and more inclusivity.

Higher level of participation in political decision also tends to enhance political culture, as it is evidenced by the Swiss example [8].



There is a perceived threat of democracy as the majority rule, according to which majorities will enslave minorities. Fortunately it does not seem to be the case if the ruling interest is sufficiently encompassing and rational[9]. About the rationality see below in “Quality of decisions”.

2. DECISION-MAKING CAPACITY

2.1 Speed of decisions

The maximum time needed for a decision on level n if initiated in a group is $(3 \cdot 2^{n-2}) \cdot (D+V)$ where D is the length of discussion period, V is the length of the vote period of one run of the resolution procedure. While both the decision time and the number of participants are growing exponentially with level, the base of the exponent is 2 for time and a few tens for the number of participants. Below is a short summary of decision times and number of people affected using 1 weeks for both the discussion and vote period, and 30 for minimum and 80 for a maximum of node degree assuming a fully balanced tree. Note that in case decisions are initiated in a higher node, decision times can be as fast as $2 \cdot (D+V)$ if no alternatives are proposed in lower levels, and representatives have plenty of opportunities to “bring up” already bubbling up alternatives, thus shortening the overall discussion process.

Level	Max weeks	Min participants	Max participants
0	2	30	60
1	8	900	3.600
2	20	27	216.000
3	44	810	12.960.000
4	92	24.300.000	777.600.000
5	188	729.000.000	46.656.000.000
6	380	21.870.000.000	2.799.360.000.000

Two years for a country, and 3 and a half a year for the whole world to decide on a controversial issue seems to be pretty fast time.

If shorter decision times are needed, it can be catered for by “emergency” decisions, where discussion is only conducted by representatives, no wait for amendments to bubble up, and voting period takes a reasonably short time. But note that matters needing immediate response are normally belong to the executive branch, not the legislative one.

It is worth to note that there are two kinds of dead-ends in the proposed decision making process: if the dummy alternative wins, or if there is no Condorcet winner. But those dead-ends cannot be used to hinder the decision-making by a minority: if the dummy alternative wins, that means that either there is no problem, or the solution space was not explored sufficiently. In the case of no Condorcet winner, the priorities of the voters are not transitive enough which means that further discussion in the society is needed.



2.2 Quality of decisions

While there are cases where no decision is a very bad decision, we feel that quality of decisions is very important. Hence we also argue about it here.

As Simon A. Herbert points out in “Theories of bounded rationality”[10], making a quality decision have some practical limits even when the actor(s) making the decision is behaving rationally. These limits all concerned with incompleteness of information. The effects of decision alternatives can only be foreseen to a certain extent due risk or uncertainty, or incomplete information about consequences. While there arguably is an ontological difference between risk and incomplete information, in practical terms it is the same thing viewed from different angles. A notable subset of the problem is the limited ability to discover the decision space.

Our model increases decision quality by crowdsourcing the search of the decision space, and judging the quality of emerging solutions. As every individual have the right to initiate discussion about alternative approaches to problems at hand (as opposed to clean representative system), good solutions have a better probability to be discussed. For each practically important problem class there are probably people who do have relevant expertise to formulate a good solution, and it helps if they have the practical ability to share it. To judge the merits of a decision alternative and the quality of the related analysis is much easier than to come out with the analysis itself. Discussion of the alternative can bring in considerations with which the analysis and even the alternative can be modified. This also means that complex problems related to many fields also have a better chance to be solved. We also argue that humans in the course of evolution did acquire a good heuristic toolset to judge the merits of decision alternatives: those who found that the chief’s suggestion to fight the cave lion without weapons is a good idea, probably have no descendants today.

Our proposed decision process have more and longer discussion runs for decisions affecting more people (higher level nodes). Also, the expected quality of discussion is higher with the node level, as alternatives with less merits and lower quality of argumentation are expected to be filtered out in lower levels, and representatives in higher levels are expected to have more experience to find good compromises.

Another question is whether people do decide rationally. There are well-known, undisputable evidences that our evolutionary toolset do have biases[11]. We just argue that our proposed system is better than the current one corrupted by motivations nothing to do with decision quality, and that any system involving human decisions will have the same biases. Here we would like to reflect to the ongoing debate on whether ordinary people should be trusted to make political decisions. This debate did intensify after re-election of Hungary’s Fidesz party, the Brexit referendum, and election of Donald Trump. As Noah Chomsky have pointed out[12], ordinary people have considerable analytical skills, what lacking is the political expertise. We again refer to the Swiss example [8] as an evidence that people who have the means to influence politics, will obtain the necessary expertise.

Research found that process accountability also leads to better communication and decisions[13]. Our model makes the whole decision process and all of its players fully transparent and accountable.



We propose that processes should be heavily supported by IT, because there is simply no other way to make decision making in large group effective. However the size of groups acting as the fundamental building blocks of the system makes it possible to have a tight offline bind between participants. This mitigates the negative effects of computer mediation in group decision making[14].

3. EFFECTIVENESS

The implementation of decisions is the responsibility of the executive branch. No big structural changes here, though the effectiveness of the implementation is ensured by the following measures:

- The measures reducing corruption (see accountability and transparency) make execution more effective. (Referring again to the importance of process accountability. [13])
- As the salary of executive leaders is very competitive, there is a chance that individuals with the right skillset will compete for those positions.
- The separation of powers means that the executive branch is free to choose the way of implementation within the goals, budget and legal framework provided by legislative branch
- A responsibility of auditory branch is to assess the results and effectiveness of the execution, and the legislative branch decides on goal and budget structure and whether new leadership is needed partly on this assessment. So there is a feedback loop both towards the executive branch about quality of execution, and towards legislative branch about the desirable environment for smooth execution. Citizen feedback helps to identify hot spots, transparency ensures that the feedback is honest, and separation of duties makes sure that there is no hidden agenda behind assessment programme structure or emphasised points of the reports.

3.1 Breaking the power feedback loop

One of the (or maybe the single most important) fundamental problems of politics is that economical power generates political power which is in turn generates economical power. This is a positive feedback loop, fundamentally and badly affecting effectiveness of the whole political system now. This is why damping is discussed here.

- The ability to control and access to information ensures that key individuals are motivated to do exactly what their mandate dictates.
- The same ability of control and the fact that people are continuously participate in political decisionmaking means that people in overall have more ability to understand political issues and the implications of their decisions.
- The career path of representatives brings stability to the system.
- The information flow in the system makes it resistant to disinformation and propaganda.
- The separation of powers makes hard to capture the government.



Do not be mistaken: some level of economic imbalance is helpful, as that is the driver for most of the people to improve themselves. The authors of this paper do like the feeling of being rich. We just do not fancy to be in the middle of a resonance catastrophe.

4. RESOURCES AND FINANCING

As we have seen, at higher nodes – for increasingly global problems – it becomes relatively easier to draw in resources, given that the political will (of the people, which is quite different from the political will of today’s high officials) is present.

The financial setup – with salaries aligned with responsibilities – makes it probable that positions are filled with talented individuals who will not feel the need to supplement their salary through other means. Their career path makes probable that genuine support of other people – rather than money – will put them to their positions.

The membership fee is a percentage of personal income. Taxes are voted for by the people, and can be progressive. This ensures that incomes are gathered in an equitable manner.

There are some not straightforward possibilities in the model. An unexplored possibility is to delegate some resources along with the budget to a lower node. For example if a grassroots initiative to rethink global peacekeeping approach would reach a certain momentum (e.g. to one or two layers below the root node), a decision on the top node could allocate the budget to the node and the peacekeeping forces to its executive branch, along with policies to follow. After that the members under the node would overview the peacekeeping operations and the implementation of the transformation. This allows also for those dissenting the change to gather under the node and influence decisions.

5. GENERAL SECURITY

The international security problems of today stem from two kinds of problems:

1. Poverty and bad government causes uncertainty in people’s life. This is sometimes aggravated by global external factors, like global financial crises and climate change.
2. Disproportionate lobbying power of certain industries (typically defence and oil)

See the rest of this paper for details on how bad government is fixed.

Poverty is the result of power inequalities, so it is the same than #2, just in the conflict zone, not at the aggressor’s side.

#2 is caused by the positive feedback loop between political and economic power, which has been discussed earlier.

The above in itself should make armed conflicts rare or nonexistent, as the root causes are addressed.

We have also seen earlier that for global problems it is comparatively easy to raise resources in this system once the political will of people is there. Armed conflicts do upset most of the people when they hear about them, even those who have no



stake in them. So it can be argued that probably there will be political will to set up global peacekeeping forces which are truly independent from nation states, and also that policies would probably emphasize non-aggressive approach to conflicts (like targeted humanitarian aid to tackle root causes, and catalysing peaceful discussion between parties).

Also, introducing effective group decision making techniques makes previously antagonistic problems solvable. Solutions can be worked out in the system presented here by people affected by the conflicts at all sides. Once such solutions exist, it is very hard for leaders to continue the conflict, and more so when they face independent peacekeeping forces dedicated to enforce them.

6. FLEXIBILITY

Flexibility in a political system have good and bad implications. Sometimes there is a legitimate and urgent need to change the status quo. Other times changes can have effects which show themselves only a long time after the change, and may be understood only even later, and some cases they have already led to hard to remediate consequences. One example of such a case is the current situation in Hungary, which can be traced back to the constitutional changes at 1990, 27 years ago. There are some structural changes in the economy made in ways including crime, which will most probably remain unpunished – due to capture of criminal investigations and the judicial branch – until they lapse. Rewinding those changes within a framework providing for legal certainty will be at least a very complicated task.

Further examining the hungarian case it will be evident that the root cause of bad changes is the rigidity built into the system (restrictions on popular referenda and recallability of representatives), with the original intent of avoiding exactly such cases.

Therefore our system allows for overriding any rules except the one providing the legal basis of human rights and the one allowing overriding any other rules.

There are a lot of variables of the rules about structure and decision-making which can be tuned, and of course the main rules can also be overridden through the decision-making procedure should the need arise (but we recommend to have a lot of evidence before doing so). Officials can be called back if their minimum term is over, and will be reconsidered after reaching the maximum term.

There are, however a number of measures to ensure stability of the system. Officials' career model ensures that in higher levels they have the necessary experience. Minimum terms ensure against abrupt changes in priorities. Norm control also have a component and procedural way to oppose changes not thought over properly.

7. ACCOUNTABILITY AND TRANSPARENCY

Transparency is handled by mandating that all deliverables of all processes be public to all concerned individuals. The ability to comment and cross-reference provides short feedback loops and a basis to initiate more formal remedial procedures.



Accountability is handled in two ways.

1. Process accountability is handled partly with the informal ways provided by the transparency measures, and partly by designating the auditory branch of power to actively guard for it.
2. Strategic and motivational accountability is ensured by directly electing top officials of each branch of power.

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