Tracing Cultural Evolution Through Memetics

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Abstract

Viewing human being, as a part of evolution process is still a controversial issue for some people, in fact the evolution runs. As a sociocultural entity, human being has distinctive characters in its evolution process. A Theory inherited from Darwin may have only been able to answer how a simple unit such genes evolve to such *complex animal* like human. Yet, how among those *complex animals* interact, communicate, and replicate idea in so forth formed a such self-organized sociocultural complexity, may only be, at the moment, answered by what Dawkins says as *memetic evolution* with *meme* as the replicator which, in near future, hoped to be a very potential tool for analyzing social phenomena.

Keywords: human, evolution, meme, interaction, communication, replication, self-organization, complexity, social system, socioculture, Darwin, Dawkins.

"We are built as gene machines and cultured as meme machines, but we have the power to turn against our creators. We alone on earth, can rebel against the tyranny of the selfish replicators"
-Richard Dawkins, *The Selfish Gene*-

1 Background: Evolution, are we exceptional?

Darwin's theory of evolution is, though admitted insufficient to answer human complexity today, fundamental to the study of life in schools, labs and many academic institutions. As he wrote in *the Origin of Species*, simple animal through natural selection and variation, gradually and cumulatively evolved to such complex animal without the need of designer. During the evolution, one character or genetic information by chances is inherited then spread through successive generation in different circumstances causing variability. Natural selection is an unconscious process. Darwinians and neo-Darwinians hold on to believe that complex design of animals today has never been designed or purposed to be so. It is a result of cumulative and gradual process of hundreds billions of years.

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Darwin's thought was confirmed in "the Blind Watchmaker" (Dawkins, 1996). It was written that variation by chance is probable although in the very high order of decimal like for 20 amino acid, he counted that possible link could reach 1 followed with 9 noughts, and for hemoglobin could reach 190 noughts after 1! This may answer the question on saltationist of possible time gap between old species to new one including the long gap from the higher mammal to human species. This is because one of the basic old debates of human as part of genetic evolution was the time gap between Homo sapiens and its previous predecessor. In one of the chapters Dawkins mentioned some interesting examples of amazing design of human eyes and bats antennas, which have complex design in their way of seeing and living in which he believed is the result of their evolutionary adaptive system (Dawkins, 1996)

In Darwinian genetic evolution, there are two important notes of evolution process: replication, and natural selection. Replication process is responsible in inheriting and spreading genetic information within one species and to other species, the unit of inheritance or replicator named *gene*. Formally, Wilkins (1998) defines gene as a fundamental physical unit of heredity that transmits information from one cell to another and thus to successive generations. Information in genes is spread or inherited through directed replication process (to stress that in genetic heredity, the modification or mutation of information is relatively small, so that it is suitable to say that the info are copied with high fidelity or replicated to almost the same with its parental gene). And as the environment, nature, change, natural selection of survival of the fittest plays in so that some species survive, while others died. This process took not a short time as we see one species so different with other that we can't simply disbelieve that such variety may have come from the same origin.

Is human part of the genetic evolution? Archeological fact giving reference of how Homo sapiens is really close to the structure of one of mammals. This came to controversies among scientists and religionists. In the Descent of Man, Darwin (1971) described how man really close to mammals especially to monkey, bat, and seal in their skeleton, muscles, nerves, blood vessel, and internal viscare. This was concluded after long curious investigation with other scientists of his age like Huxley and Bischoff who helped him show the fact of the relative ness of man's brain with those of mammal's with emphasizing to folding brain of man resembles the orang's one. Yet, still some people couldn't be affirmed that in fact if so and yes human as mammal is the result of evolutionary process of natural selection, then there should be species that shows deviation even slightly from the 'species' of human today. The gradual cumulative changes out warded by Darwin does not mean all the mutant should exist, mostly mutant were not sustained in such struggle of life, that should have been explained through natural selection process. By the discovery of DNA in 1950's, the genetic evolution is firmed that the same material constituted all living organisms, including human.

Once man has created, and culturally evolves. The human brain capacity is the main different with our closest relative, the orangutan. But this capacity has brought man through her long learning process to the fittest species (as seen in number of human population in the world today). Human we see today must be very different in their behavior, habit, and way of struggle with the former man. Human today has been very powerful even to control and rule surrounds them, other species. What has happened to the former man so that human can create technology that develops and in the other aspect, humans can heal themselves and form a very organized sociocultural system for their own sake? What is Darwin contribution to our culture today? This paper will give a slight picture of how Darwin's evolutionary concept has opened the gate for sociocultural studies on human evolutionary process, a so called *memetic evolution* and bearing a hope that this analysis may inspire us to reveal sociocultural complication that exist today in our surroundings.

2 Meme, The Replicator in Sociocultural Evolution

There may be one question appear when we say that human is the fittest species that exist today. How can a complex culture formed?

First, we have to see that system where human life is a social system. In this way, we view human as unit of interaction process that constitutes a system of network of interactions and relations that inherently have the character of self-organizing (Leydesdorff, 1993). Then complicated disorder network of interactions are emerging order or pattern that distinguishes one society with others. This pattern is manifested in different behaviors, traditions, and cultures.

Within times, traditions, behaviors and cultures of society change. If we suppose that the changes from simple to complex culture as another evolution process, say it sociocultural evolution, what made this dynamic development possible? What is the fundamental replication in human evolution?

Richard Dawkins (1989) once coined a basic unit of human evolution, *meme*. Dawkins continued Darwin's genetic evolution to the human world. He concluded that replication also happens in human evolution, yet in a different sense. In his controversial book, *The Selfish Gene*, Dawkins (1989) cited that *meme* is a unit of information residing in the brain and is the replicator in human cultural evolution. It resembles characteristics in gene, where it may self-replicate and mutate. It has pattern and can influence its surrounding and propagate. This created great debate among sociologists and biologists and other disciplines scientists. This is because Dawkins himself didn't give sufficient explanation of how replication of unit of information in the brain controls human behavior and, eventually, culture. The broad sense of unit of information came to many definitions by many scientists.

Wilkins (1998) once gave definition of meme as

> "*The least unit of socio-cultural information relative to selection process that has favorable or unfavorable selection bias that exceeds its endogenous tendency to change*".

Susan Blackmore (2002) reaffirm about meme definition as whatever copied from one person to other person. They could be habits, skills, songs, stories, or any other kind of information. Further she said:

> "Memes, like genes, are replicators. That is, they are information that is copied with variation and selection. Because only some of the variants survive, memes (and hence human cultures) evolve. Memes are copied by imitation, teaching and other methods, and they compete for space in our memories and for the chance to be copied again. Large groups of memes that are copied and passed on together are called co-adapted meme complexes, or memeplexes."

In Blackmore definition, thus, the way that a meme replicates is through imitation. This requires brain capacity to generally imitate a model or selectively imitate the model. Since human social learning process is different one another, henceforth, the imitation process cannot be said completely imitated. The sameness of an idea may be expressed with different memes behind. This is to say that mutation rate in memetic evolution is extremely high, even possible to occur within every interaction on imitation process. It becomes very interesting when we see social system where complex network of interaction lies, an orderly emerges in the macro level, culture.

How meme replicates idea and how do memes construct culture? If we trace back Darwin evolutionary process, we will find out how DNA through replication, propagates, into many identical strains of DNA in the new members of species through regenerations event. And so in memetic evolution, there are events where in individual stage, meme having selection to outward phenotypic representation of one individual, which interact and communicate with other individuals so that one idea spreads to other individuals. Here is used the definition of meme as unit of information residing in memory system, which replicated through interaction, specifically imitation.

For example an idea of a mother to accustom her children to wash their own dishes may spread and turn to be a custom of a certain group of people if she in certain rate, interact with numbers of

parents or offspring in the population, without concerning motives behind the mother's idea. Environment may affect the mother's effort. Fathers or teachers altogether with tradition and topography of the community may accelerate or slow down the emergence of this new custom, new culture.

Since the term meme taking quite different analogue to gene, though in some principles hold the genetic evolution principles of such replication and selection, it is important to know how genetic evolution and memetic evolution resemblance or difference in each other's points. To make it easier, we can see the difference between both in the table below:

Table 1 Several main different points of genetic evolution and memetic evolution

	Genetic evolution	Memetic evolution
Replicator	➔ **Gene**	➔ **Meme**
Physical position	➔ **In the loci of the chromosome**	➔ **Do not have physical coordinate in memory system**
Code	➔ **DNA alphabet**	➔ **Semantic**
Transmission	➔ **Through parental lineage**	➔ **Through social interaction**
Mutation probability	➔ **Stable (low)**	➔ **Occur in every interaction (high)**
Fidelity of copy	➔ **Highly by the content of the gene**	➔ **Depend on individual learning ability to imitate a model**
Adaptation	➔ **Cumulative design changes**	➔ **Can be cumulative or not cumulative changes**

As we have seen in the table above, it is now clear to say that memetic is different with genetic evolution in every level of description at least on the points mentioned. But taking genetic evolution as a yardstick may help us to identify what and how is memetic evolution.

To further discuss, let us limit meme as unit of socio-cultural information that is transmitted through interaction, specifically imitation in which selection lies in the middle of the process.

3 The Dynamics in Memetic Evolution

3.1 The Dynamic Meme

Human is viewed as unit that constitutes a society, in which among its interaction emerges a pattern that we call culture. To avoid vagueness of the word culture we use in this paper, it is important to refer Fikentscher (1998) definition of culture:

> "Culture is the complex attribute of a society that refers to the patterns of conduct of its participants - traditional but open to change – to societal situations concerning knowledge, beliefs, arts, morals, law, custom, or other mentally reflected themes"

Culture is the second form of evolution (Gabora, 1997). Is culture evolutionary in its forming process? Gabora (1997) crystallizes 4 conditions for a process to be called evolutionary i.e.: (1) *pattern of information,* (2) *variations,* (3) *selection,* and (4) *replication and transmission*.

In cultural evolution as Dawkins called it memetic evolution, should fulfill those above points. The pattern of information in meme is manifested in languages. In interaction process, memes recombine with other memes resulting languages or signs that is readily interacts and while the interaction occurs, memes behind the language is replicated and imitated. However, every human has different learning capacity so that it influences the fidelity of replication in an individual. This way, yielding variations of

the “same” meme in people’s language. The process of imitation of one meme group and other memes compete in term of imitation rates. In this way, we can see a natural selection in memetic evolution.

The facts of memetic evolution or cultural evolution in human can be seen in the broad varieties of traditions, languages that in a glance from west to east and north to south one culture differs slightly from another, though in many cases like ideologies or state system, an area may have contrast difference its neighbors. This is caused by different adaptation or learning ability of the individuals in the population from the past experience in different conditions (geographic, root culture, etc).

The rate of an idea to replicate is very high in society since it consists of highly interacting individuals and the possible mechanisms of thought contagion when propagating. So one idea in an individual may influence the whole population opinion in unpredictable time (can be very rapid or vice versa, depend on the meme and the individual that transmit it and this transmission rate will select which meme survive to be imitated further). In dynamic society, an exchange rate of information is really high and the phenomena resulted from interaction is unpredictable. Say it a gossip of a dropped out boy may cause the fall down of a regime, who can say?

3.2 Replication and Transmission of Meme in Structured Society

As evolution theory of Darwin has brought a simple design as genes to such complex design as human showing cultural transmission where human can intelligently imitate one idea like Kendal and Laland (2000) name it, imitate the imitator. Such cultural transmission is different with imitation in other cultural organism non-human since in non-human, transmission occurs based on stimulus enhancement. In human, cultural transmission process is including true imitation where human being through trial and error learn, discover, evaluate and then reject or incorporate a behavioral repertory in a population so it becomes culturally adaptive to its environment (Blute, 2002). The learning capacity of individual will show up in the selectivity of individual in adopting new meme. The more knowledge, experience she has, the more selective the individual in picking up a new meme, thus, the fitter the meme will survive in someone’s mind. Then it will attract other individual to imitate the meme into her mind. This can also influence the rate of a meme in spreading. However, the survival of a meme in a population will highly dependent on its own longevity, fecundity and fidelity (Dawkins, 1989). In short, longevity refers to time required for a meme to stay in someone’s mind. Fecundity is about how acceptable a meme in a population and fidelity is about how possible a meme can continuously mutate when it is transmitted. Memetic evolution or cultural evolution will work if ideas are spread contagiously and undergo the selection process through interaction, which is influenced by factors stated above, thus emerges cultural pattern in the macro level (society).

Even in viewing financial market to be an evolutionary memetic system, meme transmission most likely to occur through inter-personal reproduction Frank (1999) among other two methods of replication i.e.: (1) economic reproduction and (2) intrapersonal transfer. This means cultural process, in wide society happens in the lower level of a hierarchical system: individuals in which a system of memetic selection process of codes transmitted from one individual and imitated by other individuals in the population. Wilkins (1998) described selective process of a hierarchical evolutionary system as memetic generate-test-regenerate cycles. In accordance with culture, in which emerges from interacting memes the memetic process can be illustrated in **Figure 1** below.

Replication of memes in an evolutionary process can be described as an individual process of regeneration of thoughts where a kind of testing or selection process that is “likely to succeed” replicates and as meme transmitted through phemotypic (analogue to phenotype in gene as expression of genetic code) behavior, then they are imitated in certain rate by other individuals in a population, in the higher level of complex memes, a norm or culture is likely to emerge. It is important to note that there is a feedback arrow that showing meme generate-regenerate cycles, which makes the system to become evolutionary.

As active and dynamic replicator, meme cannot go alone, yet it recombines to complicatedly construct behavior. Behavior could be behavior of languages, institutions, societies and even traditions (Wilkins, 1998). It is responsive to the fluctuation of its surrounding. This is what is called meme to be adaptive to changes. If one population consists of interacting memes, which mean exchange of information occurs is in a high rate, runs a memetic evolution. To get picture of this memetic process quantitatively with a mathematic model is, though might be impossible, mainly needed. In this way, it will be obvious the dynamics of the system where, one individual action will give significant influence to the outcome of the process in whole system. In that way, the answers of how such complicated socioculture could have formed in human ages may be found.

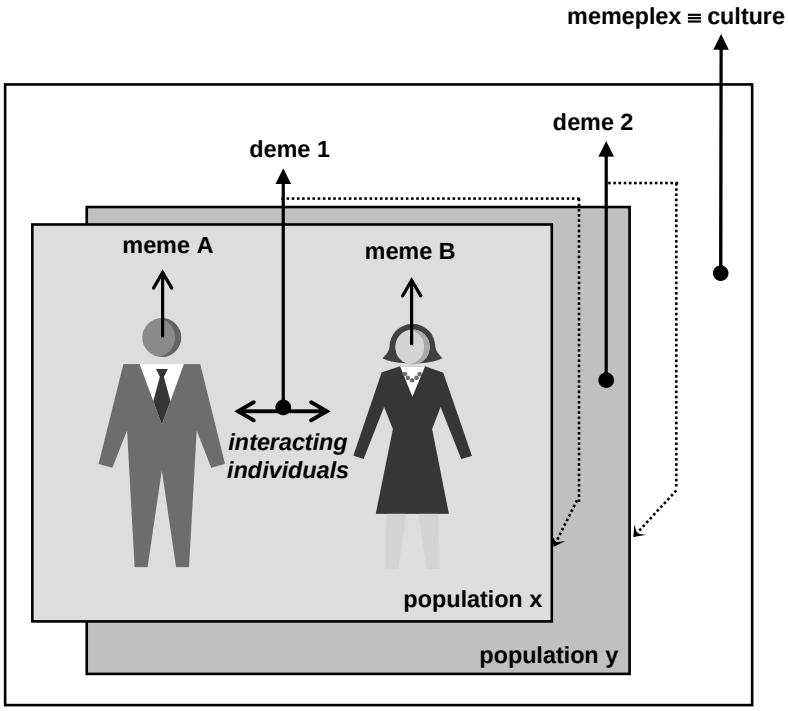

Figure 1 Replication process in hierarchical evolutionary memetic process

Of course if we want to know earlier than the picture above to find out the origin of our first culture, say, a pattern of a language in certain country formed (in which one area will have slightly different language than its neighbor) can also follow the flow in the picture. It was the first individual who imitated first meme (from animal at the first stage of memetic in human history, (Blackmore, 2002)) who played important role in spreading the primitive language, in which now has evolved into thousands forms of languages. Thus the language meme can be said following a memetic evolutionary process.

The central point in memetic evolutionary process is meme imitation process. The success of meme to be imitated is highly influenced with the learning capacity of an individual in selectively adopting a new meme. This capacity may have something to do with someone's brain capacity to adopt a new meme into her mind. However, the relation of brain capacity with meme acquiring process through imitation as in the meme-co-genetic evolution is hypothetical. So this requires numerous empirical studies to answer this mystery. This relation may have brought human, with its large capacity brain, as the fittest species among others (Blackmore, 2002). Human brain size explains the selection in evolution (Darwin-genetic evolution) that is only the fittest imitator who can succeed spreading up meme from generation to generations. However, the analysis for explaining how a culture may be emerged from memetic process can be constructed without the need of cognitive or DNA explanation.

Such as alternative in viewing a cultural change as the result of rumor spreading in epidemiological memetic process might be sufficient for further quantitative analysis.

3.3 The Selfish Meme

Meme, as well as gene, are replicators in their own fields. Both have different characters for each longevity, fecundity, and longevity (Dawkins, 1989). However, both showing facts of selfishness in term of surviving of their kinds in their descendants. Genes, so far have given sufficient evidences of how genetic information survive in an organism will induce the organism to the way the genetic information replicated in the offspring for successive generations through parental reproduction mechanism. Since Lynch (1998) wrote that meme, as unit of sociocultural information is contagious, and this what mostly make meme as the more efficient replicator than gene (Heylighen). This is because if in genes, an individual can only get the copy of gene by mechanism that will take at least one generation from its parent. Yet, in meme, the spreading can occur as soon as you even hear or read the idea from a source (individual, book, media, etc). This makes meme more possible to influence population faster, and thus the probability of the emergence of cultural pattern becomes greater that is at certain time, the whole population adopts the meme so that the meme becomes the new culture in that population. And the fitter the meme, the more numerous population adopt the same meme (can invade other group or population surround it). The whole selection process of meme remains natural selection that is bounded to the evolutionary stable strategy (Dawkins, 1989).

For instance, a belief that keeps a family do a certain ritual of such praying together. Since 'pray together' has become a fit meme in that family, then, every member of the family (without meme will to instruct the member to spread it) tries to convince their neighbor to do the same ritual. The meme 'pray together' then become fit in other family and so that family spread the meme to another until at one time, pray together becomes a norm in a certain population. The meme 'pray together' has self-propagated and become the fittest norm that dominate a group of people.

The mechanism of how 'pray together' become a norm can be explained using Lynch (1998) abstraction of meme as a contagious thought. Meme A is the idea pray together in a male muslim (the host, ~ for non-host). In the idea implied the condition for those who can follow this idea such as muslim, believe in prophet word S for instance, etc. So that A is recombination of previous memes. A = B*C*~D. The first propagation is when the man married other muslim which does not have the meme A. When the female muslim married the male and by interaction the female agree to adopt the 'pray together' idea, then the propagation can be described as A + ~A → 2A. Now when the couple has a baby, which here decribed as non-host. As the baby grows through religious education and communication with their parents, she than adopt the idea and do the routine with their parents with mechanism abstraction 2A + ~A → 3A. This is called propagation in homogenous population. The intensive interaction in homogenic population makes the rate of meme transmission higher than in heterogeneous ones. As the meme gets fitter in the family, remember that every member of the family also linked with a community where they can interact with other individual in their own community which mostly muslim. Say it, B*C*~D + B*C*D → 2B*C*~D. Then by intensive communication, as every member of the family always pray and ask their friends to pray together, then the idea of pray together, quickly adopted by other individual in other population. The multiplication of hosts of meme A is then exponential. Means, in short time, the meme becomes the dominant meme in that population. In other case of heterogeneous population, say there are at least two religions adopted by whole population, the meme transmission can be slower. Because there will be friction between conservative and moderate muslim for instance. Though there is possible assimilation between them, still the friction may cause a slow down of meme A transmission rate.

In the case above, we can see meme as selfish replicator that is replicator that makes its carrier to spread the meme to other individual for the sake of meme to reproduce in as many as possible people's mind. Any cultural information in sociocultural system now can be investigated of whether as the result of evolutionary memetic process or not. In short, we can say now that culture may have emerged from the role of the selfish meme.

3.4 The Emergence of Culture as a Complex Adaptive System

As explained above, culture emerges from the micro (individual) level. In society consists of huge number of population where every individual actively interacts with other individuals, influences and get influenced so that from the process of exchange of information among and between its individual (which has different tradition background), a pattern of norm or culture emerge. As Fikentscher (1998) wrote that culture is though inherited traditionally, yet it is open to changes. This means human, as the agent that holds culture follows learning process through trial and error process of communication so that she become adaptive to environmental changes, and selective in adopting new memes or culture. This is why this system can be regarded as complex adaptive system. The complex interaction and communication between and among individual makes the outcome of the system, phenomena, impossible to predict. Yet, in fact, in social system, we can find pattern of behavior or trait or tradition, which distinguishes one social system to the other ones. The pattern is the culture itself. The orderliness that emerges from disorder condition, as Mittleton-Kelly (1997) wrote:

> "…when a system moves from a state of order towards increasing disorder, it goes through a transition phase, called the edge of chaos, new patterns of order emerge."

One of the characters of a complex adaptive system is that this system has ability to change its internal structure, as there is an external circumstance interferes. This ability is what so called self-organization by Banzhaf where elements of the system able to stabilize the structure or the function of the system. Or, more details some characters of a self-organizing system to be: dynamic, non-deterministic, and open to changes, far from equilibrium and has character of autocatalytic amplification of fluctuation and structural or functional level. To be closer to sociocultural system we will discuss ahead, Mittleton-Kelly's (1997) definition about self-organization may be clear:

> "Self-organization is the spontaneous organization of the system's elements into coherent new pattern, structures and behaviors. It is the process of interaction between individual elements (or local principles of interaction) which brings forth of creates new patterns of emergent properties at a global or holistic level."

The dynamics of self-organizing system will correspond a lot with entropy or disorderliness. The self-organization character of the system is shown in the degrading disorder. Since it is an open system where it allows flow of input of energy with low entropy, thus this kind of system considered being far from equilibrium (Gesherson *et al.*).

Once, Leydesdorff (1993) stated that a social system is an autonomous process based on actions of its agents. Then, it is specified into social communication system, where in memetic terminology the communication is the process where meme imitation is possible. Then, the position of communication is crucial dealing with how one's information communication network system can influence the whole population. And it is the unit of information or meme, which can change population that we are dealing with.

Applying the principle of memetic evolution to understand the cultural phenomena in society is really challenging. Further Situngkir (2003) wrote that the new method, which is generated from artificial society with the help of computational innovation, might help answering social questions. The social construction that Situngkir (2003) offered can be applied into memetic construction, since the memetic evolution also showing the character of the emerging cultural pattern. The scheme in Situngkir (2003) with meme modification can be illustrated as in **Figure 2**.

The social system, by the explanation above, then can be called running a cultural evolution which is memetic. This is the very interesting side of memetic. A pattern of evolution that brought us witnesses millions of cultures, traditions phenomena and beliefs today. To quantify them becomes more challenging as challenging to find our own identity.

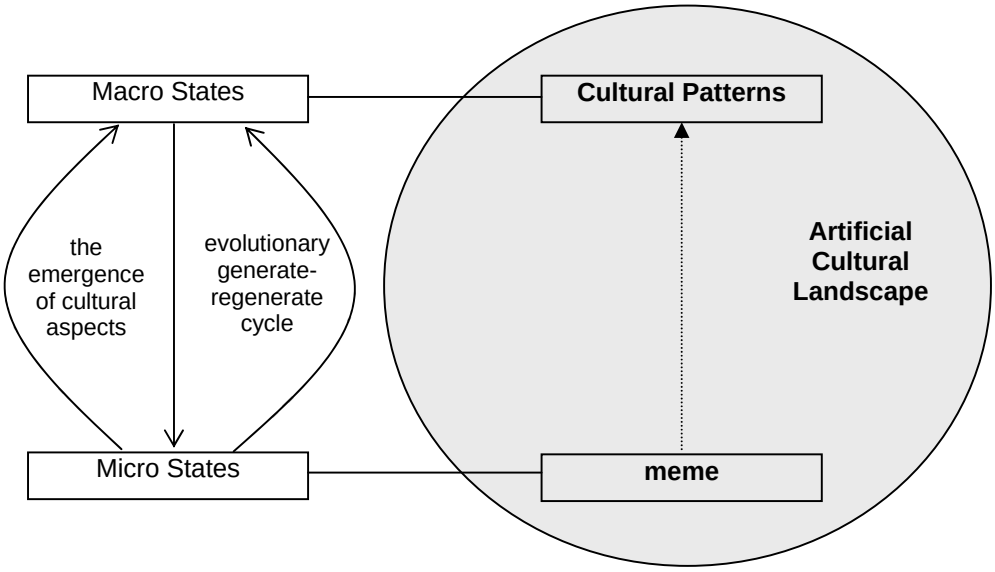

Figure 2
In capturing memetic cultural pattern using Artificial Cultural Landscape construction

3.5 Quantifiable picture of memetic evolution possible?

Despite the vagueness of meme definition and some properties within memetic evolution that disputes controversies, memetics has widely accepted as a tool for analyzing complex adaptive system such as society. This also affirmed with many efforts of memeticists in simulating using computational analysis over social phenomena, which are memetic. Name it Derek Gatherer (2001) which with gene-meme co evolution approach simulating interaction between genetic factor and memetic taboo in homosexuality, Jeremy R. Kendal&Laland (2000) who use mathematical approach in describing how an invasion of meme could occur in population, Joshua Frank (1999) who tried to bridge the gap between financial and memetic, and Laureano Castro&Miguel Toro (2002) who use mathematical model to analyze the memetic learning in offspring's behavior. In a system replication of ideas may undergo in a complicated way that is resulting unpredictable end. This complication is due to the high complexity of human "sociocultural" system as Fuchs called the most complex system.

Numbers of quantification approaches have been published, such as: Lynch (1998) tried to take more technical to describe transmission in memetic. He modeled a system of two populations of host and non-host of meme. There, he shows how expansion or transmission of the meme can flow from parents to their offspring in non-linear differential equations. The equations explain how an expansion of meme could occur through parent-children relation, where parents can influence children of certain through interaction and communication or so called parental transmission. Or, expansion could also occur through non-parental transmission that is when children or parents interact and having communication with others (friends or neighbors, etc). And of course, as an evolutionary process, memetic also having unconscious selection where one meme survives and other could drop within rates. Some factors that account for dropping out a meme are spontaneous dropout and mortality.

It is important to recite Blackmore in (Blackmore, 2002) of imitation as the only way that meme could spread, since imitation also including the individual learning capacity to imitate, and the individual genetic fitness. Following Blackmore's hypotheses about gene-co evolution in memetic, they built a model of phenogenotypic memetic process. Kendal and Laland (2000) started the model by showing relationship between meme and phenogenotype in individual fitness relation. By the information of different fitness cost within homozygote and heterozygote memes, then a mathematical equation is

formulated to describe how possible a meme could spread or invade a population. It is shown that the invasion is most likely to occur in high fidelity of meme transmission, high fitness advantage of meme, and the relationship of the dominant and recessive phenogenotypic meme. It is hoped that the formula may help describing and predicting of how a culture or trend changes as a result of fit meme invasion.

Human interaction in society is highly complicated, yet it is too soon for us to say impossible to find out the pattern. With careful, localized, specific and limited population and parameter, with the help of the right computational tools, it is not impossible to do.

4 A Challenge for Social Sciences Today

In social system in our world where billions of human interact each other in complicated network, we witness many social phenomena. Name it schools, war, fashion trend, traditions, diseases, disputes, or cooperation. According to our early note, human as sociocultural individual may have through a memetic evolution so that we now exist in such complex adaptive system. Means, we are challenged to trace whether memetic play role in our social phenomena. Yet, in fact we are not assured yet that all social phenomena are memetic. Although so, in order to ease analysis, as Wilkins cited about three alternatives way of treating meme, that is treating meme epidemiologically, restricting the application of memetic analysis to cultural phenomena, which are phenomenologically isolated, and the generalist conception we can start analyzing to which phenomena is memetic.

The difficulties of mapping the spreading meme are due to many factors in social and cultural aspects that interacts each other. As the population higher and heterogeneous, tracing memetic is never been easy. Religions or beliefs, traditions and geographical condition, which are different in every coordinate on earth contributed in making it so difficult to start. However, the developments of social science recently open wide possibility to analyze simple memetic process with computational tool assistance. Its interdisciplinary has made possible quantification approach to such process.

Indonesia comprises of more than 300 tribes and languages. There are more numbers of customs, beliefs, traditions, and cultures. That means a high complexity lies in it. The presence of memetic as a new way of look in analyzing social culture in heterogeneous population and environments become very challenging to be tested to find the map of imitation of certain issue within generations of the population.

Such issue of terrorism for instance, or how spirit of jihad spread among Muslim and manifested in bombing action (Meneghetti *et al.*, 2003), or local tradition such as, in near end of fasting month, Indonesian muslims who live and make living in distant town tend to make great endeavor to home and see relatives in hometown and use the moment of *Iedul fitri* as a family moment in a culture called “mudik” or *home* not only by Muslim. They can be investigated whether they are memetic or not. And there are numerous interesting cultures to be investigated. Indonesia is a very interesting field for memetic research. They are fields of gold to dig up.

5 Conclusion & Further Works

Despite controversies and ambiguity of meme definition, memetic is now widely learned as a way of seeing complex adaptive system. Meme, the unit of information residing in the brain has ability to self-replicate and transmit to other’s brain through interaction. Epidemiological meme also used to analyze how a culture emerges from interaction among individuals or changes. The evolutionary process of meme in hierarchical social system explained. The interdisciplinary social sciences open chance to learn the memetic (cultural) evolution in human through quantifiable approaches. A multicultural country such as Indonesia is an interesting field of memetic research. In the future paper, the author will deliver an analysis of meme, in specific term, the spreading idea or epidemiological issue in local area.

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