

From Superstatistics of Hubs of efforts to Assertions of Values: The Emergence of the Response-receptive Dynamical Economy Theory

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Abstract: This paper aims to study the relationship and connections between the global integration of the logistics systems, effort productivity, and the economy in the context of exergy and superstatistics. Since Superstatistics is responsive to entanglement farming, we propose a new framework for economics, called "Response-Receptive economy." This new economic proposal builds on the outputs of the Cultural Festival States' "hubs of efforts" supported by a globally integrated logistics network. Furthermore, our study suggests the emergence of super-cooperative behaviors that seamlessly assert values for the entanglement of virtues that objectively link the extreme ends of the scale-free power law production functions. The net result is a significant release of exergy that drives the economy. The conceptualization proposed here is applicable in practical settings as illustrated by examples from the generated coherent patterns of the collective organized festival activities of the Japanese and Australian cultural groups.

Keywords: Exergy, Superstatistics, Economy, Logistics, Assertions of Values, Entanglements

1. INTRODUCTION

The prosperity and advancement of human society, in no small extent, is determined by logistics. Logistics is one of the main arteries for the transport of exergy and commodity between the various hubs and nodes within the social systems, helping to increase their connectedness, and as such preventing social systems to reach the state of maximum entropy ending the system's healthy growth. Therefore, the role of logistics and its flow network is pivotal to the rise of the scale-free gradient induced power structures. These power structures ensure the essential human social, cultural and economic happenings occur far from the thermal equilibrium of the environmental fluctuation field (Mojarrabi, 2018).

In this paper, we suggest a new model that describes the economy as an "emergent phenomena" with its power-law scale-free features arising from the outputs of the cultural state's "hubs of efforts" - the working of which enable the entire populations to experience wealth and prosperity. Essential to the idea is a seamless and highly efficient globally integrated logistics system that systematically inform our collective choices and adds values to the worldwide arts and science workshops in a very consistent and coherent way that can objectively be observed and sustained (Mojarrabi, 2018; Lostaglio *et al.*, 2014). Such an economy is not based on the values created by the individuals, companies or communities each running and managing their logistics, supply chain formulations and transport routes (O'Kelly, 2010) in isolation to gain a competitive advantage in capital value and market place. It instead acquires values that convey the totality and unity of efforts of the individuals, communities, companies and all industry sectors across global conformational energy

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landscapes of self-similar virtues and skills.

Recently Mojarrabi (2018) proposed a new approach based on the concepts of superstatistical cells and hubs of efforts of the arts and crafts workshops of the cultural festival states as a mechanism to capture and store exergy for the global integrated logistics operations and cultural happenings. In this approach, the lines of efforts consolidate the self-similar conformational arrangement of the cultural festival states.

For the global integration economy, the totality and superposition process alone is not sufficient to spread the economic gains for the entire population. We need to take one step further to include the dynamic coherence between the virtues and their assertions within the humanitarian, cultural, commercial, logistics and discursive hubs. Wealth is unlike other virtues. It is a self-reinforcing virtue that its capital and assertion in the perception of values can grow outsized -scale-free- independent to the exergy resources of the humanitarian hubs and/or cultural hubs. Still, it can be reasoned that the exergy consumptions and actions of the wealthy, in no small extent, is influenced by the discourses within society. This is a fascinating challenge that needs to address. A scale-free growth of wealth is fundamental to human welfare, cultural wellbeing, and capacity buildings processes that create a flourishing and sustainable human future. How can we sustain an inclusive scale-free economic growth for entire populations and generations without compromising the natural and cultural exergy resources?

One standard approach is to build suitable production and/or utility functions that can coordinate and optimize the social conditions for the economic and human activities such as labor productivity, delicate balancing of the supply demands and socio-environmental-commercial investment, carefully assuming the balancing of all the costs and price benefits for the consumers happily chosen lifestyles (Domingos *et al.*, 2010; Kimball and Willis, 2006).

The other approach is via the entanglement and coherent processes between the national economy and governing regulating policies in a way that aligns with the direction of the creative and entrepreneurial elements of the society. In this way, it is possible to reconcile economic productivity (Wagner, 2012; Podemska-Mikluch and Wagner, 2012) with the conservation of the natural resources and protection of the socio and cultural ecosystem services (Fish *et al.*, 2016). These two approaches tend to decouple the national economic development functions from processes that aim to strengthen the coherence whole essential for international collective action. Also, the competitive nature of the economy is often a hard influx of tradeoffs at the microscopic, mesoscopic and macroscopic levels. At best, it is challenging for every person, every region and every country to peddle continuously to choose the more sustainable channels to produce and distribute products. At worst, there is always the possibility that a sharp transition of the socio-economic and environmental fluctuation field will cause structural breaks within the competitive market.

Here, we offer another alternative. We aim to develop a purely cooperative conceptual framework that cultivates and enhance wealth for the entire world's market in an advancing direction marked by the clear time scale gradient induced flow entities. We propose to build an economic model based on the exergy-time entanglements processes that emerge from the totality and unity of the hubs of efforts under the specific condition of the thermodynamics non-equilibrium system. There are two recent studies that suggest the totality of efforts of the arts and craft workshops of the cultural festival states (Mojarrabi, 2018) and Labor productivity distributions are found to obey power law distribution with superstatistics features in stark contrast to the mainstream equilibrium theories (Aoyama, 2008). In a previous paper, Mojarrabi (2018) further suggested that information about the non-equilibrium cultural states must be encoded somewhere in the logistics chains. Here, we

suggest, this information encodes as the entanglement of the assorted virtues that determine the productivity of the superstatistical cells or "hubs of effort." Ourabah (2017) has recently suggested that superstatistical systems support entanglement processes at a certain degree of coherence even at the presence of larger than expected temperatures. Thereby, we suggest that a similar entanglement processes in the economy are possible when sufficiently enhanced coherence time between the hubs of efforts reaches. In our approach, the coherence time is clocked to the world calendar access points and processed by the exergy units of the humanitarian hubs (Mojarrabi *et al.*, 2011). By access points, we mean the self-similar, build momentum and harvest festivals (Mojarrabi, 2018). The coherence time is the time where the total outputs from the hubs of efforts are all in phase with the exponent constant of the power law that has deduced from the assertion of values of the humanitarian hubs. This power law is a hallmark of an emergence phenomenon- the "entanglement of virtues via the assertion of values".

For global integration of the economy, the model has three critical planning stages: the totality of efforts, the production extraction function of cultural coherence and virtue's entanglement farming. These three steps-processes or stages significantly advance the economic outlook for the entire planet without depleting the social capital exergy resources of the planet or fueling the competitive contexts for nation states. Here we propose entanglement can be a new source of exergy for the human economic and social activities and happenings that can benefit all countries and regions.

In the first two stages, we present mathematical ideas about the global integration of logistics and deduce the superstatistical nature of the hubs of effort. In the third entanglement stage, we investigate the relationship between the hubs of efforts and response-receptive productive functions and how this results in the cultivation, consolidation, and assertion of the entanglement of virtues essential for the development an exergy resource wise cooperative economy.

The format of this paper is as follows: Section 2 describes the concept of the cultural festival thermodynamic states and its relationship to the exergy and logistics network. In Section 3 we introduce the thermodynamics concepts and terminology that will be used throughout the paper. Section 4 introduces the mathematics behind economic modeling. Section 5 discusses our main findings and give the practical examples of the model in different cultural settings, and finally, in section 6 we present our conclusions.

2. CULTURAL FESTIVAL STATES AND THEIR RELATION TO EXERGY

There are two thermodynamic concepts associated with our approach that stands out because of their importance for the logistics network and Economy. One is exergy, and the other one is culture.

2.1 Exergy

Exergy has been applied in various engineering and social integration systems and analysis. Gilbert *et al.* (2016) considered it as the system level attributes essential for the optimal development and integration of the complex engineering systems. EASTS IRG SCAFT (2013) used exergy concepts to design and plan for the seamless global integration of the urban and transport systems within the framework of superstatistics. Fukuda (2003) considered it as a measure of critical economic values. Furthermore, included in his consideration is the suggestion that exergy produced by labor efforts and natural resources

has a better exchange value for the economy than the conventional economic of value production based on the raw materials. Jawad *et al.*, (2018) considered the exergy analysis as the basis in which one can improve the supply chain and logistics performance. Here, in this paper, we add the exergy consideration of the measured economic values of the cultural hubs of efforts.

We define social capital exergy as a measured quality of energy that is available for social community works and lines of efforts. i.e., the capacity to do useful work through social interactions (Mojarrabi *et al.*, 2011). There are two cooperative sources of exergy available for social networks. The first exergy source originates from the clear time scale gradient induced flow entities of the civilization states. This exergy needs to process within the humanitarian hubs exergy processing units of the humanitarian hubs. The other source of exergy is the auxiliary exergy sources from the cultural festival states. These sources of exergy are the result of the sum -total of efforts and lines of actions of thousands or even millions of individual artists, craftsman, architects, discourse builders and keepers, educators and linguistics (Mojarrabi, 2018).

2.2 Cultural festival states

A cultural Festival state (EASTS IREG SCAFT, 2013) refers to the total sum of self-similar processes and effort mechanisms such as capacity building and conformational selections of virtues and skillsets to capture creative sparks, preserve exergy and therefore prolong the coherent whole of the communities. A cultural festival state is a non-equilibrium system with a number of thermodynamic properties. A full discussion of all the characteristics of the cultural festival states is beyond the scope of this paper and have discussed elsewhere (Mojarrabi, 2018).

What is relevant is that all cultural festival states have certain thresholds where critical changes occur in their conformational arrangements of virtues. As a result, their exergy production outlooks and logistics performances also change accordingly.

2.3 Logistics Network

Logistic networks are everywhere and having a significant impact on economic growth (Sezer, and Abasiz, 2017). Moreover, since supply chain and logistics network arteries deeply embedded with the value creation chain and virtue assertions throughout different cultures and industries, it is important to note that logistics integration cannot happen without the inclusion of cultural festival states. Indeed, Neilson (2010) considers from the flows of cultures to the logistics network comes about the production of new labor activities that build new connections between social domains: public, private, work, logistics, governance, political, economics, natural and cultural.

From the view of the superstatistics model of total efforts, choosing a more participatory market and destination is strongly related to the conformational arrangements of the virtues across time and place. In fact, cultural states choice of the self-similar arrangements (and contributions to unity in diversity) helps to provide the optimal exergy balance equations between the production and distribution points. Also, how the supply chain recognizes the effort values of arts and crafts in a given time and space and how these values synchronize with the spread of creative cultural modes, the artistic expressions, and entrepreneurship is vital for job creation and economic development. (Mojarrabi, 2009, 2018).

3. CONCEPTS AND TERMINOLOGY

3.1 Effort

Efforts have exergy values. They have spiritual, cultural, environmental and economic benefits that social systems require for their upward mobility and advancement. As all these aspects of efforts are interrelated, any changes in conformation arrangements of efforts and their spiritual and cultural underpinnings will affect the underlying channels of cultural transmissions that support the emergence of a united and prospering world.

Mojarrabi (2018) suggests three specific levels of cultural state efforts with each level having their time slices, namely the "Line," "Ray" and "Segment" levels: Line of effort is a continuous effort with no beginning and no end. It encompasses all the generations and heritages – from the past into the future. The rays of effort are ongoing, systematic efforts that its dynamics start at a given calendar access point often associated with a self-similar or a build-momentum festival but continues indefinitely into the future. Rays of Efforts are usually enacting or re-enacting the conformation arrangements that advance new frontiers of learning. Examples of the rays of efforts are entrepreneurship and the emergence of new works of arts and crafts. Thirdly, there are the efforts segmented from beginning to end. Examples of these are the local arts, science, and craft workshop activity (within a cluster) when only successful collective patterns of behavior and sum-total of interaction codes will add into the growth cycles of civilization states calendars. Selecting the right access point for the individual initiative (do-it-yourself) and collective action (do-it-together) is a vital optimization step in effort keeping and exergy flow economy. The way segments superimposed into rays or lines of efforts is a crucial optimization process.

In practice, there is not a significant difference between the sum-total of the segment efforts (segments stitched together) and the totality of lines and ray efforts as viewed from the exergy of the response receptive efforts over the entire calendar series. However, the total lines of efforts and rays of effort can lead to the higher dimensions of similitudes and their entanglement consolidation compared to the totality of the segmented efforts corresponding to each harvesting cycles of the virtue entanglement productions of the world's civilization states.

3.2 The Self-Similar Virtues

The self-similar virtues are the attributes associated with gradient induced flow entities. A single self-similar virtue can generate more than one alternative conformation arrangements, codes of interaction, structure related clustering of the similitudes and learned traits in response to changes in the social environment and the socioeconomic needs of time and place. Self-similar virtues are different from skillsets and competency-based standards. Self-similar virtues are the quanta of the exergy determining the quality of interactions. The maximum production of exergy through lines of efforts of arts, crafts, and cultural groups is directly related to the number of virtues that the calendar clock ticks and consolidated by the lines of efforts. The reason is that the vast majority of interactions in the cultural festival states are mediated by arts, crafts and science workshops often specified by the nature of their effort, relative to the similitude landscapes of the time.

An important concept is the assertions of similitudes (or values) relative to different cultural settings. The assertion of values is a relationship of moderation where each culture considers what virtues need to contribute and how it can consolidate the totality of efforts with respects to the coherence whole within the civilization states.

In the assertion of values, all virtues are equivalent in lines of efforts, each illuminating the others. In assertions, each virtue becomes a distributor of exergy at different stages of the fractal like supply chain networks associated with the civilization and cultural festival states. In our modeling, assertions consolidate by super cooperative elements of the society- the bright and noble characters that assert the standards for interactions and make it easier for the cultural affinity between the interacting workshops. These cooperative elements help to identify all the lines of efforts and their virtues associated with.

In our economic model, the intellectual property rights reside within the moderating influence of the assertion of values.

3.3 Calendar Access Points

The three main access points of the world calendars are “self-similar” and “build-momentum” and “harvest festivals.” Harvest festivals also can function as an access point under specific thermodynamic conditions that are related to productivity extracted from farming and agriculture industries. The total efforts of the agricultural and food industry have different kind of superstatistics that is not yet fully understood. This is because food and nutrition is the prime exergy source to sustain human activities and festival happenings, during which we add all the cultural festival states efforts that are essential for the carrying the heavy loads of an ever-advancing civilization. Our model cannot reach that deep level of historical civilization and thermal extraction primacy to include all the harvest festivals outputs from the time series continuum considering the elevated temperature of the fluctuation field and periods of often strong social turbulence during the historical times.

The self-similar festivals are festivals celebrating the birth or declaration of Clear Time Scale GIF entities. The build momentum festivals are festivals with capacity building and response-receptivity capability that greatly support the exergy distribution and flow processes. The world calendar’s access points function as the main global time portals for the thermal extraction work machine. For the sake of simplicity, in this paper, we will focus on the build momentum festivals. Examples of the build momentum festivals include the 19-day festivals of the prime number Badi calendar. However, our model works with all other world calendars.

3.4 Response-Receptivity

The essential foundation of the new world economy is “Response-receptivity.” Response-receptivity enables a cultural festival state to analyses its discourse possibilities and reads its immediate cultural reality, logistics performance and economic conditions concerning the segments, rays, and lines of efforts.

Response-receptivity is a desirable logistics operation (as well as social practice) because it significantly increases the ability to scale the logistic network without considerably impacting the contribution of each culture to global development and growth. It stops over-regulating of the economy as allows communities to map the nodal elements and processes that waste and deplete exergy and those elements and mechanisms that contribute to the net production and storage of exergy. Response-receptivity allows us for the system to quickly scale and organize all its resources to achieve immediate realities with regards to the quality of interactions.

In the heart of a response-receptivity lies consultation. Therefore, cultural festival states are good candidates for the regulation of the global integrated logistics systems. For the

global integration of the economy, we need the development of a more precise semantic global communication standard.

3.5 Entanglement

Entanglement is a puzzling concept in quantum mechanics having both an informative assertive discourse value and an exergic resource system attributes (Carmelo *et al.*, 2007) and (Dalla Chiara *et al.*, 2010). There is a natural semantic language of farming, harvesting, and nutrition to it (Martin-Martinez *et al.*, 2013). The farming blocks of the virtue entanglement farms are the human virtues in their assertions. So, the harvesting process from the entanglement of virtues consolidated by the lines of action and hubs of efforts can naturally bring large healthy doses of exergy for the growth and development. Like a farmer, the roles that super cooperators play are vital in the cultivation and harvesting of the entangled virtues or the cultural artifacts -nutritious fruits within the ecosystem of cultural festival states.

A well-harvested entanglement of virtues brings substantial and actual improvement in social and economic development that can be objectively measured.

Equivalently, entanglement can be considered as a whole coherence phenomenon where the exergy usage and maintenance costs for the system order dip to a minimum (Bény *et al.*, 2018).

Here, we propose for the first time that the entanglement of virtues makes it possible to develop a globally optimized and sustained economic system. One of the advantages of such economy is its inherent quality of moderation, where the wealth gap between the two extreme ends of the power law distributions minimized so that everyone can experience and practice the virtue of wealth. The other advantage is the universal participation of the populations in the lines of efforts due to the coherence relationship between the virtues in particular between the virtues of knowledge and wealth and their asserted faculties. The third advantage of an economy based on the solution offered by the entanglement of the virtues is the secure supply chains. This ensures assertions of values negotiated by the hubs of efforts are free from supplies with motives that alter the global economic supports of virtues.

4. GLOBAL INTEGRATED LOGISTICS NETWORKS

Here we develop the superstatistical modeling for the global integration of logistics that serves as the cornerstone for our response-receptive economic model. The model is based on the work in the following papers and reports: (Beck 2011), Bogaehov *et al.* (2017), Eckmann, *et al.* (2004), Metzner *et al.* (2015) Mojarrabi (2009) and Mojarrabi *et al.* (2009, 2011) and EASTS IRG SCAFT (2013).

4.1 Superstatistical Modeling

We consider a cultural state as a non-equilibrium power state, where its dynamics of collective efforts (the hubs of efforts) towards creating the ideal image of clear time-scale gradient flow entities derive its evolution within the time series (figure 1).

Consider a cluster of the Superstatistical cells that are consist of many local arts, crafts and science workshops. These local workshops exhibit fluctuations of the intensive parameter β (the inverse temperature T). Superstatistics technique allows us to superimpose the local dynamics of the workshop, each with its intensive parameter and then observe the average macroscopic behavior of the system over the large-scale fluctuation β according to

some probability density (E). This is possible if there is sufficient time scale separation between the two dynamics.

Here, we consider temperature fluctuation to be the results of parameters such as effort fatigue and lethargy rates, the number of partially successful and unsuccessful segments that narrows total effort outlooks for the cluster, the segment efforts that are detrimental to the broader community, the effort scaling misregulation at the calendar access points. The temperature fluctuation varies between different instances of time for different cultures. This is because different cultural groups and workshops at various times have different cultural and economic production rates.

We assume there is an absence of correlation between different arts, craft and science workshops at very short timescales. We also ignore the overlapping segments. So, the model approximates the real scenario, but it explains somewhat surprisingly some crucial characteristics of the cultural festival states and its related logistic network. Also, within each time 19-day time cycle there is a significant number of effort learning and keeping units (arts, crafts, science workshops, cultural groups, etc.) each having many individual artists, craftsmen, scholars, linguistics, etc.

The calendar time slice has units of hours, days, weeks, months, years and cycles, millennium, etc. We decided to choose a prime number calendar called Badi calendar to slice the time although our model works with all other world calendars. The time scale separation helps to optimize logistics by optimizing the time interval between the workshop incurring costs and benefits to the community. It will also increase the margin of probability in the superstatistical terms. These are crucial scaling parameters for the global extension of the logistics systems over all time scales.

In the center of a cluster lies the Hubs of Efforts (figure 1). The solid arrow line is the journey of the artists, craftsman and discourse builders moving through different workshops with different temperatures T_1 and T_2 ,... T_n , to experience the self-similar elements for creating the cultural works in the image of his/ her clear time-scale GIF entity. The dashed line is the measured sustainability of the exergy portion transfer flow for the workshops.

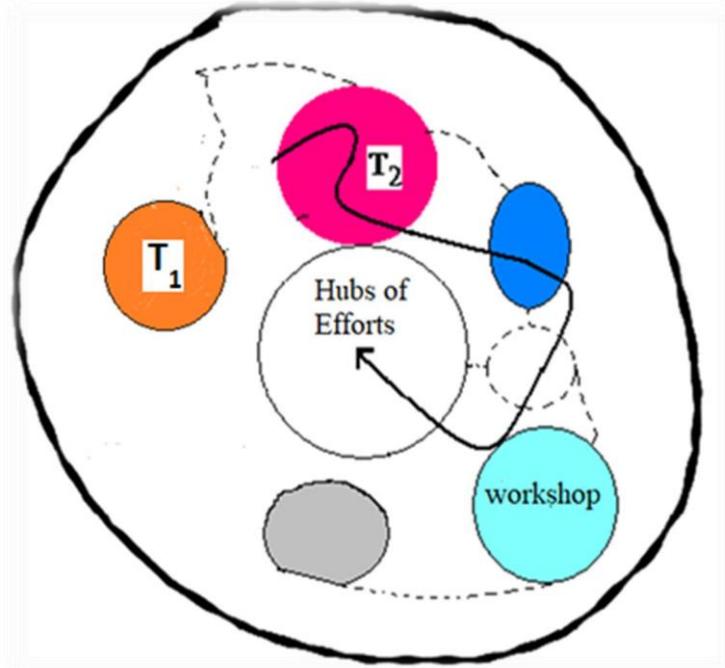


Figure 1. The Dynamics of a Cluster as a Superstatistical Cell with central Hubs of Efforts as a source within a Logistics Network.

The response-receptive interactions within the 19-day festival segment efforts into suitable length (number of cycles of growth within the cluster that effort is steady and continuous) and width (the number of participants in the efforts) in direct proportion to the corresponding increase in the capacity of the effort keeping and learning units (Arts, crafts and science workshops, cultural groups, etc).

4.2 Mathematical Modeling

From superstatistical formulism, (E) is:

$$\pi(E) = \int_0^\infty \pi(E_i, \beta) d\beta \quad (1)$$

Where,

(E) : The total energy distribution over all workshops. i.e., the probability density function over the workshops

(E_i, β) : is the marginal probability.

E_i : the energy of each art, craft or science workshop

The energy E is the total energy and has two components:

$$E = E_{exergy} + E_{Anergy} \quad (2)$$

Where,

E : Total Energy

E_{exergy} : Exergy. It is the portion of energy that can be transferred into useful work including cultural efforts. In equilibrium, the exergy value is equal to zero.

E_{Anergy} : It is the portion of energy that cannot be converted into work even with

efforts.

For each workshop, the thermodynamic equilibrium has been reached between the Exergy and Anergy components of the energy. This equilibrium has been achieved for different values of the fluctuation parameter β for different workshops.

Since the law of total probability connects marginal probability (E_i, β) to conditional probability:

$$(E_i, \beta) = \pi(\beta)\pi(E_i | \beta) \quad (3)$$

Where,

(β) : distribution of the intensive parameter describing the fluctuation field.

$(E_i | \beta)$: the Conditional probability of having a successful transfer of exergy via exergy efficient virtue channels of the calendar access points under the given conditions of the fluctuation field.

Then (E) of the total effort is given by:

$$\pi(E) = \int_0^\infty \pi(E_i | \beta) d\beta \quad (4)$$

So the normalized energy distribution is given by:

$$(E) = \int_0^\infty \pi(\beta) \frac{1}{z(\beta)} e^{-\beta E} d\beta \quad (5)$$

Where,

(β) : distribution of parameter β overall local workshops

(β) : Normalization factor for specific β for each workshop

$e^{-\beta E}$: Boltzmann factor

Now we assumed that workshops are independent of each other at short time scales, then we can propose the selection of the virtues in each workshop is a random process.

Therefore, the length of each effort segment depends on the choice of virtue sets and the skillsets. Consequently, we can approximate (E) with $\pi(l)$

$$(l) = \int_0^\infty \pi(\beta) \frac{1}{z(\beta)} e^{-\beta l} d\beta \quad (6)$$

Now the parameter β gets the form $\frac{n}{n_{ideal}}$

n : The actual number of successful effort or the lines of efforts, we have the superposition of the segments characterized by some local averages that are inversely proportional to the average n and directly proportional to the successful response-receptive operations that are in turn affected by the degree of the fluctuation field. This is a basic thermodynamic property of the superstatistical model as it affects logistics and economic turnover as well as maintenance costs of the efforts.

n_{ideal} : the ideal number of the efforts that is passed through the access points.

Therefore,

$$\pi(l) = \int_0^\infty \pi\left(\frac{n}{n_{ideal}}\right) \frac{n}{n_{ideal}} e^{-\left(\frac{n}{n_{ideal}}\right)E_l} dn \quad (7)$$

E_l : the energy relates to the segmented effort

The sum-total (l) can amount to a resource.

What is essential, however, is that our economic approach proves the existence of an

auxiliary exergy coherence source for the cultural festival states. However, this coherence source is locked in segmented lumps. It is expected that the unlocking process to happen within the cluster nodes through the mediation power of the global framework for action (Universal House of Justice, 2001). This whole process of unlocking the coherence would allow more volumes to pass through the logistics channels and reducing the overall maintenance costs for the workshops. This will even push workshops further away from thermodynamic equilibrium.

4.3 Relationship between Logistics and Economy

We suggest a new kind of global economy where the totality of lines of efforts would lead to the enhancement of the coherence time for the production function based on the portal mechanism of the world's calendar access points. This economy works because the exergy resources flowing through the logistics networks can dynamically scale with the cohesion levels of the self-similarity of the global integrated cultural festival states. Thus, effort productivity extracted from coherence levels act like a thermal extracting machine (Korzekwa *et al.*, 2016). It can be redirected along more effective shared logistics channels to accelerate the harvesting of the virtue entanglement processes.

In almost, to a similar manner to the Cobb-Douglas production function (1928) but with different specifications (Filipe and Adam, 2005; Domingos *et al.*, 2010), we start by the equation of the production throughout a year $P(t)$ for the total lines of effort as:

$$P(t) = cK^{\alpha}L^{\beta}M^{\gamma}E^{\delta} \quad (8)$$

where,

- K : the asserted value of a given effort relative to the total line of effort. It usually asserted over a cycle interval of one year by response-receptive operations.
- t : is the time taken for the segment extensions of the line of effort relative to the calendar access points.
- L : is the continuity of the effort within a line of effort.
- M : the width of the segmented effort that includes the input capital.
- E : Exergy input as a function of time for the workshop lines of effort.
- c : is a proportionally constant. It is a measure of segment efficiency as related

to

the conformational arrangement of virtues.

- $\alpha, \gamma, \beta,$ and δ : are the power exponent parameters. The total sum of $\alpha, \gamma, \beta,$ and δ are related to the calendar access points. For the prime number Badi calendar, we estimated it to be about 0.7. It is calculated from the total time length of calendar access points relative to typical patterns of scheduling response within the logistics superstatistical cell.

We estimated this value from a relatively small sampling pool of eight build-momentum festivals in the year 2018 collected in the north sector of the Morton bay cluster. We recorded the frequency of the response-receptive operations within the access points as well as the total number of volunteering efforts. The volunteering efforts were related to some regular practices such as engagement in learning networks, non-profits and community services. The factor L considers the continuity of the volunteer labor and factor E is the exergy of the social capital. Exergy E was found from the diversity of the activities and the number of virtues that calendar clock ticks. The exponent of the power related to the width (γ) was ignored due to the small sample size and the fact there were only a handful of exergy

streams within the small sampled local community. For the K values, we used the number of regular practices of the core activities within the Queensland clusters published by the Regional Bahai Council to assert values. In principle, the more successful scheduled regular cell responses, the more homogenous and sustainable streams of exergy within the logistics and distribution channels within the community. i.e., we did not consider the abrupt changes in the velocity of the streams due to the surge in activities by the same regular number of volunteers. However, we included the service activities of the new volunteers into our calculations, even though they may abruptly change the velocity of exergy streams. The reason is the new volunteers often receives a waterfall of exergy from the world calendars access points that will cause much faster circulation flow of exergy within the supply chain networks that supply exergy and learning to the community thus affecting the power exponents in the real terms. This is why, we believe our estimate of the combined power exponents is a reasonable estimate. Under this assumption, the total sum of the exponents in equation 8 found from the ratio of the total length of access calendar times compared to the regular scheduling volunteering activities including those of new volunteers.

Since the estimated ratio 0.7 is less than one, it means the successful response-receptive operations being translated into an actual effort only some of the time. Evidently, it is likely our estimates of the ratio could vary substantially between different access points of the world calendars or between samples from different clusters in different geographic units of the planet. An important future research is to study the possibility and extents of these variations in more details with much larger pool of data.

Equation (8) leads to the conclusion that the economy favors the unity of efforts to channel the asserted virtues and skills for the increase in productivity. The spanned exponent 0.7 spans all the power exponents of the lines of efforts. Its value is surprisingly close to the power exponent of the economic output of the postwar American economy (a period of a real dream, innovation, and cooperation) that leads to the emergence of the United States as an economic superpower (Wikipedia, Cobb-Douglas production Function).

This total power exponent estimate of 0.7 is our working hypothesis. We have not included the access points for the harvest festivals (the volume passage of the agricultural sector over the time portals of the harvest festivals) and all those segmented efforts that last less than one Badi months of 19 days in our calculations. Our model works with other world calendars, getting similar results over more extended periods. Besides, we also have not included the exergy extracted from the civilization states exergy reservoir at the level of cluster nodes. As a result, our growth prediction about the economy may be an oversimplification.

Another point is that the growth stages of the economy are not shaped by the technology alone but also by the virtue sets of the cultural states consolidated in the lines of effort. Otherwise, the assorted effort parameter k is devoid of its necessary virtues that consolidates the final value for the product even though the effort itself may have the needed skill set. We assumed when with a large number of arts and crafts workshops all working together, to capture creative sparks, consumers would choose those products that enhance the experience of the coherence whole compared to the labors dedicated to increasing a competitive edge.

5. RESPONSE-RECEPTIVE ECONOMY

In section 4, we developed the first and second stage of the response-receptive economic model and found that the productivity output from the hubs of effort has a superstatistical

nature with similar features to a thermal extraction machine where work and productivity can be extracted from coherence whole. Aoyama, *et al.*, (2009), confirmed the existence of the superstatistical nature of labor productivity across all sectors in Japan. Here, we used utterly different superstatistics and reached a similar conclusion. The reason may be since the backbone of both approaches has a fundamental relationship to the logistics network, and the nature of the interaction between the Japanese sectors and labors are a more culturally cooperative than competitive. The thermodynamic extraction machine of total effort is capable of performing for storage and distribution of work through the hubs of efforts and response-receptive operations.

The next stage is how to use this machine in a systematic and universally applicable economical way that can be used continuously. Here we suggest the entanglement of virtues as a sustainable way to systematically operate and pump the entire economic cycles of growth as referenced with the resources of the world calendar access points.

5.1 The Third stage of the Model Development

For our new response-receptive inspired economy, we need to find an objective physical mechanism that systematically asserts values to all lines of efforts. A response-receptive economy is the space of interactions that involve the virtue of wealth. The path to cultivating wealth for all people is through the emergence phenomena where collective actions within and between the hubs of efforts can give rise to entanglement under specific conditions. These conditions are: firstly, the exergy of efforts considered as a currency for the economy at the system level, secondly the power law exponent indicates the optimum diversity of the effort lines as referenced to the world calendars' access points, and thirdly, the necessary cultural diversity remains for the enhanced periods of the coherence time.

5.2 Economy Case Studies

There are three cases in our model (figure 2) depending on how the economy behaves and whether it departs or not from the path conditions as mentioned earlier.

- **Case a)** The overshooting Economy: The Economy departs from the targeted scaling value of power exponent, and the tweaking or tuning process of the exponents began independently of the world's calendars access points volume outputs. As a result, there is only a finite number of access points after which the wealth gaps start to increase. The emergence phenomena related to the entanglement cultivation fails and the economy possibly will shift into the competitive positions (Figure 2 case a).
- **Case b)** The entangled economy: This is the case when the power exponent reaches its target value at the right calendar access point and population experience emergence phenomena due to the efforts of super cooperators (Li and Yong, 2014) all working shoulder to shoulder-that mirrors the civilization states cultivated entangled states of self-similarities. The economy shifts in a coherence way such that all possible outcomes in effort lines and logistics are simultaneously possible and entanglement is guaranteed. In this case, the entanglement will now act as a third exergy resource to support the scale-free growth features of the wealth (Figure 2 case b).

So the total useful energy available in the system in this case is:

$$E_T = E_H + E_L + E_\varepsilon \quad (9)$$

Where,

E_T : is the total Exergy

E_H : is the Humanitarian hubs of the civilization states

E_L : is the exergy from the hubs of efforts of the cultural festival states

E_ε : is the Entanglement Exergy

E_ε is depended on:

$$E_\varepsilon = \frac{1}{2} N \varphi d \Delta t \quad (10)$$

Where,

N : is the number of super cooperators

φ : is the degree of coherence between the hubs of efforts that can sustain the shared effort at any given calendar access point

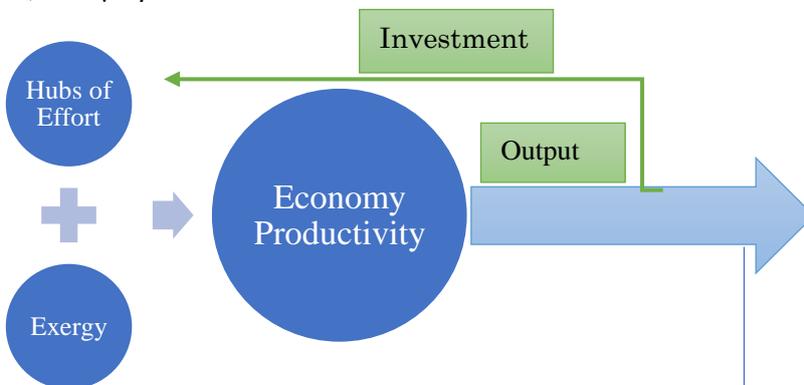
d : the energy needed for a successful coherence transfer through logistics chains

Δt : is the length of the correlated time interval between the harvesting entanglements

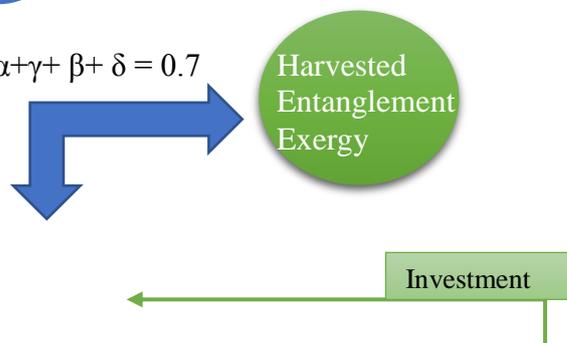
In this relation, a line of effort that consolidates the virtues between pairs of the hubs of effort counts as an entanglement. Also, E_ε is strongly depended on the number super cooperators N. Therefore, the verification process of the entanglement of the virtues concerning the economy is best to be dealt with the civilization states rather than the parliament of the cultural festival states (Mojarrabi, 2018). The key to this shift is the emergence of super cooperatives within the economic networks of arts and crafts workshops. As a result, our model suggests caution with any attempt to group virtues in distinct classes based merely on the piecewise stochastic distribution of wealth without the super coupling influences of super cooperators. The factor $\frac{1}{2}$ is due to the fact there are incoming and outgoing coherence transfer or swapping coherent waves between hubs of efforts (assuming sufficient coherence time has been reached between the hubs).

- **Case c)** The underperforming economy: In this case, before the power exponent reaches its original run to the desired value, it will be cut short by regulation or other causes. The economy will have much difficulty to grow and sustained. No Emergence to entanglement is possible (figure 2 case c).

a) $\alpha + \gamma + \beta + \delta > 0.7$



b) $\alpha + \gamma + \beta + \delta = 0.7$



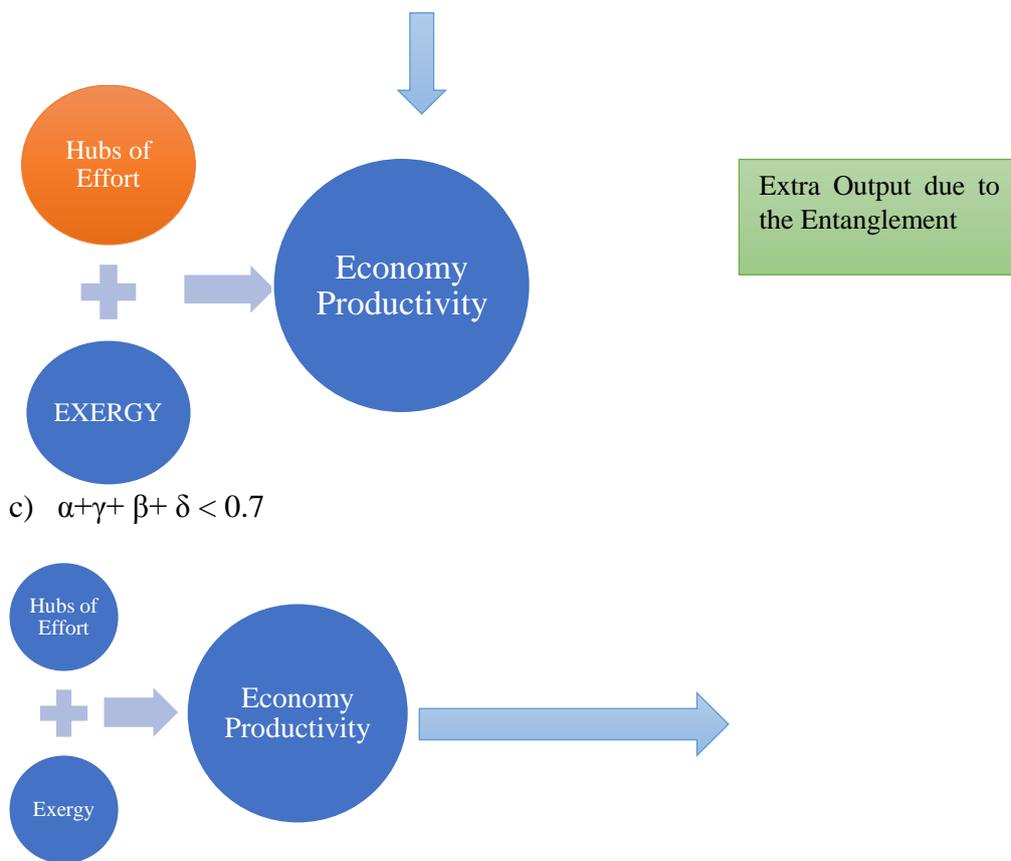


Figure 2. The Possible Cases of Productivity under a Response-receptive Economy. The agriculture sector is not included.

5.3 How an economy based on entanglement works?

The steady exergy flow through the global logistics network is conducive to economic growth. A seamless logistics functioning network is the main frame upon which a globally integrated economy can be built (Lehwacher, 2016).

In the response-receptive model, an economy in the entanglement state of virtues is the ultimate state of optimized wealth distribution through a highly performing integrated logistics platform. So far, we have shown that in theory, this is possible. The reason for the optimism is that in the first phase of the response-receptive economy, capital wealth can be distributed via a scale-free run (up to the exponent of the power law distribution). After that the system transfer into a new and well-planned coherence state. This state heralds the onset of the entanglement phase of the economy, where the assertions of values can be used to cultivate and harvest the entanglement of virtues such as knowledge and wealth. In this state, any incremental increases in the capital within the supply chain will be re-distributed in a way that supports universal participation (figure 2 case b) of wealth experience and prosperity. In the case of entangled phase b, the coherence between different lines of efforts remains stable even with the long-range trends in the global fluctuation fields due to the presence of super cooperators.

Different conformational arrangements of the virtues will lead to different measures in the experiences of coherence whole and prosperity of all. For example, a culture having the

cleanliness, tidying up and diligence as its cores of the norms of behavior have different growth rates compared to the culture with virtues of dominion, glory, and sovereignty as its asserted values. In the entanglement stage, all community experiences of the virtues are simultaneously possible and globally asserted.

This is an innovative approach changing the paradigm for global economic ways of evolution being more in accord with the global framework for action of the civilization states. There is an inherent virtue dimension embodied in the evolution of the economy. The main engine of the evolved economy is the total exergy within the system including the exergy pumped from the response-receptive phases of the assertion of values and entanglements phases. These response-receptive cyclic wave activities ensure the virtues and skills of the participants in a given line of effort are asserted, and diversity in capacity between the workshops are respected and valued.

For a community to financially prevail on a line of effort, a house of finance enables the line of credit when a successful entanglement harvesting process planned or started and verified by the civilization states' exergy processing units.

In the next section, we look into two cultural practices from two different cultural festival states that show, the many different ways civilization states cultivate and disclose their shared vision of cooperation through their combined assertions of values. Evidently, in this shared vision competition is considered as a limiting factor to the growth of virtues.

5.4 Conceptual Examples

The examples of the “Japanese Coherence Festival” and the “Australia Dreaming Manifest” illustrate how the self-similar process from two different cultures give rise to the totality of efforts and how the emergent phenomenon of entanglement relates to the outputs from the two hubs of efforts. The first step begins when a cultural festival state cultivates a global discourse for its actions that is constituted in perceptions of the coherence whole. A truly global approach may even require the global growth of the line of effort. i.e., to develop projects that invite other cultures to join their efforts. This is an essential step as it will help to increase the self-similar dimensions of its virtue conformational settings that are fundamental to the creative outputs of its arts and crafts workshops. Secondly, creating a global reach, often means a culture must tap into an existing narrative that includes the elements of the global framework for action. Both the Japanese coherence festival and Australian dreaming manifest do this.

I. Coherence Festival

This festival was held in 2015 in the Egret cultural center located near Himeji Castle, Hyogo, Japan. It involved several cultural groups from two neighboring clusters- Okayama (Bizen-Bingo) and Himeji-Kakogawa clusters. The festival organized by the Bahai study group and supported financially by the Himeji City Council. The heart of the coherence festival was the discursive elements of the Wa (the state of the dynamic coherence within the Japanese cultural festival state) and lines of effort such as Sekku Mikoshi festival, the tea ceremony and Haiku poetry.

Here we consider the Sekku Mikoshi festival in Kasai City. The Sekku festival provides an excellent discourse that conveys the spirit of the collective in action. This festival has three fundamental discursive elements with regards to the collective efforts, namely Yatai, Mikoshi, and Sashiage. The Yatai and Mikoshi are the heavy self-similar loads that carry on the shoulders of the carriers navigating their path towards the shrine- the exergy source of the humanitarian hubs. The Yatai's are the virtue loads in the human cultural plane. It symbolizes the plane of the authority of the

collective self. Mikoshi is the virtues of the divine civilization plane and is much lighter to carry compared to Yatai. A Mikoshi symbolizes the assertion of values of the coherence whole. Sashiage state is the state of the full entanglement of virtues where the lines of efforts consolidate into the highest state of and unity in action and synchronization.

The festival brings forward a navigation and logistics challenge as the heavy load continuously and dynamically looks for all the available paths to reach to its support base. It requires the economy to check the muscle and strength at the microscopic level of the efforts in order to assert values.

There are accompanying super cooperatives units to the Yatai and Mikoshi that move around and keep monitoring the surrounding environment for any logistics challenges encountered along the way. They even join the effort whenever the loads veer off the course. At a particular stage of motion, the collective efforts begin to produce fascinating incoming and outgoing waves that after a while each Yatai and Mikoshi carrier responds and adjusts accordingly in proportion to the strength of the swapping waves (A dynamic response-receptive phase enabling the coherence transfer of assertions via the moving reference frame). After some time, the coherence waves will synchronize all the efforts in a way that the onset of entanglement occurs. This stage is called the Sashiage state of unity of effort.

II. Australian dreaming manifest

Since the dawn of history, Aboriginal culture has recognized the dreaming times as its most basic collective organization unit and cultural happenings. Le Roux (2014) suggested that these collective units can lead to the conception of the Australian Indigenous arts and culture as one of the entangled global values.

In the dreaming manifest, each culture shed their separate dreams and assume a shared experience where they collectively evoke and consolidate cultural values through stories and songs. It is a continuum cultural space within which the conformational arrangements of the vast number of virtues (and their groupings) combines, disjointed and recombines until a stable encoded set of shared virtues emerge that consolidates the assertion orders of the Aboriginal historical virtue narrations and its dreaming continuum. Therefore, it encourages the healthy relationship between Australian culturally diverse groups. In this way, every line of effort reinforces virtue gems shaped in the collective dreams and vice versa the lines of efforts reinforce by the virtues being in their coherent whole where transfer from generation to generation moving forward. As a result, there is a culturally based logistics in time through which cultural virtue artefacts assert their values, while all cultural groups social exergy needs being met and thereby being conscious of the complex and multifaceted nature of the Australian cultural virtue entanglement fields. The key is the role of the super cooperators- the active participants who not only aim to realize the dreams but also transform the actions cultures exert into the continuum of individual and collective initiatives. Moreover, we observed with the next cycle of growth and evolving step; these initiatives link to a specific line of efforts via a participatory festival that enables extraction of work from coherence fields or entanglement farms.

An example is the Australian Clean Up Festival organized by the Moreton Bay and Brisbane clusters in Queensland. This festival builds on the cleanup and land preservation lines of effort of indigenous Australia that many different cultural groups engage and connect. The festival chains of connections serve as a perfect logistics channel that helps to expand the dimension of the clustered virtues and total

productivity of the cultural lines of effort. The critical point of this festival is that, in trying to contribute to a cleaner Australia, cultures do not merely interact with each other and institutions that organize and manage the clean-up Australia days. They are also exerting powerful adapting social forces that bring about the total coherent state of the lines of effort. This emerging of a cohesive social effort of the dreaming manifest is a powerful means through which many cooperative elements of entanglement farming are cultivated and maintained within the Australian cultural festival state.

Through these examples, we have provided two instances of the entanglement farming concepts that increase capacity and productivity for all the populations independent of their initial economics and logistics states. Interestingly, the historical time scale associated with the pairing of these two virtue entanglements farming processes is large enough to suggest a considerable number of virtues can simultaneously be harvested and asserted within the global cultural landscapes. Practically, for both festivals, the importance of super-cooperators remains the same irrespective of the type of lines of total effort.

Another interesting phenomenon is the persistence of the coherence even between these entirely different lines of efforts that appears related to the large scale- cultivation of cultural of learning and harvesting of exergy resources at the grassroots.

Being able to treat such different calendar happenings and do-it-all together projects in a different locality and (character) across the cultural landscape simultaneously as a part of the discourse of coherent whole is a challenge. The challenge is practical (different ways of entanglement farming) and historical (degree of similarity in the culture of learning origin initiatives). Cultural happenings have their specific logistics needs mostly independent of each other but still, have self-similar coherent signals that impart their dynamics to the world cultural landscape. i.e. in a way, they speak to the world. The strength of these coherence signals varies among cultures, but they all have a response range with respect to the exergy processing units of their mother civilization states. Observed patterns of coherence between the Sekku festival and Clean Up Australia festival has structured response-receptive operational patterns that assume the same order of the civilization states coherence structures. The coherence between these two is high even in the presence of the environmental fluctuation field possibly suggesting the onset of the totality of social action essential for entanglement farming. This is no surprise given that the march of the Mikoshi around the world's temples and shrines require the logistics function related to the virtues of cleanness and clean up.

The same coherence observation can apply to all other cultural festival states festivals and happenings in dynamic coherence with the nation and civilization states that together support the sustainable farming of a global entanglement response-receptive virtues economy that is able to make happiness and prosperity worldwide.

6. CONCLUSION

This study is a fresh look towards building together a viable social-economic system. Our paper suggests a significant shift in perspective from the current entropy based competitive economic approach towards the exergy-based response-receptive approach. First, we suggest, a superstatistical model of total effort for the cultural festival states. We propose an economics approach based on the entanglement of virtues extracted by the assertion and consolidation of values from the outputs of the superstatistical cells and its hubs of efforts. We studied the essential entanglement structures and elements including the super cooperatives that help to enable the entanglement harvesting process from the totality efforts of the arts, crafts and

science workshops. Also, we described the three cultivation steps for the economic growth cycles, the superposition of the lines of efforts, the power law exponent standards for the work extracting thermal machine and the virtue entanglement steps. Furthermore, we discussed how the exergy features of the entanglement distribute through the logistics channels. Finally, we provided examples from the patterns of the collective organized activities of clustered cultural groups in Japan and Australia to illustrate how cultural groups and clusters admit themselves on the entanglement farming networks built on the backbone of the global integrated logistics network to distribute exergy and happiness worldwide.

It is the opinion of the authors that entanglement virtue farming is an optimal solution to cultivate and extract the essential nutritious and wealth minerals that bolster and sustain the global economic growth for all nations.

Acknowledgments

I am thankful to Ai Atsumi, Rubina Aumeer, Graham Barnes, Misa Oda Mojarrabi, Yae Oda, Sharad Kumar Shrestha and Daniel Winnak for their helpful discussion on this work. I also thank Luis Manuel Sanchez and anonymous reviewers for their comments. This research was funded by the Grants-in-Aid for Scientific Research of the Sachi Foundation for the Promotion of "One Common Happiness for All," Kasai, Japan (Principal Researcher: Bahram MOJARRABI, Catt Systems, Australia).

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