EVOLUTIONARY STABLE PROPERTIES OF POLITICAL PARTIES IN INDONESIA

Towards General Election (PEMILU) 2004: A Case Study

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Abstract

The major idea is to use memetics as an analytical tool on viewing how the existing political parties towards General Election 2004 creating formation of their presidential candidacy, ideology behind it, the change of political atmosphere it will bring, etc. into a compact evolutionary model that exhibits *fitness* of each political party within population of a society. The strategy used is through transforming polling statistical language into evolutionary stable language of dynamical system. Here, memetic method is applied as an evolutionary computational tool.

Keywords: memetics, political party, evolutionary stable, general election

A party of order or stability, and a party of progress or reform, is both necessary elements of a healthy state of political life.
John Stuart Mill (1806 - 1873), "On Liberty"

1. Political Systems & Uncertainty

As it stated by a political philosopher John Stuart Mill, a party in a healthy political life lies in a balance atmosphere between stability and orderliness with such progressive situation to make a change. Certainly it is an interesting idea that may trigger our curiosity to view political system as one of human cultural and civilization aspects. It is of no nonsense to say that human being's dream of political system lies between that both contradictory states: stability and orderliness to gain drastic change of collectively one nation's political destiny and the emergence of stability and orderliness from the change and disorderliness of the system at once. This balance is what we are about to test and hopefully achieve in every general election in the modern national organizational structures.

Yet, what is a political system outside human cultural object actually? It is a system made by human beings that is constructed from anything perceived by their commonsense (as perceived) – inconsistency becomes more often to be and is a common accident in a political system (Beer, 1972, 1995:5). It is also based on the approach of political system in the election process using collective cognitive mapping of the society, in social psychology studies (Achen, 1992) that views individual political system as a black box system: we can only see connectivity of the input and output, yet the process inside is really invisible and immeasurable (Lodge, *et. al.*, 1990).

Here lies the uncertainty of political systems. It is not possible to make prediction precisely (relative to certain limitations) of a political system. *First*, since it is composed of elements that dependent on the cognitive abstraction of the observer, which means it is a constantly changing abstract object in the observer or the user's cognitive dynamics (Johnson, 1992). *Second*, political system– as well as other social systems – is constructed by collective patterns of individual cognitive system. As a matter of fact, we know that phenomena and political event often related to political education within the society. What we are familiar with as political object generally is a collective stance and as explained in Chaitin (1991), has "summation" of its cognitive elements in such non-linear relation (Situngkir, 2003). Uncertainty is an inherent thing in political system, which ironically requires estimation with a proper certainty levels.

Those two features above become important in political system evolution, be it at national level, political party level, or elementary individual of political system. This paper tries to show a way to understand the evolution of political system in a deeper sense as stated by John Stuart Mill in the beginning of this paper. We divide the paper into several parts. The second part of this paper will deliver evolutionary stable phenomena as one of logical consequences from evolution and uncertainty coherent with it by performing memetic methodology as firstly coined by evolutionist Richard Dawkins (1976, 1982). Then we will see how paradigmatic evolution of party system facing general election 2004 in Indonesia. We constructed a model from several polling data spread out in wide society through mass media that is wrapped with memetics to exhibit the multi-equilibrium states from political parties' evolution[1]. This paper ends with discussion and analysis along with possible development and methodological implementation and several epistemological and methodological conclusions to further approaches on political system, especially voting and general election. Note that this paper doesn't have any political tendency– this is more to the interdisciplinary political science development within the horizon of memetic analytical system than merely a justification of a stance and constellational atmosphere of certain politics.

2. Evolutionary Stable System through Memetics

Memetics is a new concept over a long adventure and argument up to new scientific methodological stage of approaching social system and cultural evolution (Sartika, 2004). Memetics possess a high potential in analytical methodology of cultural evolution since it was firstly founded by Richard Dawkins (1976, 1982) to see the cultural unit evolution as a Darwinian (genetic) evolution. As a dynamical system that possess complex characters, hence, political system also can be approached computationally as a complex adaptive system (Epstein & Axtell, 1996), as shown in the previous work of Situngkir (2004). As the result, socio-political system eventually is a far from equilibrium system, it constantly has numbers of equilibria and finding a single equilibrium as a predictable property of the system is impossible – this is also a consequence from the two inherent features in political system as explained at the previous section.

It is very interesting when we intent to observe the evolution pattern of a political system. Several previous researches tried to explain any political system as a cultural aspect as

[1] Formal and technical things in methodology we use in this paper are not discussed wider in order to give wider interpretation among readers to see directly the theoretical construction in Situngkir (2004).

in Axelrod (1997) who sees agent position (=elementary individual of a collective social system) and inter-agent interactions as the main focus of his analytical tool (Khanafiah & Situngkir, 2003). We will find it different using memetics as analytical tool – since the focus we are dealing with is not merely agents and interactions between them, yet it is more to the collective cognitive abstraction that spread out in society. Our focus is drawn more to the population of ideas and abstractions and how they infect, replicate in a social system. In memetics study, this has been carried out in a different approach by de Jong (1999) to observe the development of consensus in a society.

By viewing abstraction *as perceived* by a population in society as a virus-like that is contagious (Brodie, 1996), so we view information unit of politics as an elementary unit of a dynamical system. One may think that A can be a today president, yet in another time may also think that B is more competent. One can accept a party with ideology and message X at this moment and then can accept more ideology Y offered by other party. And so on, this is the black box of human cognitive system which becomes the collective focus of memetics. Eventually, in its evolution, the domination of a political party is not permanent. Its domination "fluctuates" in stable way (*evolutionary stable*). This is what we are intended to perform in this paper.

3. Political parties and Election

There have been so many literatures talk about election system and voting analysis becomes very popular recently. Those literatures and analysis are mainly growing in statistics. The obsession that emerges in conventional analysis is the use of linear regression in processing questionaire data (polls) that is used to make cognitive mapping over the voters. However, it shoud be admitted that the utilization of statistical analysis which are based on demography and linear regression cannot grasp the non-linearity of the political system we are going to approach, and that is why political system need to stand based on theoretical foundation that allow the non-linearity of the system (Achen, 1992). At this level, the system of social psychology of the wide society should be more on the focus than merely a demographical segregation. Political system is constructed based on political stance that is related with someone's abstraction over a certain political stance.

Lodge, *et.al.* (1990) divided three popular approaches in United States of a cognitive mapping system from people evaluation over presidencial candidate elections, they are:

a. Sociological approach (Columbia school)
b. Socio-psychological approach (Michigan school)

c. Rational choices approach (Rochester school)

We will try to see these three schools complementarily as they are applied in complexity sciences, which has a high concern with the non-linearity of the political system that is about to approach. The first approach is based on thinking that the determinant of the voters in their political responses is socioeconomical status, religious affiliation, and its residence (rural or urban). In another words, this approach is based on social bounded of voters from their ethnics, races, religions, familiness, and friendhips that they experience historically. The second approach is based on the cognitive system of the voter agent in picking his choices, which means how people's cognitive system are mapped on such political map that is currently developing psychologically – this is very useful in order to find a campaign format used in an electoral system. The third approach is based on Anthony Downs' theory of voting stating that the voter will vote rationally by watching things that affect most in his utility function as a voter agent. In simple the steps of voter agent based are:

a. Calculation of total advantage gained for each candidate winning for the voter agent
b. Make list of candidates, started from the most beneficial to the least one
c. Vote what benefits you most

In other words, every voter will vote candidate that his political position is closest with the issue space that is where the voter lies.

The three approaches are drawn to mathematical formalism and computational effort from the voter agent and have the character of memory of the voter agent. Yet these three approaches can only be useful in long-term preparation. Based on this consideration, the fourth approach is made, that is the voter agent's mapping system is based on the voter impression over the candidate. At this approach analyst makes a stronger approach on the correlation between (1) candidate information as expected by the voter (in campaign, etc.), and (2) direction and evaluative power of the voter over the candidate. This is the form of rational choice theory that we are going to change in the later sections of the paper.

The approach that we perform here will widen what has been stated by Lodge, *et.al.* (1990) – that we view evolution of political system as cultural unit evolution. Cultural unit that is transmitted through the population of citizens we analyze as meme in memetics approach.

4. Political Party Evolution as Groups of Memeplex

As proposed in Heylighen (1993) and applied computationally in Situngkir (2004), we see meme of the the smallest cultural unit (as well as gene in genetics). Each meme is a

specific stance over an option allomeme (as well as allele) "yes" and "no" of a political proposition constituted in the structure of statement "IF… THEN…". Several numbers of memes eventually construct a meme group called memeplex, as a cultural unit (meme) which is replicated simultaneously in every social agent interaction. In this level, for example, one memeplex "my presidencial candidate", thus we have several memes as follows:

1. IF I am asked to vote THEN my president will be Megawati Sukarnoputri.
2. IF I am asked to vote THEN my president will be Amien Rais.
3. IF I am asked to vote THEN my president will be.Susilo Bambang Yudhoyono.
4. *et cetera.*

Or memeplex "the category of my party" will have memes as follows:

1. IF I m asked to vote THEN I prefer nationalist party.
2. IF I am asked to vote THEN I prefer Islamist party.
3. IF I am asked to vote THEN I prefer democratic party.
4. *et cetera.*

Every memeplex may consist of numbers of memes which values of "yes" (denoted as "1") or "no" (denoted as "2"). It is of certain that a group of certain memes (called "deme") may constitute hundreds of memeplexes – that we choose based on the limitation of available data and computational capacity to precede them.

Table 1
Representation of Electoral Political Party Concept and Memetics

Memetic concept	Representation in Political Party Evolution
Meme	Stance "YES or NO" over a conditional proposition "IF… THEN…".
Allomeme	Option "Yes or No" in meme
Memeplex	Group of Memes constitute certain abstraction situation. In this paper: presidential candidate brought by political party and thematic or ideological categorization which motivates behind.
Fitness value	Certain value owned by memeplex based on observation object's opinion (mapped into Real number $x = [0..1]$)
Meme pool	A room of any meme to interact one another in neighborhood cobceot among elementary agent in social system. This is related with memory of each agent on each fitness value.
Replication	Transmission process from one agent to another by considering each fitness value (bit of each replication may mutate)

Each meme has its own fitness value, which eventually determines the winner in the election process[2]. In practice, certainly each meme is not single (independent) in affecting what seems to be the configuration of meme (femetype). This is due to epistatic characteristic or interconnectivity between one meme to another. So it becomes, party with Islam and democratic stream, and so on. There are also inter-infecting memes in different memeplex. For example a presidential candidate A wll not be chosen (has the value of "0") since he has certain uncomprommisable ideology, etc. A shorter detail about memetics representation in Indonesia electoral system is described in table 1.

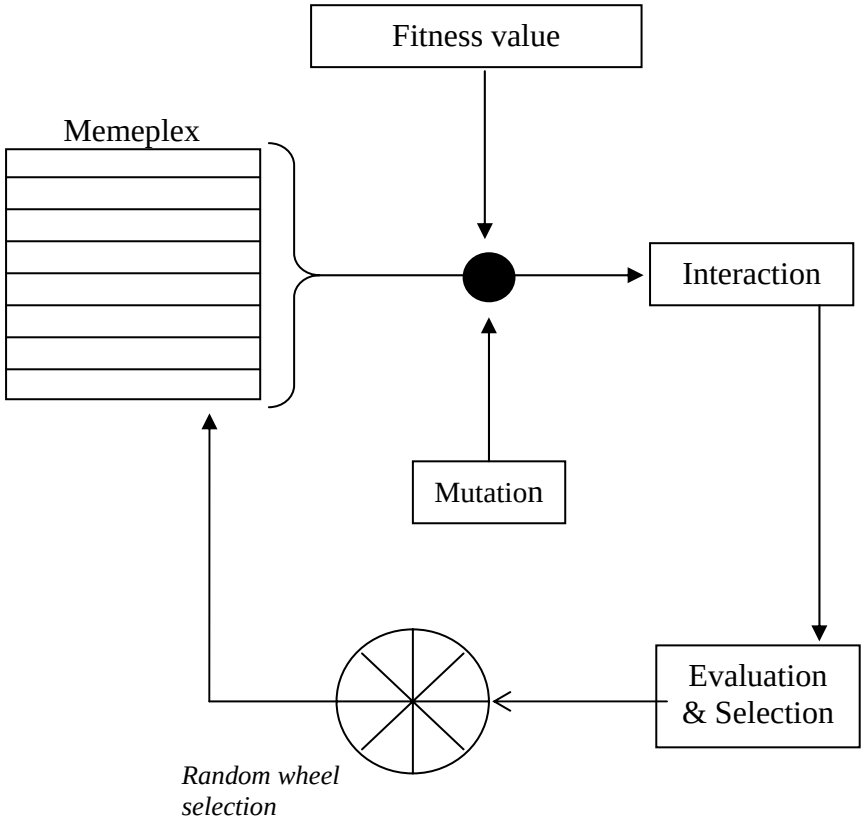

Figure 1
General Structure of Memetics used here

From this point we construct computational model to be simulated and analyzed in term of research or prediction over general election or PEMILU 2004 in Indonesia. Algorithm and sequences of analyticial system used is shown in Figure 1. Formally we can

[2] At this point, the paper is constructed by using polling data issued by Majalah TEMPO and *The International Foundation for Election System* as explained more detail in appendix. Further implementative works can be developed by adding allomeme variation used in each meme representation. We picked "0" and "1" with two memeplex in the simulation on the base of simplicity of computational model and data availability (the authors did not conduct survey). This is due to the aim of this paper as an initial structure toward survey-based research in advance.

say that if we call set C as memeplex or set of memes representing something, then there will be evolutionary function μ that maps:

$$\mu : C \times x_m \rightarrow C^* \qquad (1)$$

with C^* as the most dominant meme configuration we are going to approach in memepool, and

$$C^* \subset C \qquad (2)$$

in which its process is dominated by the probability of bit mutation factor (x_m) from each meme represented[3].

In short we can describe algorithmic configuration from memetic system we use to analyze this political system as follow:

```
begin
       t←0;
       Population initialization P(t);
       evaluation P(t);
              while (not stopped) do
                     choose neighbors to interact from P(t);
                     fitness_comparation_interactions on P(t);
                     ouput C(t);
                     evaluate C(t);
                     Choose P(t+1) from C(t) and P(t);
                     t←t+1;
              end
end
```

One important note is that memeplex population does not equal to human population. Memeplex is abstraction of numbers of people over a party joined in election. That is why, as we explained further in appendix, we choose fitness value of several polling data carried out and the result has been published by mass media.

From the above algorithm (as seen in Figure 1) we made several simulations to find out configuration of memeplex of which party dominates in evolutionary stable state.

5. Simulation & Discussion

In this simulation we pick two memeplexes, they are "presidential candidate from a party" and ideological background of each party". These two memeplexes showing the same deme i.e.: the fitness of party with things that are expected by the major public. The higher the fitness value of one party's deme, the more possible it can win the election. What is

[3] Basically this can be compared with optimation evolutionary programming as is genetic algorithm (Gen & Cheng, 1997), however, there are several differences sinve memetic evolution is not equal to genetic evolution as explained in Sartika (2004). In political studies, this genetic study has been conducted in the previous work (Situngkir & Hariadi, 2003).

interesting from this way is that our discussion is no longer based on as the previous works did on rational choice theory which treated all interacting agent aimed to maximize the pay-off it would gain in each iteration/game (Frank, 1957, 1998). At this point the utility function of each agent is replaced withmeme configuration in one certain memeplex.

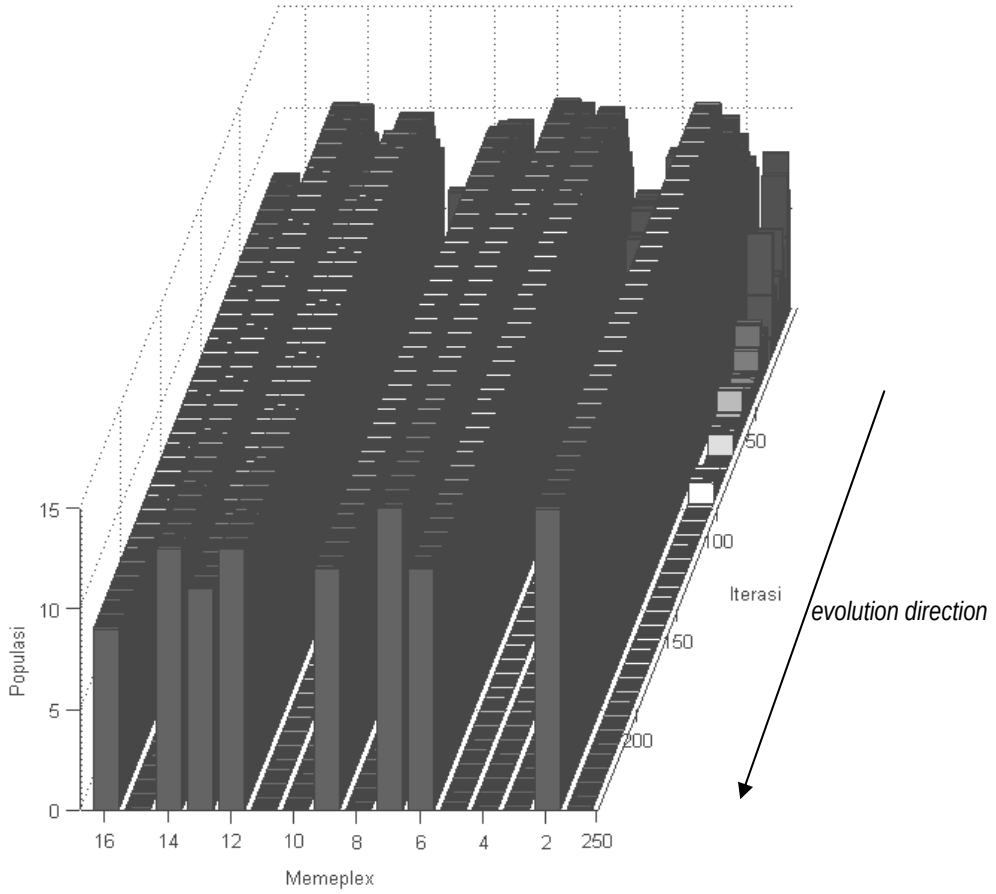

Figure 2
Evolutionary stable condition from memeplex party's ideological background

From the simulation, we obtained an interesting result. For memeplex "party's ideological background", we use survey data conducted by The International Foundation of Election System which in detail explained in appendix 1. Each party is categorized as "secular" party, "religious", "democratic", and "other". The "other" category uses reference of the surveyor researcher as "pro today status quo" that we regarded outside the three former categories. The fitness value of each category is obtained from the polling data as discussed in appendix – meanwhile fitness value of combination of the four existing categories is calculated through mechanism explained in appendix 1. The combination of each combination is shown in table 2. The result of our simulation is shown in Figure 2. It is

shown in the figure that here lies ideological categories of parties which at the end of simulation gone extinct because of its low fitness value.

Table 2
Possible configuration of Party's Platform and its fitness value
(1=voted; 0 not voted)

	Configuration of platform of party				Fitness Value
	Secular	Religious	Democratic	Other	
1	0	0	0	0	0
2	0	0	0	1	0.065
3	0	0	1	0	0.1175
4	0	1	0	0	0.0325
5	1	0	0	0	0.035
6	0	0	1	1	0.1825
7	0	1	1	0	0.15
8	1	1	0	0	0.0675
9	0	1	0	1	0.0975
10	1	0	1	0	0.1525
11	1	0	0	1	0.1
12	0	1	1	1	0.215
13	1	1	1	0	0.185
14	1	0	1	1	0.2175
15	1	1	0	1	0.1325
16	1	1	1	1	0.25

Dominating memeplex (as shown in Figure 3), is relatively based on the collective expectation of people in constructing their nation life. It means parties with certain combinatorial categories are expected by public. In the result of our simulation, we found out that evolutionary stable system giving opportunity to the party with ideological background of "religious and other" as a major dominant. This shows the high religiousity and at once public expectation to achieve government system stability. Other memeplex is party with ideological background of "religious, democratic, and other", followed by combination of "secular, religious, and other". Although they are not definitely dominating, party that accepts all ideological background is also predominant in evolutionary stable condition in this simulation.

The relevant result is also obtained for presidencial candidates proposed by parties. At this point we use polling result performed by Majalah TEMPO by picking presidential candidate of respondent's choices i.e.: dengan memilih kandidat presiden pilihan responden, yakni "Amien Rais", "Megawati Sukarnoputri", "Susilo Bambang Yudhoyono", and "the

other". We choose four presidential candidates only for model simplification[4]. We use fitness value from each candidate as explained in appendix 2. The arrangement of fitness value here is a slight differ with memeplex "ideological background". Means, the maximum fitness value from each memeplex is not simply by averaging fitness value of each. Here, we use random choices (*roulette wheel selection*) to configure party with 3 and 4 candidates at once. This is surely acceptable by the commonsense due to parties which have explicit platform and welcomed by people of course will have explicit nation's leader candidate. It means, in every iteration, for party with candidate of more than two fitness value will constantly changing – at the end artificial parties in this simulation are directed to choose two candidates maximum from four candidates offered. Table 3 shows fitness value data we use in simulation.

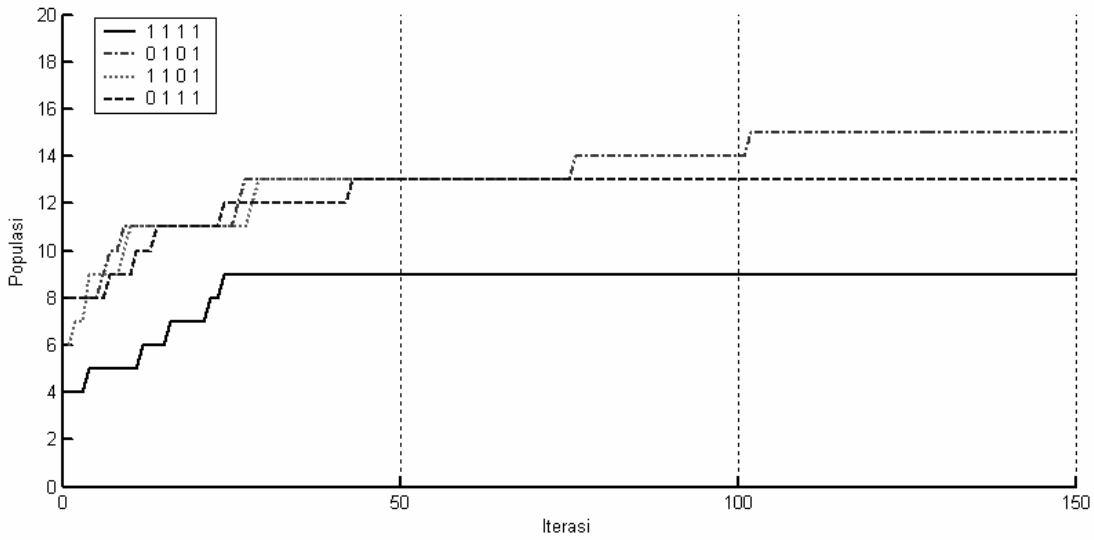

Figure 3
Several predominating "party's ideological background" memeplex

The result is as shown in Figure 4. It is shown that few memeplexes dominate and the related parties each gain fitter position among the population. We see domination of memeplex of each configuration of choices of "A.R. (=Amien Rais)" with "other candidate", "M.S. (Megawati Sukarnoputri)" with "other candidate", and "S.B.Y. (Susilo Bambang Yudhoyono)" with "other candidate". This is obviously seen in Figure 5.

In Figure 5, is also seen that there are configuration of memeplexes that predominate; that is coalition forms between "A.R." and "S.B.Y." and coalition between "M.S." and "S.B.Y.". In evolutionary stable condition, it shows a negative correlation of

[4] We certainly may widen this memeplex in model implementation.

fitness (*fitness*) between "A.R." and "S.B.Y." and coalition between "M.S." and "S.B.Y.". The existence of candidacy of "S.B.Y." with negative correlation here is of course an interesting phenomenon if we deal it with the actual condition. Although the three candidates have only slightly different power, however, the combination between them gives an evolutionary stable condition reflecting antagonistic stance between one composition and the others.

Table 3
Configuration of Presidential candidate and its fitness value
(1=chosen; 0 not chosen)

	Presidential Candidate				Fitness Value
	A.R.	M.S.	S.B.Y.	The Other	
1	0	0	0	0	0
2	0	0	0	1	0.277241
3	0	0	1	0	0.318541
4	0	1	0	0	0.175308
5	1	0	0	0	0.22891
6	0	0	1	1	0.297891
7	0	1	1	0	0.2469245
8	1	1	0	0	0.202109
9	0	1	0	1	0.2262745
10	1	0	1	0	0.2737255
11	1	0	0	1	0.2530755
12	0	1	1	1	*roulette wheel selection*
13	1	1	1	0	*roulette wheel selection*
14	1	0	1	1	*roulette wheel selection*
15	1	1	0	1	*roulette wheel selection*
16	1	1	1	1	*roulette wheel selection*

A.R.=Amien Rais, M.S.=Megawati Sukarnoputri, S.B.Y.=Susilo Bambang Yudhoyono

However, our discussion is of no trying to give any justification over political system we are about to approach, yet it is more to offering a form of evolutionary methodology and fitness analysis of political parties as a deme of composition and memeplex configuration constitutes it. This is what we are going to elaborate more in the later chapter.

6. Discussion and Possible Further Works

A question that may be posted afterall is: What about the other candidates who also have power that also need to consider in the evolutionary model built? There may also questions about memeplex aspects from other political parties. For example, the programs campained, the effectivity and frequency of campaign, the process used inelectoral system and in determining legislative candidates, etc. in which the whole combination will reflect how fit a political party in a collective cognitive system in society.

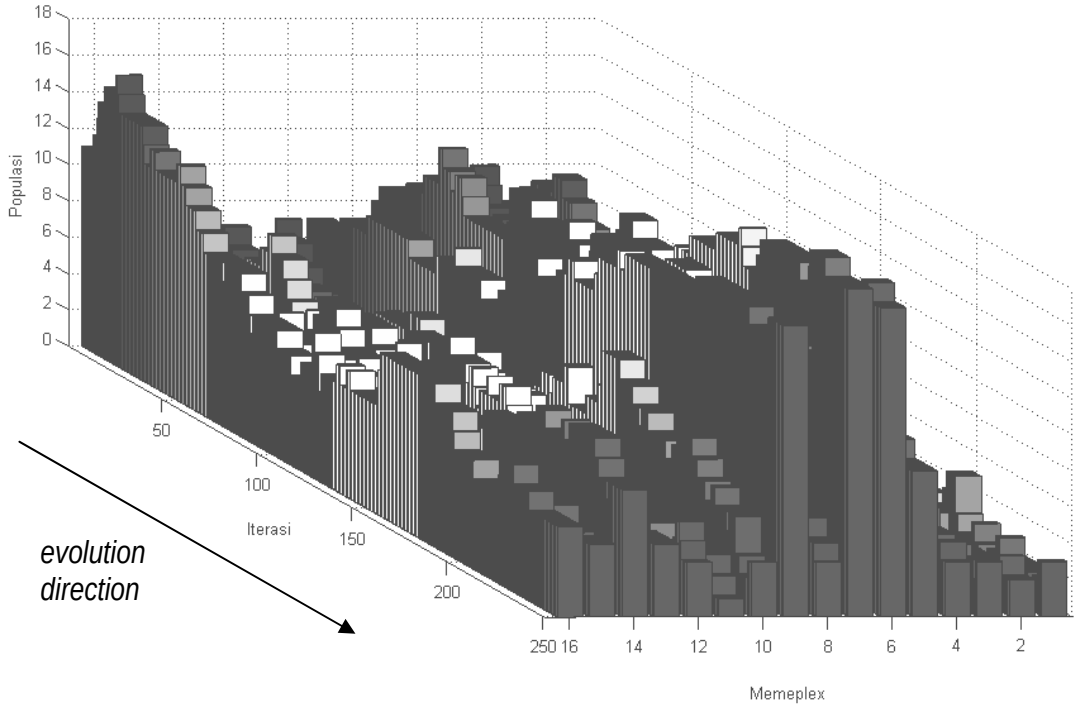

Figure 4
Simulation result for party's proposed presidential candidates

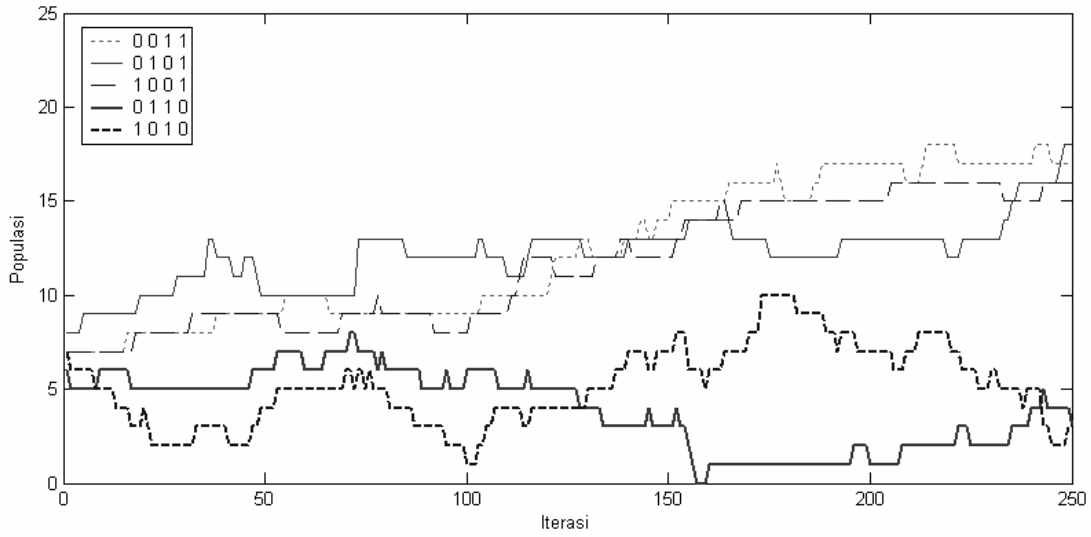

Figure 5
Several predominating "presidential candidate" memeplexes

The model we offer in this paper cannot grasp the whole stated thing in the previous paragraph, due to the limitation of data we have. But there is one thing to note here is that the model of construction we offer gives an opportunity to get relieved from the dilemmatic of constituting payoff function from each person when he has to make choices, determining memory of voter, etc. that should be made exactly in such agent-based conventional model.

Through memetics, we represent individual decision data of voter agent as bits with evolutionary capacity inherent. This feature cannot be found in conventional models. In the other side, the reduction we made carefully since it doesn't come from classic assumption and questions such as: Do Indonesian people choose a party or candidate rationally by viewing the program they offer? How long is the Indonesian voter's memory to choose a party? And many other questions in which conventionally related with election process and political decision making.

The model we offer here should be admitted still lack of some points that may be insufficient to be made as references and analytical matters in party decision to determine its winning strategy. However, the proposed methodology should be admitted, a new and have high potential to be a reference for researches of political system in Indonesia and other countries in the world with the better result and better scientific justification capacity.

7. Concluding Remarks

Memetics is an analytical tool that resulted from a crossover of evolutionary theoretical biological analysis in mathematical and computational language as a tool that enriches analysis of social physics today, through various analytical tools like rational choice theory, bounded rationality, *et cetera*, which the aim is to give evolutionary stable conclusion by viewing social and political system as a complex adaptive system. This paper is implementatively showing a profounding of evolutionary stable condition to be later analyzed.

The simulation has resulted interesting features of political system (unique to Indonesia) in various characteristics of political parties, voter's cognitive system, and the political system can be drawn with memetics. Political idea can be viewed as replicating meme and population of meme (meme pool) with the follower agent as its "vehicle" over a party. By conducting a more comprehensive polling to be processed as memeplex we are sure to give analysis that may, at least, give capacity to see fitness of the political parties to the society where the party grows towards general election 2004 ahead.

Memetics methodology made political system we analyze becomes easier to gain evolutionary stable condition without arguing a very local thing (which is hardly reached by today theoretical tools) like rationality of the voter and its deviation, the limitation information obtained by the voter, the long or short memory of the voter, the construction of game theoretic utility function, etc. This shows how memetics can be used to giving

dynamical analysis from the data collecting system, which is not static from covariating variables.

Acknowledgements
As a good citizen, there is nothing more joyful than to believe that her country's political system bring joyful to her life. The three writers would like to thank Prof. Yohanes Surya for financial supports along the period of research, and to all BFI researchers for their support.

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APPENDIX 1

THE DATA CONSTRUCTION OF MEMEPLEX "PARTY'S BACKGROUND" MEMEPLEX

For platform type that will determine the fitness of a party. We picked data from characteristic analysis of public opinion which related with public involvement in political fields, conducted by *IFES* in *Summary of Public Opinion Preceding the Parliamentary Elections in Indonesia: 1999*[♣]. IFES defined 5 group of respondences conducted using c*luster analysis group* method which based on repond similarity. The group is defined into 5 parts:

1. Pro-status quo (26% from total national population)

   Characteristics:

   - Believe that economy will recover
   - Prioritizing gorvernmental services
   - Believe in life quality improvement in Indonesia
   - Information consumption and broader opinion
   - Age of relatively young (under 40 years)

2. Religious non-democratic (13% from total national population)

   Characteristics:

   - Less interested in democracy
   - Less consuming information
   - Find ease in governmental services
   - Rural society
   - Mostly old women

3. Secular non-Democratic (14% from total national population)

   Characteristics:

   - Less interested in democracy
   - Less religious
   - Mostly rural society
   - Less consuming information
   - Intellectually far from national development
   - Believe that changes cannot bring improvement in life quality in Indonesia

[♣] Characterization is done based on questionare of 140 questions. Filled through interview at the respondence's residence and conducted to over 1507 adults randomly in entire Indonesia.

4. Pro-democratic –Expecting changes (21% from total national population)

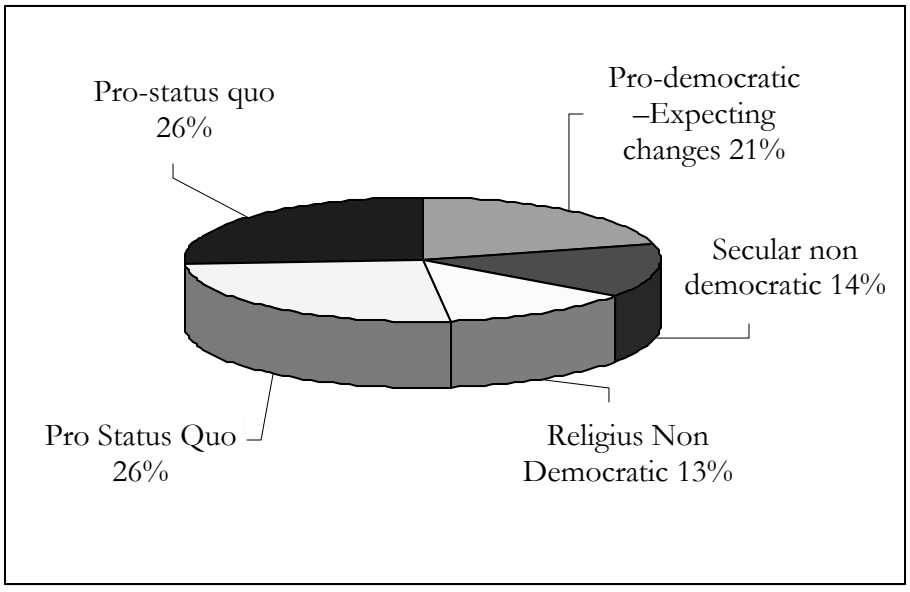
   Characteristics:

   - Believe that changes will bring improvement in life quality;
   - Gaining access in governmental services;
   - Pro-democracy
   - A good consumers of information,
   - Mostly youth

5. Democratic – Refuse changes (26% from total national population)

   Characteristics

   - Pro-democracy
   - Believe that economy will grow worse
   - Mostly believe that changes will decrease life quality in Indonesia
   - A high dose consumer of information and broader opinion;
   - Mostly youth and urban society;



Basic composition of groups in Indonesia. Describing five relatively large grouping emerged from analysis.

The existence of population grouping into certain characteristics above can be interpreted as a probability to use one specific platform/ideology that suits a party, in order to attract symphaty of the voter. Fitness value of a certain platform is then picked by one party as its identity is assumed to be equal to relative size of population compose it. Four party's platform types then arranged using the data, they are:

1. **Religious**, bringing up certain religion's identity
2. **Democratic**, bringing democratization issue. There are two types of democrats from the data above, and since both are pro-democracy, we categorize them into one category of democratic.
3. **Secular**, and
4. **The other**, such as pro-status quo, etc.

Since the contribution of fitness value of a platform picked by a party is equal to relative size of national population who bring it, hence the contribution of each platform that possibly chosen will be equal to the percentage of population size (in decimal) as shown in the table below:

Contribution of fitness value of party based on its platform

Party's platform	**% size of group**			
	Secular	**Religious**	**Democratic**	**The other**♦
Relative size of group	14%	13%	47%	26
Fitness value	0.14	0.13	0.47	0.26

A party can have one platform or combination of already existing platforms. If assumed there are 4 types of platforms, then the possible configuration of platform will be $2^4=16$, with fitness value from that configuration is total of types of platform used/chosen by one party.

$$\text{Fitness Value} = \frac{1}{4}\sum Fitness\_Contribution\_each\_Platform$$

♦ The other representing size of pro-status quo group that is 26%.

APPENDIX 2

THE DATA CONSTRUCTION OF FITNESS OF MEMEPLEX "PARTY'S PRESIDENTIAL CANDIDATE" MEMEPLEX

The data for determination of fitness of Presidential candidate is based on polling result conducted by Majalah Tempo published in 29 December 2003-4 January 2004[*]. The reason people vote president is categorized into 8 categories, (every one can vote more than one candidate), and they are:

Result of *Polling* Majalah Tempo. Criteria of Indonesia Presidential candidate

No	Background of voting candidate	%
1	Honest, clean, do not corrupt	54.51
2	Capable to bring out of crisis	43.48
3	Leader is a Moslem	29.72
4	Well- educated	27.09
5	Indonesia needs an experienced leader	25.77
6	Indonesia needs a civil leader figure	18.78
7	Indonesia need Military figure leader	16.76
8	Other candidates are not qualified	12.46

From the eight reasons, we use 1 to 7 reasons that are assumed to affect the performance of a candidate. For each reason is assumed to have certain weight (from 0 to 1) that equals to the size of respondance percentage who chose that reason that in turn will determine the president he votes.

$$\text{Weight Criterion} = \frac{percentage\_of\_chosen\_criterion}{total\_percentage\_of\_all\_criterions}$$

[*] Methodology of survey conducted from 5 to 12 December 2003. The data is collected from 1.000 respondences in Jakarta, Surabaya, Yogyakarta, Medan and Makasar. Using that sample size of 1.000 tersebut, the estimation over parameter value has *margin of error* of 4-6 %. *Sampling* is conducted using method *stratified random sampling*. Analysis of sample data is weighed based on census in 2002 (BPS), for cities where survey were conducted (*Tempo, 2003.Page 65*).

Weight for each Criterion

No	Reason to vote one candidate	% (in decimal)	Weight
1	Honest, clean, do not corrupt	0.5451	0.2520
2	Capable to bring out of crisis	0.4348	0.2015
3	Leader is a Moslem	0.2972	0.1376
4	Well- educated	0.2709	0.1253
5	Indonesia needs an experienced leader	0.2577	0.1192
6	Indonesia needs a civil leader figure	0.1878	0.0883
7	Indonesia need Military figure leader	0.1676	0.0775
	Total	2.1611	1

The figure of Presidential Candidate that is chosen as sample are 3 toppest candidates voted by respondences based on 7 reasons i.e.: Amien Rais, S.B Yudhoyono and Megawati, the rest are assumed to be the other. Percentage data of respondences that chose presidential candidates based on above reasons are as follows:

Result of *Polling* Majalah Tempo. Persentage of number of respondences in voting presidential candidate

No	Criteria/Reason	% Respondences who vote presidential candidate (in decimal)			
		AR	M	SBY	YL
1	Honest, clean, do not corrupt	0.63	0.38	0.63	0.80
2	Capable to bring out of crisis	0.33	0.44	0.65	0.47
3	Leader is a Moslem	0.28	0.10	0.45	0.36
4	Well- educated	0.46	0.10	0.38	0.30
5	Indonesia needs an experienced leader	0.16	0.31	0.40	0.32
6	Indonesia needs a civil leader figure	0.24	0.33	0.03	0.22
7	Indonesia need Military figure leader	0.04	0.04	0.75	0.01

To determine the fitness of Presidential Candidate based on that respondence, here is assumed that fitness is equal to the respondences voting presidential candidate suits the weight of each criterion.

$$\text{Fitness Contribution} = \%\, chosen\_respondents \times Weight\_Criterion$$

and

$$\text{average fitness contribution given by each candidate to his party} = \frac{\sum kontribusi\ \ fitness}{7}$$

To simplify the calculation, average fitness contribution is scale d0 to 1 in mechanism below:

$$\text{Avage fitness contribution in scale [0,1.0]} = \frac{Average\_Fitness\_Contribution\_each\_candidate}{\sum average\_fitness\_contribution}$$

so that we obtain table:

Convertion of contribution of fitness value of each presidential candidate

No	Criteria/reason	Contribution of Fitness Value			
		AR	**M**	**SBY**	**YL**
1	Honest, clean, do not corrupt	0.1589	0.0958	0.1588	0.2016
2	Capable to bring out of crisis	0.0665	0.0887	0.1310	0.0947
3	Leader is a Moslem	0.0385	0.0138	0.0619	0.0495
4	Well- educated	0.0576	0.0125	0.0476	0.0376
5	Indonesia needs an experienced leader	0.0191	0.0370	0.0477	0.0381
6	Indonesia needs a civil leader figure	0.0212	0.0292	0.0026	0.0194
7	Indonesia need Military figure leader	0.0031	0.0031	0.0581	0.0007
Average of Fitness contribution		0.0521	0.0399	0.0725	0.0631
Average of Fitness contribution in scale of 0 to1		**0.22891**	**0.175308**	**0.318541**	**0.277241**