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STRATEGY FOR SOCIAL SOLIDARITY IN THE AGE OF ARTIFICIAL INTELLIGENCE[1]

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Introduction

After AlphaGo's victory over Sedol Lee in April 2016, uneasiness and worries have spread fast out of fear for human intelligence to be overpowered in the age of artificial intelligence or AI. A frontrunner of technological developments centered on AI, Ray Kurzweil, predicted that science and technology research would also be led by artificial intelligence in the 2030s and 2040s, thereby replacing human-led research activities (Kurzweil(1): 47–53). Of course, it is fair to say that there would remain things that cannot be done by robots but only by humans, such as emotional work, care work, or simple physical work, even if intellectual labor is replaced by AI. However, the age of artificial intelligence presents a genuine threat to the labor force as a whole based on the possibility that 'artificial labor' can replace not only the intellectual labor but also all sorts of labor including emotional as well as physical labor.

In his book entitled *Humans Need Not Apply: A Guide to Wealth and Work in the Age of Artificial Intelligence*, Jerry Kaplan introduces various types of 'artificial works' to be seen widely as follows: There are already robot vacuum cleaners out in the market while there are robots that are going through a commercialization phase with functions such as pulling weeds, loading and unloading cargo boxes, carrying luggage alongside, harvesting crops and plucking fruits ripen to a right degree. Automation would be realized for nearly all the physical labor, such as painting a building inside and outside, cooking food, putting away empty dishes, cleaning a table, serving food, making the bed, folding laundry, walking a pet, laying pipes, sweeping the sidewalk, delivering tools, collecting tickets, stitching and controlling traffic. Industrial robots of various kinds are already spreading while there are robots under development for the purposes of military, beauty care, massage and even prostitution (Kaplan: 63–64).

Human activities are driven by four major resources that are combined with the human body: (1) kinetic energy that performs task; (2) recognition by the brain that collects information sensed

1 This writing is an edited excerpt from the section entitled "Cognitive Ecological Outline of the Strategy for Social Solidarity in the Age of Artificial Intelligence" of the writer's book, *Revolution and Execution*, published in 2017 (8th Max Communale Organizing Committee, Hanul)

through sight and hearing; (3) reasoning power that develops and corrects a plan; and (4) muscles as execution means to perform a task. On the contrary, a robot does not require such four resources to be combined with a body or space. As for a robot, a network of ubiquitous sensors would be sufficient even without eyes and ears. The capabilities of identifying the source of sound or perceiving depth would be enhanced even more effectively if the eyes or ears of a robot are located at a very long distance. Necessary data would be collected at once throughout the world while it is possible to change a task at will and to choose the most convenient venue for performing a task. If an extensive network of remotely cooperating machines is actuated automatically, it truly signifies a robot per se (Kaplan: 65 – 71).

If it is possible to get out of the delusion that a robot would be like a humanoid being (android), through which the aforementioned four activity resources are combined with a body, the crucial factor is technological evolution that allows 'data recognition' and 'reasoning and judgement' to advance as separate capabilities and, at the same time, to be combined freely. For the past two centuries, there have been sufficient technological advancements in terms of kinetic energy and execution means. Data recognition has evolved by recent big data technologies while it has been artificial intelligence that brought about the evolution of the powers of reasoning and judgement. In 2016, AlphaGo has scored an easy victory against the world's renowned master go players including Sedol Lee by combining these two technologies. The speed at which these technologies are to interjoin would be accelerated in the future as technologies of parallel computing and ubiquitous sensor networking advance even further.

To be sure, the basic driver of accumulation under capitalism is from surplus values generated by 'exploitative labor practices arising from production processes'. Therefore, as long as capitalistic relations of production continue to exist, human labor would not disappear no matter how fast production becomes automated. Just as all the production approaches of the past have been, however, capitalism does not remain unchanged forever. Recently, automation technologies known as the revolution of Genetics, Nanotechnology and Robotics or GNR have progressed exponentially, which no longer requires capitalistic relations of production. Such breaking

point and potential arising therefrom shall be considered. In this case, the accumulation of surplus values is expected to take a direction towards a two-way junction.

1) One is a path towards the existing institutional division between full-timers and part-timers, which would be enhanced even more while increasing labor intensity within production processes and, at the same time, decreasing employment ratio with pillage ratio expanding externally on a proportional basis. If such phenomenon is accelerated by AI, capitalistic production mode would reach its limitations since it would no longer be capitalism if the production mode creates an environment where pillage ratio continues to expand in comparison to exploitation per se. Accordingly, there could emerge a situation something like where times regress to feudalism. The public resistance or uprising against this could be controlled by a new structure of combination comprised of 'coercion and agreement', i.e. 'AI police/military + virtual reality system', just as the past feudalism was controlled by a structure of combination comprised of 'coercion and agreement', i.e. 'steelclad knights + church'. It is just like a dystopian future envisioned by SF movies, such as the *Matrix* in 1999 and the *Elysium* in 2013.

2) The other one is a path towards creating a virtuous cycle connecting AI and human activities by allowing all the social members to share increased achievements driven by improved productivity of the society as a whole thanks to the AI advancements. The achievements may come in the form of increased basic income and welfare at a universal level. This is advancing into a new society where surplus values are shared differently from how it used to be under capitalism. To simply put, this is a path towards a utopia.

Just ten years ago, this two-way junction was thought to be possible only in SF stories. However, the world is approaching this junction ever more closely due to neoliberal exploitation/pillage deepened for the past ten years along with exponential parallel developments driven by GNR revolution including AI. In particular, there are clear signs of movements towards this two-way junction throughout the world as countries can no longer count on others for own survival during this transitional period when Brexit was decided by the U.K. while Trump was elected as the President of the United States. Technically, the days of neoliberal globalization are over. One way would be the global expansion of far-right political parties

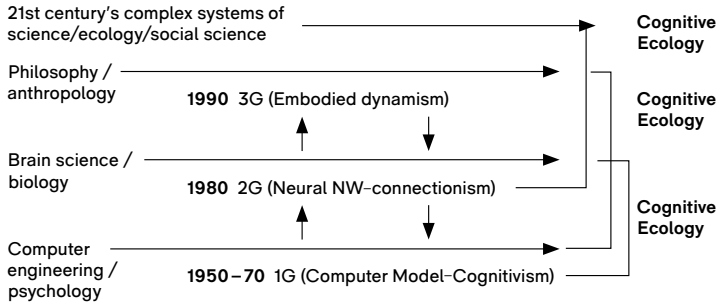
that make blatant attempts to revive fascism by employing 'hatred tactics' while the other way would be rapid spread of public interests in basic income movements that have thus far been disregarded. In Korea, there are two starkly different movements going towards opposite directions; One is led by Liberty Korea Party making flagrant attempts to reunite far-rightists pivoted around supporters of impeached President Park Geun-hye and far-right Christians under the banner of 'Torch' after the scandalous 'Park Geun-hye & Choi Soon-sil Gate' was exposed while the other is initiated by the campaign pledge of presidential candidate, Lee Jae-myung, with results of heightening the public interests in basic income.

Of course, complex processes in the reality would not be swayed right away by this two-way junction towards new trends. Even if neoliberalism loses its hegemony, it will hold its power to a certain extent for a considerable period of time. Existing political forces would also seek diverse solutions, thereby extremely complicating conflicts and competition in the political, economic and ideological terms. Yet, as far as automation continues to accelerate without a stop, two new trends would be key variables that nudge the world history to take a complete different path unseen before at the macro level. If such prediction turns out to be correct, an immediate challenge during this transitional time for all of us would be to have the proper understanding of antagonistic as well as cooperative relations between existing political economic forces and these two new trends and to expand the utopian tendency mentioned in 2) while containing dystopian tendency mentioned in 1). This is why it is urgent to seek a new strategy for social solidarity entirely different from what we have thus far seen.

It would not be possible, to be sure, to cover all the various activities of social solidarity spanning a wide range of political, economic, social and cultural instances in this limited space. In this writing, the discussion would be limited to the suggestion of a new strategic perspective and a framework required to form progressive solidarity through collaboration between individuals and groups on new conditions emerged during the era of artificial intelligence. It is a cognitive ecological frame, which is still an unfamiliar concept in our society. Cognitive science has evolved through three phases during a short period of about 60 years and still continues to evolve at present. The cognitive ecological perspective asserted here is an extension

of 'embodied dynamism' in the third phase. The first generation of cognitive science known as 'cognitivism' or 'computationalism' has governed the days from the 1950s until 1970s, followed by the second generation of 'connectionism' in the 1980s that challenged the 'cognitivism'. Then, in the 1990s, the days of 'embodied dynamism' of the third generation ensued. Nowadays, these three approaches are in coexistence, which are separated from each other but also in diverse mixtures (hereinafter Thompson; 3–13).

The three approaches have emerged in a consecutive order over time but are now in coexistence to either compete against one another or be combined with one another. As the key driver of the 4th industrial revolution, artificial intelligence is advancing as part of extension of the 1st generational frame and on the back of the integration led by the following frame of the 2nd generation. Meanwhile, the 3rd generational frame is based on the combination of biology and philosophy/anthropology, which is advancing towards the direction of utilizing research outcomes of brain science through experiments. In other words, cognitive science in a broad sense places advancing brain science at the center of a spectrum, of which AI research efforts are being made to translate brain functions into engineering algorithms at one end while efforts are being made to explain the complexity of living structural connections encompassing the brain, the body and the environment at the other end.



[1] Three phases of development and co-existence surrounding cognitive science

In the figure above[1], cognitive ecology is a frame that combines research outcomes concerning complex systems of science, social science and ecology from the perspective of

embodied dynamism of the 3rd generation, which is the view point that this writing is to take. Of course, all the research activities with the title of cognitive ecology do not necessarily take the same position as I take.[2] Cognitive ecology, in general, places emphasis on information environment or natural and ecological environment. On the contrary, I perceive the environment, as extension of Marx–Harvey, as complex processes of historical and geographical changes of human–nature metabolism. Thus, cognitive ecology is personally interpreted in the aspects of history and geography. Such cognitive ecology shares advancement achieved by research on brain science with AI while striving to focus on multi-level interactions with social–natural environment from the first person viewpoint. Therefore, the opposite counterweight that challenges this viewpoint with criticism is the instrumental viewpoint held by AI technologies attempting to reverse –engineer the intelligence of living things from the third person viewpoint. With this perspective in place, this writing would continue to make predictions on the changes of capitalistic production mode and arrangement for social formation to be introduced by the acceleration of the AI era while discussing about the desired basic direction of a new strategy for social solidarity accordingly.

Changes of Capitalistic Production Mode and Arrangement for Social Formation in the AI era

The key principle of artificial intelligence is the combination of algorithms equipped with recognition reasoning abilities, big data technology, and computer hardware. Although these three technologies have been developed through different paths, they started full-fledged development in the 2010s, owing to Google, Facebook, Baidu, and Amazon, the platform companies that integrated them into artificial intelligence technology in 2000s. Of course, platform companies generate profits above the average through AI technologies used within the present capitalistic production relations. Therefore, there is a need to conduct a political

2 For systematic understanding of cognitive ecology in general, the following books are recommended: Reuven Dukas's edition of *Cognitive Ecology: The Evolutionary Ecology of Information Processing and Decision Making*, The University of Chicago Press, 1998, Reuven Dukas; and John M. Ratcliffe's edition of *Cognitive Ecology II*, The University of Chicago Press, 2009

and economic analysis of potential changes in the arrangement of the capitalistic production mode.

To this end, the framework suggested in *AI and Right to Basic Income* by Nam-hoon Gang (Study of Marxism, Winter Issue of 2016, Volume 13, Issue 4) seems appropriate. In his paper, the author explains that AI is comprised of hardware, algorithm and data and that respective such element can be matched against three sources of excessive profits, which are special surplus values, monopolistic profits and rent, in the following manner:

1) High profit margins generated by the development of new hardware, such as CPU and GPU, and of new algorithm correspond to 'special surplus values', which tend to dissipate after new production mode creates excess profits for a certain period of time before becoming generalized mode to lose its unique value over other social values. However, such special surplus values driven by the aforementioned two elements are hard to maintain for a long time since the hardware market itself is highly competitive with technologies adopted quite at a fast speed while algorithms are completely open for everyone with the open source direction.

2) On the other hand, platform companies use software to record human behaviors automatically without additional labor input. Thus, profits generated by data correspond to a kind of 'rent'. When many people access to a beautifully decorated platform, there come excess profits. Special surplus values dissipate over time due to competition while this kind of rent tends to increase over time. Unlike the differential rent backed by the productivity of a natural object, to be sure, this sort of rent derives from people's shared participation rather than a natural object.

Through such analysis, the author asserts that separate taxation is required for excess profits driven by platform rent just as tax is imposed on excess profits generated by land for rent. As for the latter, profits are generated by people's shared participation. Therefore, the author argues that it is possible to impose tax based on basic income (Nam-hoon Gang, 18–23). The key message in his paper is to draw a conclusion on why the second path (utopia) suggested above is the right for everyone and an inevitable choice in the era of AI through a political and economic analysis. In his paper, what caught my attention was the part where the author demonstrates why the source of high profit margins is inevitably the

type of rent instead of special surplus values or monopolistic profits in the era of AI. The statement of the rent as the sustainable source of profits for the key industry leading the 4th Industrial Revolution based on AI implies that a new trend guiding the future of capitalism makes regression to feudalism.

Of course, companies other than platform companies would face fierce competition over the development of hardware and algorithm while competition would continue for other industries that have been built throughout the 3rd Industrial Revolution. However, obstacles posed by a nuclear umbrella block a path, along which a breakthrough can be made to overcome a crisis through means including an all-out war and colonialism just like the transitional times of the past. Into the 2010s, there is not any clear-cut solution to overcome the crisis of excessive production and overspending prevalent the world over. With the worn-out production relations at present, it is not possible to control future changes within the economy that are occurring due to exponentially improved productivity. All sorts of political confusions observed around the world are spontaneous results of ever-worsening contradictory relations between the foundation and superstructures above. Marxist ideology shall be revisited for a comprehensive analysis and an ensuing judgement so as to understand potential changes in the entirety of capitalistic production mode and social formation that are reaching limitations. There is no other means to analyze the entirety of internal contradiction and the structure of a capitalistic society except the Marxist analytical approach.

According to Marx, the labor force as well as natural forces both serve as commonwealth. Capitalism commercialize both sources while subordinating production mode, which is the product of combining the labor force and natural forces, to the mechanism of private ownership so as to intensify pillage of natural forces and to exploit & pillage the labor force. This has led to the accumulation of massive surplus values. When the capitalism reaches its limitations, social members would be asked to make a choice facing the two-way junction mentioned above. It is either a path of regression to production mode similar to that of feudalism with a vertical hierarchy based on rent or a path towards a shared economy beyond the current capitalism. Existing anti-capitalistic strategies, however, have opposed and competed against one another by focusing on partial

changes instead of considering a synchronic direction of changes found in the foundation and superstructures above as a whole. Min Geum[3] argues that discussions are led by, on one hand, one camp focusing on the socialization of physical–intellectual production mode to deliberate on 'public or public domain' (Republic, The Public) (socialism, social democracy, etc.) and, on the other hand, one camp focusing on the issues of autonomous labor and mutual assistance to deliberate on 'commonwealth' (Commonwealth, The Commons) (traditional anarchism, autonomy, etc.). In addition, there is a difference between ecology and feminism in that the former seeks the liberation of natural forces while the latter seeks the liberation of the labor force for the sake of gender equality.

However, there are three irreducible elements in the social development, which are socialization of production means, autonomy of the labor force and gender equality, and coexistence with the nature. Therefore, changes of the entire social formation cannot be induced with a reductionism view of thinking that other issues would be resolved naturally if any one of the issues are resolved. To realize the 'solidarity of unconstrained individuals' at a societal level, a 'public' shall be socialized and the labor force and natural forces be decommoditized so as to be able to seek a new formation of the commonwealth and to create a virtuous circle between the two. If the labor force becomes increasingly more decommoditized due to a reduced number of jobs caused by AI of the future even after the socialization of a public, it would not result in social exclusion. If we wish to see more free time for social participation and social

3 In his writing entitled "Basic Income – a new socialization approach to divide what is universal and what is common", Min Geum makes a political and philosophical review of the significance of a new socialization approached contained in a basic income theory. There are two pillars supporting his methodology of seeking the socialization approach: (1) the author perceives the basic income as a bridge connected to the commonwealth grounded on the sharing by everyone of everything owned by everyone and, at the same time, as the completion of a "republic", i.e. a "public" (res publica); and (2) the author perceives shared economy of a public and solidarity economy of the commonwealth as two pillars shoring up basic income and as the effect of introducing basic income. I would like to interpret public as a structural framework for a social formation combining a foundation and superstructures (national instruments) while interpreting the commonwealth as drivers, humans and natural forces in general, that actuate such structural framework.

activities, the outcomes of improved productivity enabled by AI shall be distributed to all the social members in the form of universal basic income instead of privatizing such outcomes in the form of rent.

Universal basic income can serve as a starting point for changing the shape and function of a social formation that corresponds to changing production mode in the era of AI. The reason is suggested here. Basic income distributed regardless of wage labor can remind people of the fact that the labor force each is providing is not a commodity but a part of natural forces along with diverse energy sources containing water, air, land, fauna and flora, and minerals belonging to the commonwealth and can also enable people to realize that it is a basic right of a citizen, who is part of a public, to be secured with such sources through the form of a 'public', which is the socialization of production means.

For these changes to take place, to be sure, there is a need to fundamentally transform a public per se so as to evenly distribute basic income by abolishing private ownership while reducing required social labor through advanced science and technology. The transformation of a public for socializing production means would make it possible to secure financial resources needed for the payment of basic income, which would achieve the decommoditization of the labor force and the realization of rights of the commonwealth. If a public becomes more socialized, the rights of the commonwealth would be realized. If such rights are realized, the scope of a public's socialization would be expanded. If such scope is expanded, more rights of the commonwealth would be realized through a virtuous circle (Kwanghyun Sim: 143–146).

For the past decade, basic income has been researched in Korea through multi-faceted dissections of types of required financial resources and of a process of creating the virtuous circle at a macro level while running economic simulations of potential benefits for the mass public if basic income is to be distributed. However, discussions have thus far not included an essential element that can realize the simulated results, which is a strategy for political and social solidarity. Rather, discussions of basic income are preconditioned on job losses and are faced with criticisms raised by labor movements that have been pushing for the agenda of putting the labor at the center and of offering full-time positions to contract workers because of the reason that values created through labor are not respected. This is why there

has not been any progress on the expansion of social solidarity. If such standoff is prolonged, it would become more challenging to unify social solidarity to fight off the onslaught of capitalism. There are justifiable causes behind confrontation and division. Similarly, justifiable reasons and momentums shall be suggested for solidarity and cooperation. In this respect, it is imperative to take a look at obstacles that block the expansion of social solidarity at present.

Beyond the Habit of Making Cognitive Errors: Shift from Left-brained Thinking to Balanced Thinking Employing Both Hemispheres of the Brain

In September 2016, a survey was conducted on approximately 10,000 Koreans aged above 12 by Korea Institute for Health and Social Affairs. In the released survey report entitled *Status of and Policy Response to Health Behaviors and Psychological Habits of Koreans*, 90.9% of the respondents said yes to more than one question out of five questions asking for any habit falling in the domain of 'cognitive errors', which are: (1) I feel that just one aspect is enough to make a generalization (selective abstraction); (2) I think that everything is either right or wrong (dichotomous thinking); (3) I always prepare for the worst first (catastrophizing); (4) I feel disrespected if my opinion is not asked for when making a decision (arbitrary reasoning); and (5) I feel that people have been speaking ill of me if they suddenly stop talking when I approach them (individuation).

Arbitrary reasoning makes an arbitrary conclusion of something being factually correct even though it is not backed by any fact or it is against a fact. Selective abstraction makes a generalization based on selectively chosen information so as to justify own thoughts and feelings. Individuation perceives irrelevant events or facts as their own business. Dichotomous thinking is a habit of seeing everything in black and white or right and wrong based on absolute criteria applied to every matter in the world. Catastrophizing assumes the most catastrophic situation out of all the possible scenarios that can happen in the future in the progress of the work.

Paralogism (arbitrary reasoning) confuses grounds with facts while it serves as a distinct feature of positivism ideology. On the other hand, paralogism (selective reasoning) substitutes the entirety with a partial aspect while it serves as a distinct feature of reductionism ideology. Individuation and catastrophizing are

internalized individualism ideology as the result of long-standing competition of atomized individuals in a destroyed community while dichotomous thinking is a view of society established as the result of the society permeated with anti-communist ideology, which has been in dominance over the past 70 years on the divided peninsula. Despite the efforts for reasonable reasoning and behavior, it has always resulted in a sort of unconscious resignation that everything is concluded as either (1) anti-communist ideology that separates allies from enemies through a black-and-white lens on this divided land; or (2) individuation and catastrophizing driven by intensifying multi-level competition under capitalism. Such sense of resignation has established itself as an 'interpretive framework' in the minds of the mass public. This signifies that the lives of the mass public are permeated with a way of thinking that places importance on simple reasoning approaches, such as positivism and reductionism, based on immediate facts and definitive answers for solving problems at hand and placing less emphasis on taking a holistic view shored up by a reasonable basis. It means that people think the former is more efficient that the latter.

It is difficult to say that social activists are immune from this way of thinking. Even though participation in social movements itself could be deemed as an act of refusing the habits of individuation and catastrophizing as well as positivism, which place sole importance on immediate facts. However, it is still difficult to say that they are completely immune from the habits of reductionism and dichotomous thinking. The trends of antagonizing opponents whose opinions are different from own opinions driven by ethno-, labor-, ecosystem- and feminism-centric agenda are what symbolize reductionism-driven dichotomous thinking that blocks the spread of social solidarity (Red-Green-Purple Solidarity). However, this does not mean that such way of thinking would remain dominant as it has been. Since the existing social system that has forced the formation of such way of thinking is going through dissolution, the psychological habits of making cognitive errors that were introduced to adapt to such system would also go through dissolution altogether.

Yet, it is more difficult to change a psychological habit than to change a physical habit in some sense. If the majority of social members get stuck in the inertia of these cognitive errors, then it would be impossible to expand the social solidarity while the way

forward would be tilted toward dystopia. In order to contain such trends while facilitating the transition to a new society through continuous expansion of the solidarity of unconstrained individuals based on shared economy as well as solidarity economy, conscious efforts are paramount for breaking the habit of making cognitive errors and for rebuilding a reasonable way of thinking. From the perspective of cognitive ecology, positivism, reductionism, individuation and dichotomous thinking are key characteristics of left-brained thinking, which became prevalent in the Korean society not because of the national character but because of the 50-year-long compressed growth unique to Korea. Now, the era of AI has emerged to replace most of the physical and intellectual works that have thus far been minced in a capitalistic way, thereby quickly extinguishing the efficiency of the left-brained thinking. In the meantime, there is a growing need for activating the right-brained thinking that has thus far been contained and suppressed.

From the perspective of cognitive science, the left hemisphere of the brain makes concentration within an explicit and narrow range through conscious attention while the right hemisphere of the brain unconsciously captures a broad and open view, widely proliferating quick responses and subtle perception. In general, the left hemisphere of an animal's brain exerts narrow but highly focused attention to seize a prey, which functions competitively. On the other hand, the right hemisphere of an animal's brain exerts wide-ranging attention to caution against a potential predator nearby or to pick up any signal sent by other approaching living creatures that can be friendly so as to facilitate the solidarity among social animals. In the case of humans, the separation of left and right hemispheres of the brain may be out of the necessity to embrace two kinds of incompatible interests in the world (Mcgilchrist: 52-55).

> "The right hemisphere of the brain emphasizes the extent and flexibility of interests while the left hemisphere of the brain captures focused interests. It results in the right-side brain seeing an entire object in its context and the left-side brain seeing an object's fragments extracted out of context, which assembles the eternity that is completely different from the features of respective object. The human ability to form solidarity with others, such as empathy and understanding of

> feelings including completely different types of interests from those towards the world, is mostly the working of the right hemisphere of the brain." (Mcgilchrist: 55–56)

In the case of most mammals with social life, the right hemisphere is longer, broader, larger and heavier than the left hemisphere. The size and shape of various sections of the two hemispheres, the number and size of nerve cells, and the asymmetric branching extent of dendrites are all different. In the right hemisphere, dendrites are overlapped more in the cortical column, where there is a mechanism that improves interconnectivity compared to the left hemisphere. Furthermore, there is more of the white substance than gray substance in the right hemisphere, making it easier to deliver information over the other section. This signifies great interests paid by the right hemisphere concerning the holistic situation. On the other hand, the left hemisphere makes it a priority to deliver information within a section while focusing on local communication first (Mcgilchrist: 64–65). Such neurological asymmetry serves as a basis for Mcgilchrist to make a multi-faceted comparison of functional differences between the right hemisphere (focusing on how) and the left hemisphere (focusing on what) (Mcgilchrist: 73–161).

The author explains that languages of the modern world are so accustomed to the agenda driven by the left hemisphere that languages with clear evidence of being processed by the right hemisphere, such as Hebrew and Arabic, as well as languages read from right to left at present are mostly processed by the left hemisphere. The reason why the direction of writing has changed otherwise is because of the emergence of an empire that places importance on numbers and currencies, which make it possible to predict mutual relations and to clearly reflect a process of values transferred from the right hemisphere to the left hemisphere. Currencies have been widely adopted since the 4th Century B.C. Initially, the balance of power was equally shared by the right and left hemispheres then to be overwhelmed by the left hemisphere gradually. It approximately coincides with the time when the world created by philosophers before Socrates gave way to thinkers of the Platonic world (Mcgilchrist: 454–457). However, the trends of the dominant left hemisphere have not been attained in a consistent manner. Mcgilchrist cited a great amount of literature to explain

about the brain's shift towards the right side during the Renaissance.

> "In every thinkable aspect, the Renaissance represents massive expansion existing in this world, which is driven by the right-hemisphere. It began when works driven by the left hemisphere became integrated as part of such expansion. In every aspect, it is truly so as the body and the spirit considered to be more than an object; as respecting it as an essential part of the entire human; as reinstating senses; as emphasizing the depth of space; as emphasizing moments that are lived; as egoistic senses of an individual as well as an integrated being through moral-emotional solidarity with the society; as a theater for polyphony; as crucial relations between melody and harmony and between the part and the whole; as increased importance of humor and pathos; as fascination of individual cases rather than categorization; as the ability to recognize the opposite, appreciate mixed emotions and combine broadly differing thoughts; as emphasizing the importance of maintaining what needs to be silent; and as placing importance on the translucent world and the world filled with myth and metaphor." (Mcgilchrist: 519–520)

The Renaissance was a transitional period in the history of civilization, during which massive changes occurred to shift the society from feudalism towards capitalism. This period, to be sure, is only remembered as the 'myth' of the distant past beyond the point of no return since it perished completely due to the industrial capitalism diffused by the combination of monetary capital and bureaucracy of absolute monarchy. It is fair to say that depression and schizophrenia on a steady increase nowadays are the price paid for the suppression of the right hemisphere, which was caused by the cumulative dominance of the left hemisphere over the human culture.

> "Before the 18th century, schizophrenia was rare in the U.K. with significant increases of such cases during industrialization. Similar trends were found in other countries including Ireland, Italy and the U.S. However, it is difficult to say that the rise until the end of the 19th century was significant compared to the rise in the first half of the 20th

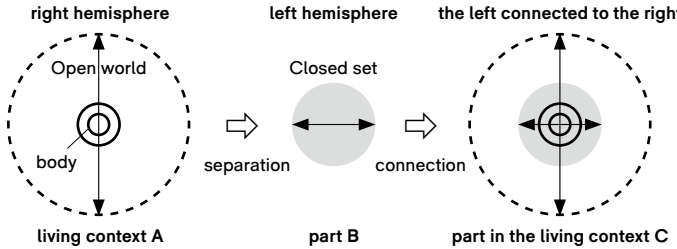
> century. The likelihood of the onset of schizophrenia is twice higher in cities than in rural areas. The evidence shows that individuals at high risk move to cities where increased risk of developing schizophrenia can be found in the city environment. Competition is obviously higher in the city environment…Capitalistic culture…I don't know whether it sounds right to use the word "culture" in this context, but it is a win-or-lose culture." (Mcgilchrist: 637-639)

Based on various research data, Mcgilchrist explains that a multitude of diseases including cold, heart failure, stroke, cancer and depression are less likely to occur in an environment with strong social bonding while mental conditions are more likely to occur for people living in developing countries around the world due to recently spreading urbanization, globalization and destruction of local cultures. However, he is not making an assertion that the left hemisphere has not made any contribution whatsoever to all the achievements made by the human kind. According to Mcgilchrist, the left hemisphere plays a magnificent role as a servant but a very pitiful role as a master. Therefore, each hemisphere of the brain shall be given with appropriate roles to play as a master and a servant respectively (Mcgilchrist: 690).

If this is the case, please take note of the fact that a way of thinking led by the left hemisphere, which has been dominant with the rise of capitalism after suppressing a way of thinking led by the right hemisphere that claimed its dominance during the Renaissance when transition was made from the Middle Ages to the Modern period, is losing its dominant status with the 21st century capitalism at risk. With a possible transitional period to begin for the emergence of a new civilization due to the global capitalism at risk, would it not be possible to once again see the revival of thinking led by the right hemisphere? Of course, such revival does not mean that the left-brained thinking would be completely replaced. Rather, the status of the right-brained thinking would recover from the suppression imposed by the left hemisphere to strike a new balance between the two hemispheres for new changes. How would it be possible to see both of the hemispheres falling into their places once again?

Mcgilchrist describes that corpus callosum plays a complex and paradoxical function that separates two worlds of each

hemisphere and, at the same time, bridges them back together (Mcgilchrist: 359). Children are less dependent on corpus callosum with more dependency on the right hemisphere that develops earlier than the left hemisphere, Over time, however, the functions assumed by corpus callosum and the left hemisphere grow in importance (Mcgilchrist: 358). Furthermore, he argues that, based on the studies conducted by McNeil on body language and studies by Rivet on willingness, our thinking process begins in the right hemisphere then to receive information sent by the left hemisphere and, lastly, to synthesize information held by both hemispheres. In this regard, the right hemisphere serves as the foundation, upon which the world of the left hemisphere is built (Mcgilchrist: 321). Such explanation suggests an approach of assigning roles to each hemisphere while bridging them back together as follows. 'A closed set image' ruled by the left hemisphere and 'an open set world' ruled by the right hemisphere can be both separated and connected by corpus callosum. Such paradoxical connection between the two hemispheres can be visualized through a diagram below.[2]



[2] Separation and connection of two hemispheres by corpus callosum

The 'dotted circle A' represents the status of the world experienced by the right hemisphere. The right hemisphere mediates the lived body, spiritual meaning, experience of emotional resonance and esthetic appraisal, which are mutually inseparable. In the modern capitalistic society, however, the body we own is becoming an object that can be designed through plastic surgery just like a fancy sports car and a controllable object that can be abstracted just like any other objects in the world we live in. This is the typical representation of the body just as the closed set in the 'closed circle B' shows. Mcgilchrist explains that a patient with schizophrenia never fails to

regard oneself as a machine such as a robot or a computer. Just as Merleau–Ponty describes, it mirrors a situation where the body becomes just a matter and walking limbs (Mcgilchrist: 693–695).

In this situation, a person is alienated from own living body and the surrounding world in terms of emotional resonance. The 'quadruple alienation' suggested by Marx refers to alienation from labor means/labor subject, labor process, labor product and, of course, the human nature. And, this is what completes such quadruple alienation. Yet, this paper is not making an argument to revert to the state of nature before the modern times after wiping out the products of capitalistic modernization, such as artificial objects and machines, just as romanticists of the 19th century had argued despite the fact that such situation is riddled with problems. What is at issue here is the fact that the relations between objects/machines and humans/living creatures with the body are reversed just as the relations between both hemispheres are. Thus, a solution can be found by correcting such revered relations between the left and right hemispheres. The part (Circle B) described as the closed set of objects can be reinserted into the living context (Circle A) described as the open living world so as to rediscover objects as parts in the living context (Circle C). In this situation, the body can sense that the world of products comprised of objects or machines that surround the body is merely a closed set that was formed through the history and also realize that it also belongs to the world of a more extensive open set that surrounds the closed set. Just like the concentric (circle C), the embodied mind would be understood as rippling waves of the mind emotionally resonating together with other bodies and living creatures of the world and with the vibration of the open universe.

As such, it is realistically possible to make efforts to switch from the left-brained thinking, which leads to form the habit of making cognitive errors, to a way of thinking with the balanced use of both hemispheres, which leads to form the habit of reasonable recognition, based on the history that shows the possibility of changing the way of using the two hemispheres.[3]

New strategy for Social Solidarity based on the Balanced Thinking through the Use of Both Hemispheres

What is the correlation between balanced thinking using both hemispheres and the strategy for social solidarity that enables coping

Habit of making cognitive errors (left-brained thinking)	→	Habit of reasonable recognition (balanced thinking through the use of both hemispheres)
1. arbitrary reasoning (positivism) 2. selective reasoning (reductionism) 3. individuation (atomized individualism) 4. dichotomous thinking 5. catastrophizing		1. critical reasoning 2. irreducible reasoning 3. social individual as a cooperative–networked being 4. dialectical thinking 5. creative evolution based on co-existence

[3] From cognitive errors caused by the left-brained thinking to the balanced thinking using both hemispheres

with the era of AI? In his book entitled *Humans Are Underrated* (2016), Geoff Colvin describes that what is crucial in the era of AI is not how well you compete against AI as a knowledge worker but how well you utilize AI by facilitating interactions among people as a relation worker (Colvin: 84–85).

> "As machines are entrusted with the mechanical and asocial parts of works, the most crucial part humans play is focused on the social aspect. Humans are basically social beings and thus may not survive, find happiness or become a productive being without social relations…Empathy is a basic element that makes such process possible and serves as a basis for all the important relations…Empathy is more than just feeling the pains of others. It is just as important to recognize all the other emotional states including happiness, rage, interests and confusion…The domain of empathy includes one's thoughts of wishing to help others and to know more about others." (Colvin: 117–118)

The ability of a social being to empathize with others is mainly driven by the function of the right hemisphere of our brain. This function is what clearly separates humans from other animals during the evolutionary process. As the recent brain science studies have attested thus far, this is why humans have evolved to have renal cortex and the body in the greatest proportion. The problem is that the right brain's empathic ability is deteriorating to the extreme extent due to rapid growth under capitalism for the past two centuries. According to a large-scale study conducted on university students studying in the U.S. from 1979 until 2009, the

empathic ability has deteriorated sharply particularly after 2000. Furthermore, the empathic characteristics that have retrogressed since 1979 correspond to worst elements (exploitation and granting qualifications) that signify narcissism, which was shown in a separate study. The deterioration of the empathic ability has been most evident during a booming economy and sustained well into an economic downturn. A number of studies cite the increased use of TV, mobile phone, and online social network services as a contributor to such deterioration (Colvin: 131–132).

The existing capitalistic system has played a key role in losing the empathic ability for the past 200 years, and now such system is nearing its limitations. The left-brained cognitive function would be replaced with the emergence of AI. This paradoxically signifies that an opportunity would present itself to recover the thus-far lost ability of social interactivity governed by the right hemisphere. In short, the empathic ability can finally be recovered. In proportion to the reduction of labor activities governed by the left hemisphere, which was driven by the division of labor placed at the center of the social life, there would be tasks with growing importance including 'ethics of caring for oneself and for others', 'education on cooperation', 'art and politics' and 'creative revolution of the daily life', which are all founded on empathy and social interactions. It is not to say there is no need for the function played by the left hemisphere. Unless social interactions are made in the air or revert to the nature, we still need to learn how to efficiently use and to control the outcomes made by the civilization led by science and technology as well as the products of AI. To this end, the function of the left hemisphere shall be developed continuously in new ways (entirely different from how it has been). The mental habit of valuing the left hemisphere shall be changed to a new mental habit of making the balanced use of both hemispheres.

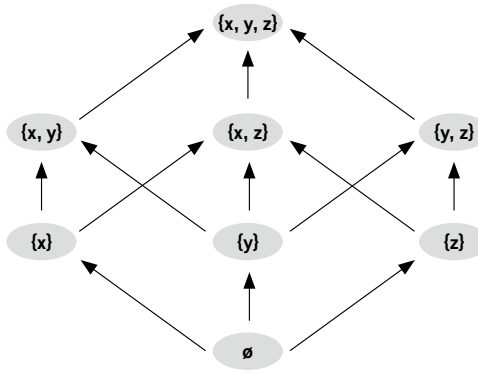
These sketchy considerations provide a framework to discuss why a new strategy for social solidarity is needed in the era of AI. It is fair to say that the left-brained thinking has taken strong roots in a wat that solutions to problems have been suggested and used by identifying causal relations based on the systematic analysis of existing social systems in case of social movements until now. During the process, to be sure, a great number of outcomes were achieved. Yet, it was at the cost of not being able to advance social interactions and empathic skills, which are essential for such social

movements to popularize desired social agenda. Of course, this issue is not limited to social movements but is shared by all the social members. Therefore, the relations between such movements and the public have been deadlocked or in a vicious cycle. As the AI era hits its stride now, the terrain of the left-brained mental habits begins to crack, causing a great spurt of demands for new social interactions and empathy. A vivid eruption of the new demands of the age is exemplified by the enormous flow of the 10 million candle lights that filled the heart of Seoul in 2016 and 2017. Then what is a new social solidarity strategy that meets the demands of this era?

It is necessary to recheck the Red–Green–Purple solidarity strategy last ten years. Instead of making void attempts to find a new strategy, it is more realistic to review solidarity strategies that have been suggested but yet to be implemented. In general, the need or validity of the Red–Green–Purple Solidarity Strategy per se were rarely denied. However, it was rare to see actual efforts being made to apply this strategy to own domain of activities or to expand the link connecting the movements of Red, Green and Purple. In most cases, the thinking habit has remained as reductive and dichotomous. Yet, unless efforts are devoted to tridimensionally identify the link connecting exploitation and repression of labor, pillage and destruction of the nature, and exploitation and repression of women more in depth, which have been forced upon by the capitalistic system, and to apply and practice social interactions driven by empathy at multi levels encompassing family relations, workplace and relations with the nature, there is no means to escape the current situation especially when respective social movement is making strides separately.

The biggest driver behind such strides made by each movement is attributable to the chronic habit of pursuing hierarchy –reductionism, ecology–reductionism and gender–reductionism. Such reductionism does not allow even a single step forward to be made because of the following reason: Every human belongs to a hierarchy but, at the same time, is an ecological being who cannot survive even a single day without multilevel metabolism with the nature while being identified culturally, biologically or sexually. Thus, every human is bound to face the overdetermination of multilayered interactions involving hierarchy, ecology and gender. If a human is assumed to be the assembly of three elements, such as hierarchy,

ecology and gender, then the human is a being not fixated by either of the three elements, but a sum of subsets amounting to 2^3=8. In case of the set signified as S ={x, y, z}, all the subsets of the S set, i.e. the power set of P(S), would become the sum of all the subsets amounting to 8 (2^3=8 subsets). It is shown in the figure below [4] (Wikipedia on the power set).



[4] The network of subsets in the power set

The reason behind such complicated network of a single set comprised of just three elements is not because of the fact that each element of {x, y, z} is converged upon the whole set immediately but because of the fact that there is a midway process of creating relations like {x, y}, {x, z}, and {y, z}. If this network is applied to the {Red – Green – Purple Solidarity} set, there shall be a midway process of creating subsets like {Red – Green}, {Red – Purple}, and {Green – Purple} to achieve the solidarity set of {Red – Green – Purple}.[4] It goes without saying that such interactive efforts shall be expanded beyond the narrow scope of social movements to be more widely accepted by the general public. With a growing number of members, the number of subsets in between would increase indefinitely (The

4 Regarding the midway process of connecting these three subsets, the need and methodology thereof can be verified in the book entitled *Encounter between the Marxist ideology expanding into historical, geographical and ecological science and the feminism of socialism: mapping the Red–Green–Purple Solidarity* written by Kwanghyun Shim (3) (Study of Marxism, Volume 10, Issue 1, 2013, Institute for Social Science at Gyeongsang National University).

maximum number of subsets would be tremendously huge, equaling to 2^n, when the number of members is n). The power erupted from these interactive relations found in mid-level sets would set the course for the arrangement of the existing systems considered to be impregnable Goliath on the surface.

Of course, this might give a rise to concerns over whether the existing social hostility is overlooked by only emphasizing the solidarity itself. However, solidarity and hostility spread out at different levels. Solidarity is the network of co-existing differences required in the ecological domain while hostility is a selective fight against the social structure of a hostile hierarchy. The thus-far observed confusions have been caused by ambiguous distinction between the two. The two camps of 'political science driven by hostility' and 'political science driven by differences' have been at odds in a dichotomous manner. For a meaningful unison of the two, dialectic and philosophy of differences shall be classified theoretically as different types. In short, distinction shall be made to differentiate Hegelian dialectic that dissolves contradiction from Marxist dialectic that lives on the working mechanism of antagonismus, and to differentiate philosophy that justifies differences arising from hierarchic competition from philosophy that promotes differences dependent on the ecological network. When spatial types driven by two differences (hostile/non-hostile differences) and dialectical types are put together, the following matrix with four domains is formed.[5]

Crucial differences come from the confrontation between the combination of 〈A−D〉 and the combination of 〈B−C〉. Opinions within social movements have been divided or conflicted between Marxism and post-Marxism, Marxism and Ecology, and Marxism and feminism mostly due to the presumption that 〈A〉 and 〈D〉 are unrelated or that a forced choice shall be made between the two. On the contrary, the combination 〈A−C〉 is a totalitarian and destructive combination that does not democratically recognize diverse difference (Stalinism and fascism) while the combination 〈B−D〉 is a distorted combination that recognizes diverse differences but takes an indifferent approach to solving social hostility (liberalistic post-modern ecology/partially feminism). On the other hand, capitalism has spread out by taking turns between easing (Keynesian) and enhancing (neoliberalism) of (c) in reality within the liberalistic,

[5] Matrix of dialectical–spatial types (Kwanghyun Sim (4): 439)

Spatial Type of Difference \ Dialectical Type	Dialectic(hostility) of this or that (struggle between opposites)	Dialectic(complementarity) of this and that (interdependence and penetration between opposites)
Structural hostility within social spaces (hierarchical struggle)	(A) 1. Marx's revolutionary selection 2. Benjamin's dialectical switch and revolutionary suspension	(B) 1. Hegel's transcendental dialectic 2. Concealment of hostile hierarchy emphasizing the civil society's diversity
Non-hostile differences within ecological spaces (regional–generational–gender–racial difference)	(C) 1. Acceleration of division and opposition among all differences caused by capitalism 2. Social pluralism = Evolution of competition and survival of the fittest	(D) 1. Marx's human-natural metabolism 2. Benjamin's collective innervation involving the nature – image – the body 3. Network for cooperation and co-existence involving region – labor – ecology – gender – race and evolution thereof

distorted and destructive combination of 〈B – C〉. In case of 〈A – C〉, it corresponds to the cases of Marx and Benjamin who creatively suggested a revolutionary, ecological and democratic combination (Kwanghyun Sim (4): 437 – 441).

In consideration of the situation at present, the Red – Green – Purple Solidarity is nothing less than the demand for realizing the network of A – D conceived by Marx or Benjamin. In order to accurately perceive the structural antagonism (A) produced by class domination, not only analytical left-brained thinking but also comprehensive right-brained thinking is needed to understand coexistence of differences (D). Separating the both sides for thinking is due to the habit that isolate the left from the right brain in thinking. If you should start from the right brain through the left brain to reach balanced thinking between the right and the left brain, however, you'll need a new process of thinking of 'the right brain (D) ⇨ A (the left brain) ⇨ A′ ∈ D'' (balance between the right and the left brain connected by the callosum). From the right-brained viewpoint in which only coexistence of difference can make life possible in the long history of human and natural metabolism, and through the left-brained analysis accurately perceiving the violent hierarchy built by capital and state power, what you need is creative thoughts in which the right and the left brains are balanced and aggressive

actions in order to organize social solidarity broad enough to encompass labor movement, ecological movement, or women's movement, as a network of counter-power and counter-sovereignty that can overcome capital and state power.

Closing

Recently, artificial intelligence technology has started to make remarkable progress not only because big data technology is developing. The evolution of algorithmic technology is also evolving at an alarming pace (and will continue to create special surplus value for the time being). Ray Kurzweil emphasized that the secret of accelerated development of AI technology lies in combining the Pattern Recognition Theory of Mind via reverse engineering of the brain and the Law of Accelerating Returns of technology. This technique is to understand exactly how the human brain works and to build intelligent machines that are superior to individual humans based on these facts. This reverse engineering technique, to put it simple, belongs to an engineering, which greatly amplifies natural phenomena. This is an example of engineering that has created a huge aviation industry using Bernoulli's theorem that explains the pressure drop of air as it passes over a plane than it is flat (Kurzweil: 20).

Kurzweil emphasized that the secret of accelerated development of AI technology lies in combining the Pattern Recognition Theory of Mind via reverse engineering of the brain and the Law of Accelerating Returns of technology. Already, many are communicating in smartphones as well as natural languages and Google's autonomous vehicles have traveled more than 2 million kilometers in the busy city center of California. Thanks to the spatial resolution of brain scanning and data on the brain doubled every year, the auditory cortex, the visual cortex, and the core motor functions of the cerebellum were successfully reverse engineered(Kurzweil: 22–23). A summary of the structures and functions of pattern recognition in the brain identified through this process is as follows:

The network of renal cortex is structured as a grid similar to the well sectioned Manhattan. It is like a well divided two-dimensional road, upon which an elevator goes up and down to create a three-dimensional structure as the third axis. Kurzweil sees the units of the neuron network comprised of a regular hexahedron in width–height–verticality as the 'module for pattern recognition'

(Kurzweil: 129). The function of going up and down vertically refers to interactions between top–down information processing(prediction) and bottom–up information processing (data input) (Kurzweil: 85). The renal cortex with such function is comprised of approximately 500,000 cortical columns that contain 600 pattern recognizers respectively. Each recognizer, in turn, contains about 100 neurons. Accordingly, the renal cortex is home to about 300 million pattern recognizers and around 30 billion neurons in total (Kurzweil: 69). The advancement of AI technologies mimics this module for pattern recognition to create artificial renal cortex.

Techniques to create and connect artificial neocortex will continue to evolve, and individuals can not catch up with this technology. However, human beings are social entities living in networks in varied ways. If you receive training for the balanced right-left-brained thinking habits and actively perform interactions, n numbers of social members are able to create as many as 2^n numbers of networks as a result of interactions between them. This is the power of active social interactions that only human beings can do against the artificial neocortex network. And those interactions have the neurologic roots in the functions of empathy, joint attention, imitation, and contagion, functions that are performed by the insula, located in the temporal lobe within the neocortex of each hemisphere and dense with the spindle neurons, and the mirror neurons, situated on the frontal lobe.

There might be a day when AI is equipped with the functions of the insula and the mirror neurons, but such a day is not likely to come within the next ten years. Because AI technology focuses on enhancing robot technology to replace intellectual or physical work for the time being, it has to concentrate on elaboration of pattern recognition and acceleration of connection, as Kurzweil mentioned. Human beings could activate social interactions just by willingly receiving training for them, while AI so far centers on elaboration of pattern recognition function. On this wide gap can human beings have a hope. If human beings activate their functions of social interactions, it can open the way for them to secure social control over AI. This is why you should make efforts on developing a new social solidarity strategy, a strategy that puts emphasis on non-reductive cooperation and social interactions based on the balanced right-left-brained thinking.

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