General Systems Theory (GST) and Concepts of Indian Philosophy May Provide a Holistic View of Consciousness and Its Evolution

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Abstract This paper describes limitations of the scientific knowledge and the scientific formalism which is currently used to study living systems and human systems in general [1-7]. It is suggested that there is a need to explore the General Systems Theory (GST) for better understanding of these issues [8-9]. General Systems Theory (GST) is a generalized methodology to study properties of both the physical systems and the social systems [10-13]. It is shown that the concept soul and soul-matter interaction of Jainism [14-16] and their concept that knowledge is structured in the consciousness needs to be examined in the modern context. Three examples are given which shows that the concept of knowledge of consciousness has a great meaning and it can be good example to be pursued by the scientists. They lead one to infer that there exist higher dimensions of knowledge including Extra Sensory Perception (ESP) which are not yet properly explored in a systematic way in the context of understanding soul [17-20]. As a consequence of this, it is also mentioned that Darwin's principle of "Survival of the fittest" should be compared to a wider principle "Live and Let Live" of Jains based on higher dimensions of knowledge which put more emphasize more on underlying identify (common soul) among all living beings than differences among them [3, 21]. This comparison could provide a new way of looking at the concept of evolution and so the concept of spiritual evolution should be also examined in the modern perspective. Ultimately it appears that the characteristics of a pure soul as described in Jainism may provide new ways and new concepts to the modern scientists in understanding the soul/consciousness. Their concept of pure knowledge seems to be quite close to the concept of Implicate Order of quantum mechanics as described by David Bohm [22]. Finally it is proposed that the process of spiritual evolution as described in Jainism to achieve the highest state of soul may be accompanied by decrease in rate of entropy production at every stage and building up of some new type of order [3].

Keywords Science, Knowledge, General Systems Theory, Entropy, Jainism, Consciousness, Evolution, Amazing Memory

1. Introduction

Science and technology and their use in economic development and commercialization have revolutionized the whole world in such a way that everything appears to have changed in last 100-200 years. Developments in the field of space technology, atomic energy, electronics, biotechnology, modern agriculture, telecommunication, and manufacturing systems are some of the examples of these changes. These changes have also played a key role in making this world truly global. However, they have also resulted in an increase in population, depletion of natural resources, damage to the environment, increase in terrorism, threats of nuclear wars and so on. It can be observed that all these consequences have resulted in a large scale increase in entropy in the world at different levels in different fields [3]. In addition, because of these changes and domination of science and technology in all walks of life, an impression has been created that scientific knowledge is the supreme and anything other, which does not fall into this domain is not very relevant. However, Science and technology are just two hundred years old only and there was a concept of knowledge and technology even before the modern science came into the existence.

Actually one finds that scientific methods developed to study the physical systems are not adequate when biological and human systems are also included [1-4], because all living systems are essentially irreversible in nature that is they grow and decay, they are open systems compared to the physical systems which are closed systems. So the biological

and social systems cannot be strictly subjected to the process of measurement and exactly describable in the terminology of the physical sciences [8-9]. Also any type of experimentation is not possible in case of human systems, as they have memory, free will, creativity, tendency to interact strongly with other fellow beings and the environment. In addition, there are micro controls in the form of thought processes which cannot be easily adjusted in any planned "scientific experiment". They also have a property of infinite amplification because of the thought processes, which makes it difficult to study human systems in a strictly scientific way. Expressed in a different way, it is now felt that the standard concepts used in any scientific study like compartmentalization, reductionism, causality, mechanism, induction, empiricism and passivism etc. [21] cannot be used to strictly study the biological systems and social systems. Not only this the basic parameters used in science like energy, mass, linear momentum and angular momentum are basically defined for isolated closed systems, so they may not be the best choice for describing the biological and social systems [23,24]. The final blow to limitations of scientific methodology is being done by Godel's incompleteness theorems [5,6,7] which have virtually shaken the foundation of modern science that modern science can describe the reality or the truth. There is another dimension of this problem and this deal with the direction of development and evolution in general. In the modern time, the concept of development is interpreted only in terms of economic development whereas in the case of evolution, we talk about Darwin's principle of evolution. However, in Indian philosophy in general and Jainism in particular, we talk of spiritual evolution which essentially talks of evolution of consciousness. [25-32]. In view of several problems faced by the modern world, there is a need to have a detailed comparison between these types of concepts of development and evolution so that some better model of development and evolution can be evolved. A mysterious example also is given in which a person living today has not taken food or water from last 75 years. He was medically tested by a team of twenty three doctors in Ahmedabad 2003 and the team inferred that this example is a challenge to the modern science [33]. Such examples may provide new domains of knowledge not yet explored in the modern science. Last but not the least; even the process of scientific study needs to be enlarged by taking state of consciousness into account even within classical physics. This is illustrated through the famous Einstein's relation between energy and mass and its utilization in the World War II.

In view of these issues, it is observed that most of the development in science and technology and their economic exploitations have resulted in a large increase in the entropy at all levels starting from the human brain to the whole biosphere. [34] Hence the concept of "order" as defined in the case of General Systems Theory needs to be closely examined in view of irreversibility of the human systems. It is proposed that the Jain concept of evolution of

consciousness might be closely related with some kind of information layers and order at different levels. Also the concept of Moksha discussed in the Indian philosophy can be compared with a concept of Goal directed systems in the General Systems Theory, where effect determines the cause and not the conventional concept of science in which cause determines the effect. Hence General Systems Theory (GST) is used for better understanding of the whole problem because by its intrinsic nature, GST can give a better picture of the interconnectedness of various components of the Human-Earth-atmosphere system. It is finally a problem of order versus disorder [3] at all levels and so when we talk of development and evolution, we should talk about the development of the order and evolution of order for complete understanding of the term development. They will have significant impact on all the problems of the modern life.

It also appears that it will be necessary to explore the concept of consciousness for better handling of the current problems and its connection with the knowledge. It is here that the concept of knowledge as enunciated in Indian philosophy in general and Jainism in particular needs to be brought into the picture. (For brief description of Jainism, see Appendix 1 and [14]. Actually the Jain concept of knowledge is so extensively discussed with five different types of classes of knowledge that it needs to be further explored in view of modern concepts of knowledge in computer science, neurosciences, possibility of information being stored in space-time geometry and others. However, this paper emphasizes that scientific knowledge has limitations and there can be knowledge beyond science and still meaningful. So, it is mentioned that the concept of knowledge needs to be enlarged further by taking consciousness into account [34]

Some examples are given from Indian philosophy in general and Jainism in particular which indicates that during the higher stages consciousness, there is a possibility for existence of new frontiers of knowledge and evolution [3]. They include the possibility of estimating sizes of microscopic particles of matter through knowledge structured in the consciousness [12], extraordinary memory of spiritual masters [32,36], exploring system of fourteen stages of consciousness and five different type of bodies of human beings whose extensive details are available in Indian philosophy in general and Jainism in particular [14]. Many other properties of soul as mentioned in Jainism are described along with karma theory with elaborated soul-matter interaction in a very comprehensive way.

It is also illustrated that spiritual processes mentioned in Jain philosophy could provide new direction for development and concepts of knowledge and evolution which may be accompanied by a reduction in entropy production in the brain as well as in the society and the atmosphere at different levels.

Not only this, the role of consciousness and thought processes is also elaborated by David Bohm [22]. His concept of the implicate order and explicate order provides a new way of looking at the world. This concept of implicate

order may be very close to the concept of a type of knowledge system, very different from the conventional knowledge system and close to concept of *keval jnana* (absolute knowledge) mentioned in Jainism.

Section 2 briefly summarized the consequences of scientific, technical and economic development in producing entropy in the world. Section 3 illustrates the limitations of scientific methodology due to conservation laws, Godel's incompleteness theorems, Darwin's principle of evolution versus the Jain principle of "Live and Let Live" and many others. They all imply a need to develop an abstract concept of consciousness or soul. Section 4 elaborates limitations of science as applied to living systems and need to use General Systems Theory. Section 5 explains that there is a need for a concept of consciousness and its evolution in the modern science if we look at these issues in a systems perspective. Section 6 highlights some factors, attributes and systems which implies a need for recognizing a need for the concept of consciousness within the modern science. Section 7 discusses the concept of soul and knowledge through soul in Jain philosophy, along with the soul matter interaction and the concept of evolution in Jainism. In section 8, it is mentioned that we must treat scientific knowledge as only small sub set of total knowledge which can be perceived through the consciousness. Section 9 gives three examples of higher stages of consciousness and spiritual order with a quantitative evidence about sharp memory of Swamy Vivekanand. Two examples of *shatavdhanies* are also given which clearly illustrates higher stages of consciousness which may involve extraordinary capability of the human mind and consciousness. An example is also given which shows that ancient Jain *acharyas* might have directly perceived the smallest particle of matter and even tried to estimate their sizes during these higher stages of pure consciousness. In section 10, a hypothesis is put forward that spiritual processes may be defined as that set of processes in which rate of entropy production and total entropy decreases, along with reduction in consumption of natural resources and is accompanied by the emergence of a new type of order. In section 11, some examples of order in nature are given. Whereas section 12 describes five different types of bodies for living beings, which can exist in nature and have some mysterious structures and functions which include movement of soul from one birth to another, even after death. In section 13, we provide an exploratory view about consciousness, information layers and an optimal strategy with ideas coming from different sources to understand soul. The Discussion and conclusion are given in section 14.

2. Science, Technology, Economic Development and Entropy Production

In this section we shall see how a unidirectional concept of Economic development and its modifications due to science and technology have destroyed the environment and is degrading the life support system irreparably. Actually

economic development is required for smooth running of a society and everybody wants it. However, with the advancements of science and technology, a huge industrial revolution took place in the whole world. Due to this economic activity started concentrating in a few places and in a few cities. Their activities started polluting the natural resources in a highly damaging way. The whole process of polluting the environment can be traced to these increased industrial activities and increase in population due to decrease in the death rates. Due to the congestion of the cities, their results a cut throat competition among people for survival. The old value system based on simplicity, honesty and sincerity started getting replaced by complexity, consumerism, dishonesty, and unwanted domination of certain groups and countries over others. It has also resulted in a large scale corruption in many places in the world. The emphasis on economic development has become so much so that all other types of developments have been set aside. Thus women in many countries who used to work towards spiritual evolution, religious activities and family welfare, have all started working for economic development only. Also indices based on economic growth are so much dominating the people's mind that the impact of economic development on the environment is totally ignored. One can mention the following as the most challenging problems of the modern society:

- Population is increasing and resources are shrinking.
- Automation/Computerization is increasing but jobs are decreasing
- Environment is getting polluted and care for animals is decreasing.
- Competition is increasing and love and affection are decreasing.
- Risk and uncertainty in life are increasing.
- Development is interpreted in the economic sense only. But gap between rich and poor is increasing.
- Sperm counts in males have gone down by 50 percent in last 50 years. Means maleness among men is decreasing [37].
- Females are developing male like characteristics.
- In last forty years, half of animal and insects have died due to human activities, climate change and other factors [38].
- Around 25,000 biological species are getting extinct every year [39].

Effectively one can say that final consequences of these activities have resulted in a very large increase in the disorder (entropy) of the environment and the society. Here entropy is to be understood in terms of mixing of objects and/or entities with time which results into more information to know these objects and/or entities (Shannon equation form). Some examples are given below where one finds the ideas of entropy increase in one way or the other.

- Mixing of hydrocarbons like petrol and diesel vapor with air and water etc. which were otherwise distinctly separate.

- Spread of industrial chemicals and other pollutants in rivers and ponds.
- Flow of millions of tons of fertile soil in the sea every year.
- Adulteration of food and medicines and many industrial products.
- Spread of electromagnetic pollutions in atmosphere due to very large increase in use of mobiles, internet and other electric gadgets.
- Decrease in orderliness in music and increase in noise.
- Mixing of the roles of men and women.
- Increase in corruption and black money due to which unaccounted money is diverted from the main Economy to areas and accounts which are not counted in GDP and so on.

Explanation of increase in Entropy

• Petrol & Diesel are
Confined to the Earth

Petrol and Diesel have
entered into the atmosphere

Creation of the so called ordered systems (say concrete jungles, industries etc.) in the name of economic development have basically led to the generation of entropy in the biosphere. Such ordered systems can be called as “Non-biological Ordered systems” generating large entropy.

Now to understand the root cause of these problems, one has to closely examine the basic laws of science and find out whether this type of analysis can provide better alternatives and new directions of development and evolution, knowledge and, order etc.

3. Limitations of Scientific Approaches to Understand the Reality

In what follows, we describe limitations of scientific knowledge in describing reality from widely different perspectives.

3.1. Limitations of Scientific Methodology Due to Conservation Laws

Any phenomenon is called scientific if it can be verified in a laboratory under a given set of controlled conditions and is reproducible at any point of time and at any place in space.

This condition is called space-time invariance condition in science. In addition, we define conservation laws of physics which are the foundation of all scientific measurements. Thus we have conservation laws for energy, linear momentum, angular momentum etc. Now all these conservation laws are defined for isolated closed systems, thus approximating the nature. Thus energy is defined as that variable of a closed isolated system which does not change over time [23]. But in principle we can never have a totally closed isolated system. Similarly linear momentum is defined as that property of a closed isolated system which remains invariant with any spatial displacement and so on. Hence the mere definitions of conservation laws do not describe the reality accurately, because they first divide the world into closed isolated systems and then interaction among these systems are studied by considering the nature and magnitude of the interaction among them. Recently Lee Smolin [24] has discussed this topic in detail. For biological systems which are so strongly interacting with each other, this type of formalism cannot be applied in a satisfactory way in a real sense. Here interactions among different subunits and their organization are as much important as the individual subunits themselves.

3.2. Gödel's Incompleteness Theorems and Scientific Reality

The most attractive aspect of scientific knowledge is its mathematical basis. We generally feel that this mathematical representation of various scientific facts makes our knowledge more precise and accurate. However, from the following theorems which have been put forward by the great mathematician Kurtz Gödel, we find that any mathematical representation of any physical reality limits our knowledge of that reality [5, 6, 7]. Not only has this but the theorem also implies that none of the languages or representation can express the reality of nature with perfection. Complete knowledge must necessarily have its foundation in an unexpressed, un-manifest field of intelligence. The two theorems are given in what follows:

3.2.1. Gödel's First Incompleteness Theorem

This theorem says that the truth of a formalism (which describes any phenomenon) cannot be proved. Thus no finite expression of mathematical knowledge can ever provide a basis for comprehensive knowledge even of the elementary properties of the counting numbers. Thus if one starts with a collection C of symbolic mathematical (or any other) axioms which is specifiable by a finite number of mechanical rules, and if C is consistent, then there will be a true statement about the counting numbers which cannot be proved from the axioms C, using the standard rules of mathematical logic. The proof of this theorem shows that from C one can construct a sentence S in the simple mathematical language of elementary number theory whose meaning is: This sentence is not provable from C. Once S is constructed it

follows easily that S must be true but not provable from C. Thus on the basis of any finitely specifiable collection of axioms C, one cannot prove all true propositions about the counting numbers.

3.2.2. Gödel's Second Incompleteness Theorem

A formal language (mathematical or any other) if consistent cannot define its own truth i.e. the definition of truth for a theory must be of a higher order than the theory itself. We can also say that the consistency of any specifiable collection of axioms can never be established on the basis of mathematical arguments which can be justified by these axioms. Thus to establish the validity of any single mathematical system one must necessarily utilize a more comprehensive system, to validate the latter system one has to investigate an even more comprehensive system. In these examples, Gödel's theorems are applied to some cases in abstract mathematics, but they are now being explored in various other branches of sciences. However, as discussed above, a concept of consciousness is required to go beyond the current scientific thinking.

3.3. Darwin's Principle of "Survival of Fittest" and the Jain's Principle of "Live and Let Live": Are They Contradictory or Complimentary?

At this juncture, it is also important to discuss another principle from the modern science which has become very controversial these days [26, 40]. It is the Darwin's principle of Evolution. As we know this principle is based on the rule of natural selection and was brought into limelight by Charles Darwin. An assumption is made that all life emerged from the slow evolution from a single ancestor. The basic idea of his hypothesis is that due to limitation of resources, various species of living world struggle for survival. Those which have slightly superior functionality will survive and others which do not have these additional functionalities will be eliminated and the whole process is very slow. Hence those who can adjust to the change in time, survivors and others are eliminated. This is therefore being described in short by a well known saying that is "the survival of the fittest". This principle was enunciated by Darwin about 150 years ago. At that time there was no genetics. With this new development, the same principle was termed as Neo-Darwinism. Under this name natural selection at the genetic level is considered during mutation and those genes are selected which are superior in functionalities.

Darwin also talks about the evolution of human beings and mammals and observes that all humans have striking similarities with apes and hence humans evolve from apes through natural selection in very slow processes over long time. However, Darwin's ideas are based on analysis of past data and develop correlations between them to establish

some hypothesis. As per this hypothesis, living beings only look at nearby future and attempts to survive. His laws do not provide any goals or objectives and directions of development for the species. They only look at nearby future and attempts to survive. Recently Bhakti Nisakama Shanta [26] has written an interesting paper which summarizes the Objections raised by several scientists which shows the limitations of the Darwin's principle. In particular he mentions that "In his book, *Evolution: A View from the 21st Century*, James A. Shapiro, Professor in the Department of Biochemistry and Molecular Biology at the University of Chicago, provided ample examples where molecular biology has recognized cell cognition from cell sensing, information transfer, decision-making processes. In this book Shapiro, thoroughly dismisses the traditional Neo-Darwinian evolution theory that is widely accepted by biologists. In Darwinism, organisms are often assumed as optimally designed machines blindly engineered by natural selection. However, based on cell cognition, Shapiro challenges that view: "Given the exemplary status of biological evolution, we can anticipate that a paradigm shift in our understanding of that subject will have repercussions far outside the life sciences. A shift from thinking about gradual selection of localized random changes to sudden genome restructuring by sensory network-influenced cell systems is a major conceptual change. It replaces the "invisible hands" of geological time and natural selection with cognitive networks and cellular functions for self-modification. The emphasis is systemic rather than atomistic and information based rather than stochastic."

In view of this scenario, we have the Jain's principle of evolution which is characterized by the principle of "Live and Let Live" in contrast to the Darwin's principle of "Survival of the fittest". The former principle emphasizes on recognizing the underlying identity among all living beings. Darwin's Principle of evolution needs to be thoroughly reexamined.

3.4. Why There Is a Need to Enlarge the Scope of Scientific Methodology to Study Reality in a Better Way: An Example from Agriculture

As another example of limitations of science, we consider case of High Yielding Varieties (HYV) of wheat and other crops which were found in some cases in late seventies and were tested for small fields in few trials. They were then recommended for large scale and in many states in India for example. After few years, they were found to result into depletion of ground water say in Punjab and poisoning of the soil due to heavy use of pesticides. Now the number of cancer patients in that state has gone up significantly [41]. This only shows a need to study these processes in totality and see their interconnections.

Table 1. (From: John Gigch, 1978 [9])

A COMPARISON OF ASSUMPTIONS UNDERLYING SYSTEMS TO WHICH THE ANALYTICAL MECHANISTIC APPLY WITH ASSUMPTIONS OF SYSTEMS TO WHICH GENERAL SYSTEMS THEORY APPLIES (Courtesy: John P. van Gigch (1978) Applied General Systems Theory)		
Properties of Systems	Assumptions of systems to which analytical-Mechanistic approaches apply	Assumptions of systems to which general systems theory applies
Living or nonliving	Nonliving systems	Living systems
Closed or open	Closed; with feedback: Limited properties of open systems	Open
Separability	Wholes can be broken down into component parts	Wholes are irreducible
Aggregativeness	The whole is a sum of the parts	Whole can be more than the sum of parts
Interdependence	Low interdependence parts can be treated in isolation	High interdependence: parts cannot be treated in isolation
Complexity	Organized simplicity: unorganized complexity	Organized complexity
Central concepts	Force and energy	Entropy and information
Entropy and order	Equilibrium: maximum disorder	Systems resist the trend toward disorder by: Importing energy and information from environment.
Purpose and teleological implications	Antecedents are of interest(causality)	The consequences are of interest (Goal- directed systems)
Organization and hierarchy	Properties at higher systems levels inferred from those at lower systems levels	Properties of organizations cannot be inferred from those of sub-systems.

3.5. Limitations of the Physical Sciences as They Apply to Living Systems

Actually all living beings are essentially irreversible in nature, which is they grow and decay and they are also open systems compared to the physical system's which are closed systems. They constantly interact with the environment like human beings take information and oxygen from atmosphere and releases carbon di-oxide and other waste products. Certain order is maintained in them. Human system has memory, free will, creativity, tendency to interact strongly with other fellow beings and the environment. Furthermore there are micro controls in the form of thought processes which cannot be easily adjusted in any planned "scientific experiment". More differences are given in the Table 1 like importance of order and entropy and teleological developments etc. Hence biological, human systems and social systems cannot be subjected to the process of measurement and hence they are not exactly describable in the strict terminology of the physical, sciences, hence it is very difficult to perform experiments on human systems and predicting events about them from a purely scientific point of view. Hence such systems are studied in a different way by using statistical procedures. In such methods only some rough trends or patterns can be found. Hence these living systems are better studied using the General Systems Theory.

3.6. Can a Person Remain without Food and Water for 75 Years?

There is another very mysterious phenomenon which will be of great interest to the scientific community in general and

that working in the field of consciousness in particular. In this era of modern science, can someone believe that there exists a person in India who has not taken food and water from almost last 75 years? He is currently 87 years old. He is popularly known as "Mataji" by his disciples and he himself is a disciple of Deity "Mother Ambe". He has a very super natural experience when he was 11 years old and since then he has no desire to take food and water or releases stool or urine. He was thoroughly examined by a team of 23 doctors from all medical faculties in Sterling Hospital, Gurukul, Ahmedabad (India) from 13-22 November 2003 [33]. All his medical observations were found to be normal as if his lack of taking food/water or releasing stool and water does not have any effect on these parameters. Of course, no scientist will make any generalization of this 10 days study to 75 years, but his disciples and he himself says that it is like this only. The point to be emphasized is that he does not have any urge or desire for taking food/water or releasing stool/urine. He does meditation in a cave in a temple town called Aambaji, near Ahmedabad (Gujarat). Every day he goes in a Samadhi and in a state of great bliss in which he gets an exposure of enormous amount of light and energy. Occasionally he comes out of the cave and visit houses of his disciples. The author had his Darshan two times and once has even shared a dais during a programme organized to honor him.

4. General Systems Theory and Its Implications

Hence to handle these problems mentioned above, we

look for General Systems Theory (GST). John Gigch, 1978 [9], and Bertalanffy, Ludwig Von, 1976 [8] have developed these ideas to handle such complex systems and to handle some of these issues. Different sets of rules are there to describe and understand such systems (Table 1).

This concept takes into account both physical systems and biological and social systems. Actually system's properties depend on their domain. The domain of systems is the field over which they extend. It can be classified as to whether: (a) Systems are living or nonliving, (b) Systems are abstract or concrete, (c) Systems are open or closed, (d) Systems exhibit a high or low degree of entropy or disorder, (e) Systems display organized simplicity, unorganized complexity or organized complexity, (f) Systems can be ascribed a purpose or not, (g) Feedback exist or not, (h) Systems are ordered in hierarchies and/or Systems are organized, (i) System and associated processes are reversible or irreversible and so on.

In this analysis pure physical sciences are now categorized as hard systems and subjects like sociology, religion, psychology, biology etc. are classified as soft systems [8,9]. It has been developed to handle such diverse systems and is a serious attempt to reconcile physical sciences with social sciences. As per this theory, all systems are characterized by the transfer of information, knowledge and entropy/order which are much more important than any other attribute. Even energy comes next to them.

Hence even religion also falls in this domain, as some type of system in which, there is information and knowledge transfer going on continuously. Actually the physical systems like physics, chemistry and mathematics are called "Hard systems", whereas social systems such as sociology, biology, religion, political science and economics are called "Soft systems". Thus religion and science can be reconciled in this formalism.

5. Need to Extend the Method of Scientific Study by Including State of Human Consciousness for Better Description of the Reality: An Application of General Systems Theory and Jainism

As mentioned above, the methodology of science is based on the conservations laws and the space time invariance of the law. That is if an experiment is repeated at any place or at any time, the results will be same within statistical errors. However, we feel that there is a distinct role of one's feelings and state of consciousness in describing the reality which requires a more broadened view of our concepts and description and measurements. Let us illustrate this by taking an example. Albert Einstein discovered the famous relation between mass and energy, which is described through the famous relation:

$$E = mc^2$$

Here E is equal to energy and m is mass of an atom. Small

c is the velocity of light. It shows that mass has tremendous amount of energy and this energy can be produced through atomic reactions. This discovery of Albert Einstein was later on used by the American, British and China's politicians to drop atom bombs on Hiroshima and Nagasaki, two big cities of Japan, which killed thousands of people and affected several lakhs over years. In the present example, we find that when Einstein discovered this famous relation between mass and energy, then his mental state of his mind or the state of consciousness was to understand the laws of physics at micro levels. On the other hand, the mental state or state of consciousness of the politicians of America, Britain and China at that time was totally different and was totally negative from humanitarian angle.. The Second World War was going on at that time, and Japan was showing great strength and was not ready to accept defeat. At that time these politicians came across this great discovery by Einstein and it struck to them to perform an experiment on Japan. This decision resulted into the famous Manhattan project which proved the power of atom bomb and created first example of destructive use of Einstein's discovery.

It is very important in this story to understand the state of consciousness of all players ranging from Einstein to the politicians to understand this total reality. We therefore need a better methodology which can talk about feelings and state of consciousness also. Jainism provides such a methodology. It includes five components compared to only two components (space and time) in scientific studies. These five components are: *Desh* (space), *Kala* (time), *Bhava* (feelings or state of consciousness), *padarth* (matter and its quantity or the scale on which it is used), and *Nimit* (prevailing conditions). It should be noted that Einstein was studying property of matter only theoretically but the process of making atom bomb involved a large quantity of matter. So it explains the beauty of Jain method of description where matter and consciousness are also included. *Nimit* (~condition) was the prevailing condition of war at that time. It is very similar to the situation in quantum physics and the famous Copenhagen interpretation, where the state of an electron (or say a photon) depends on the state of consciousness of the observer. Thus if the observer wants to see the wave aspect of electron then it can be observed through the diffraction or interference experiment, but if the observer wants to see the particle aspect then he will go through the photoelectric effect. The state of consciousness decides the property of the electron. So the concept of consciousness comes into the picture even in classical physics when the role of observer is also taken into account in totality.

6. Consciousness and Its Evolution Should Be a Fundamental Element of Any New Paradigm of Total Systems Approach to Deal with the Modern Problems

This situation was probably realized by several Indian

schools of thought, who talks about consciousness and its evolution. This is assumed to be main characteristic of all living beings and is different from matter. In particular, Jainism assumes that knowledge is structured in the consciousness. Several experimental studies have been carried out to recognize various states of consciousness like sleeping, Waking and dreaming stages. A fourth state of consciousness is well established now (Transcendental Meditation). Many more such studies are required in this direction as Indian yogis and monks talk of several higher stages of consciousness. Also one finds that in Indian context this evolution of consciousness is closely related with practices which are carried out while living with nature and hence persons deeply involved in such pursuits are very close to nature, so they are strongly helping in preserving the environment [25]. This must be recognized in view of the serious threat to the environment caused by uncontrolled materialistic developments. Such ideas of spiritual evolution should be therefore examined while talking about development. A lot of progress has been recently made in the field of neurosciences, quantum mechanics and General theory of Relativity for searching and understanding the concept of consciousness. In particular the work of Prof Penrose and Prof Stuart Hameroff is very outstanding in this respect who have used quantum gravity and tubulins of microtubules in neurons and have introduced a concept of Orchestrated Objective Reduction (Orch OR) [30, 31]. It appears that GST, concept of ORCH OR and Indian philosophy can help a lot in further exploring the concept of consciousness and its evolution

7. Concept of Substances, Soul, Consciousness and Knowledge in Jainism

Let us now look at the concept of knowledge in Jainism. In Jainism, the world is assumed to be consisting of six distinct substances. They are: *Dharmastikaya* (Medium of motion), *Adharmastikaya* (Medium of rest), *Akashastikaya* (Space), *Pudgalastikaya* (Matter), *Jeevastikaya* (Living beings having a soul) and *Kala* (Time). This medium of motion is interpreted as something which causes motion of matter and is interpreted as equivalent to gravitational force or ether, whereas medium of rest is responsible for position (stability) of matter and is interpreted as inertia or mass. Matter and soul are defined as two completely different substances, virtually nothing common in between. Space is defined as a substance which contains all the above substances except time. Time is treated as a substance which helps in describing change or is also a cause of the changes in matter, soul and medium of motion. Thus two slightly different interpretations are there [15].

7.1. Concept of Quantization in Jainism

Space, matter, medium of motion, medium of rest and soul

are assumed to have some indivisible units which are called as *pradeshas* (like quanta), which are not further divisible and these *pradeshas* are extremely small in size. In case of soul, the number of *pradeshas* is treated as infinite whereas in the case of matter and space, they are treated as innumerable.

7.2. Main Properties of a Soul

Jainism has defined the soul as the basic constituents of all living beings. Soul has the following properties which are given below: (Jindhammo in Hindi)

7.2.1. Soul Has a Utility (*Upyogamay*):

The most important property of soul is that it has certain utilities or uses. Knowledge and institution are the primary utilities of a soul. A pure soul has infinite knowledge, infinite intuition, infinite bliss and infinite power (Figure 1). Although a pure soul has other characteristics but the knowledge has been regarded as the chief characteristic of soul. Kundakunda (Mehta 1980) has stated that although from the empirical point of view there is a difference between the soul and knowledge yet from the transcendental point of view it is sufficient to say that the soul is knower and nothing else. He further said that there is no difference between the knower and his knowledge. From an empirical point of view an omniscient (Kevali i.e. a pure soul) perceives and knows the whole of reality and from the transcendental point of view he perceives and knows nothing. It has a capability of perception and cognition. It has structural as well as functional attributes. [Kachhara 2014]

As per Jainism, telepathy and clairvoyance do exist and are being categorized as examples of direct knowledge. Now the modern science these faculties are not recognized as they are not observed consistently in any scientific experiments and do not follow the repeatability criteria of space-time invariance. However, one should realize that these two paranormal faculties are properties of living systems which are irreversible systems with memory and are open systems. Hence even at fundamental level, it will not be appropriate to assume that these phenomena should follow the rigid conditions of spatial-temporal invariance and criteria of repeatability. We feel that these phenomena can exist and they need not follow the criteria of modern science.

7.2.2. Soul Always Exists But Shows Different Modes or Characters (*Parinami Nitya*)

A soul has permanent status that is it is neither born nor dies. However, it shows different modes or characters at different times but its inner existence remains.

7.2.3. Soul Is Formless (*Amurta*)

It does not have any physical form. Thus it is non-corporeal and has no colour, no taste, neither cold nor hot, neither male nor female etc. Thus it does not have any property of matter. It may be mentioned that the author has proposed that a pure soul may be an entity for which

causality is neither obeyed nor violated. (Appendix 6)

7.2.4. Soul Is Action Oriented and Directly Enjoys the Pleasure and also Suffer Because of Its Action (*Kartaand Sakshat Bhokta*)

Actually soul is also the doer of everything and also responsible for all actions of a person. It is soul which feels pleasure or pain, it is soul which has intelligence, it is soul which is conscious of itself and also conscious of its surroundings.

7.2.5. Soul Has Innumerable Indivisible Parts Known as Pradeshas (*Asankhyat Pradesha*)

All souls consist of an innumerable number of parts which are extremely small and are not further sub-divisible. These parts are called atma pradesha.

7.2.6. Soul Has a Property of Expansion and Contraction in Pradesha of Soul (*Atma Pradesham Sankochaur Vistarkagun*)

The pradesha have a property of expansion and contraction. In principle the flexibility is so much so that for a very small sized living being, it can occupy just one Pradesha of space whereas if required then it can expand so much so that it can occupy the whole universe (akasha).

7.2.7. It Has Exactly Same Shape as the Body Which It Occupies (*Swadeh Pariman*)

Its shape is exactly same as the body which it occupies. Thus an elephant will have a bigger soul and an ant will have a smaller soul. But the number of atma pradesha is the same in both the cases. Actually soul has a property through which its pradesha can contract or expand as per the size of the body. A comparison with a flame of a lamp is given to describe this character, which can become small as well as large. Otherwise the two souls are exactly same. It is mixed up with matter like milk and water, but they maintain different identities. Each living being has a unique soul.

7.2.8. Invisible and Mixed up with Matter from Infinite Past (*PudgalicAdrashta-van*)

The association between soul and matter is there from an infinite past. But through spiritual practices, the matter can be slowly removed and the soul can be made completely free from matter.

7.2.9. It Affects Matter and in Turn Is Affected by Matter (*Parasparprabhav*)

Because of the above property, the soul can affect the matter and in turn can be affected by the matter.

7.2.10. It Is Not Like a Molecule (*Anurupnahihai*)

It is practically neither like a molecule nor very large in size. It is exactly equal to the size of the body which it occupies.

In addition, to these major characteristics of a soul, Kachhara has provided a list of forty seven characteristics of

a soul whose names are given in the Appendix 7. It may be noted that some of these properties are quite similar to the model of consciousness proposed by Penrose and Hamreoff using quantum gravity based considerations where concept of Planck's polygon is proposed as the smallest indivisible unit of space-time geometry with spin-foam like structures which are dynamic and can contain information.

Characteristics of a pure consciousness (soul) as defined in Jain religion

Figure 1. Four main characteristics of a soul.

Table 2. Categories of knowledge and their sub-classification in Jainism [15]

SN	Type of knowledge	Sub classes
1	<i>Mati Jnana</i> (knowledge acquired through one's own mind)	340 and 28 in two different ways
2	<i>Shruta Jnana</i> (knowledge acquired through external sources)	18 and 20 in two different ways
3	<i>Avadhi Jnana</i> (Clairvoyance)	6
4	<i>Manha Paryaya Jnana</i> (Telepathy)	2
5	<i>Keval Jnana</i> (Absolute knowledge)	1

7.3. Definition of Matter in Jainism May Help in Better Understanding of the Difference between Soul and Matter

These days lot of discussion is going on whether soul or consciousness is obtainable from matter as some kind of emergent property or it is totally different from matter. (Shanta 2015). However the definition of matter in Jainism is very interesting and may be useful in the context of distinguishing soul from matter. As per Jainism, the term used to describe matter is known as *pudgal*, a Sanskrit word. The word *pudgal* consists of two parts: *pud* means to combine and *gal* means to dissociate. If we look at chemical reactions or the process of making mixtures and compounds or even in radioactivity or in particle physics, then this definition holds quite well, because in all these cases, process of making and breaking is going on at all levels. But this property is not present in case of other substances of nature like soul. Thus if we use the definition of matter as given in Jainism, then it can probably better help in understanding the difference between matter and soul.

7.4. Soul-Matter Association in Jainism: An Analogy with Quantum Field Theory in Solid State Physics

According to the Jain doctrine of Karmas, a pure soul can have an infinite knowledge, infinite intuition, infinite bliss and infinite powder (Four infinities). But from an infinite time in the past, it has been infected by matter. This matter has been held responsible for the disorder present in the worldly souls. This form of matter has been termed as Karma. (The word Karma in Jainism does not mean work, but it means a type of very fine category of matter). The whole universe is full of that kind of matter which can become Karma. Due to the presence of different types or karmas indifferent quantities, different characteristics are manifested by worldly souls i.e. by different living beings.

We feel that there is an interesting analogy between this karma theory of Jains and the quantum field theory used to study phenomena at low temperature like superconductivity and super fluidity [42]. Thus a perfectly ordered pure soul is analogous to a perfectly ordered ground state which is free from any elementary excitations. These elementary excitations then correspond to Karmas.

At every moment, an empirical soul is attracting this matter towards him by his actions through mind and body. This matter which has now become karma then remains latent (in memory) in the empirical soul for some time which is determined by the passions at the time of arrival of new matter. Passions in turn are determined by karmas which are already present. Karmas have the following four characteristics (A) Nature, (B) Number, (C) Lifetime and (D) Intensity

A. Nature

Different properties of different systems originate from different elementary excitations. Thus phonons, rotons and vortices are meant for different properties of superfluid helium at different temperatures. Similarly in case of superconductors, there is a superconducting state with very high order and there are elementary excitations over it in form of Cooper Pairs. Similarly karmas have the following species. (number in front of each specie indicates its sub-categories).

- Knowledge obscuring karmas (5)
- Intuition obscuring karmas (9)
- Feeling producing karmas (2)
- Age determining karmas (4)
- Belief and conduct producing karmas (28)
- Body determining karmas (103)
- Status determining and karmas (2)
- Power hindering karmas (5)

Each one of these is held responsible for different types of disorder present in the empirical self and impedes the manifestation of true nature of soul. Jainism claims that all properties of living beings can be explained in terms of these 8 karmas and their 158 categories.

B. Number

The relative number of various elementary excitations present in a system is different at different temperatures and this number varies with temperature. In a similar way the number of karmas changes from one animate to another and within a given animate they vary from time to time, depending on one's mental state and state of evolution. Their relative quantities are given by the following rule: The age determining species receive the smallest part; a greater portion goes to the body determining and status determining ones, both of which obtain an equal portion. More than that goes to the knowledge obscuring, intuition obscuring and power hindering species each of which gets an equal portion. Still a larger part than this goes to the belief and conduct obscuring species and the greatest of all goes to the feeling producing species. It is obvious that these karmas are not very similar to the matter which constitute the bodies of living beings but are different and could represent state of matter.

This difference in the number will then determine different properties of different animates. In case of concept of elementary excitations, it is again the number of these excitations which determine the disorder in the state of these systems, say at different temperatures like thermal and acoustic properties of these superfluids and superconductors.

C. Life Time

The interaction among various excitations causes scattering among them. Thus in a particular state an excitation stays only for some definite time. Similarly the lifetime of the incoming karmas depends upon their interaction with karmas already present which actually determine one's passions. This lifetime is then determined by karma-karma interaction.

D. Intensify

Pure matter is neutral. The various effects are manifested because of its association with the soul. The effect which these karmas show depends upon their rasa (juice) which is determined by the passions of the empirical soul. This intensity is analogous to the energies of different excitations which show different properties. Thus phonons and rotons determine propagation of sound in liquid helium. The properties of sound will depend on the contribution from different parts of the spectrums of these excitations.

The concept of elementary excitations can also explain the phenomena of phase transitions. Thus different phases of helium have been tried to explain in terms of elementary excitation picture. Similar situation occurs here in this theory also. There are fourteen stages known as Gunasthānas which have been recognized in this theory through which one passes before acquiring the pure soul, starting from a state of highest sinfulness. These have been nicely explained in terms of various karmas and their mutual interaction.

7.5. Procedure for Spiritual Evolution in Jainism

All living beings may be physically different but exist in

the world from the past which does not have any beginning. It is due to their attachment with material particles known as karma that they continuously take births in the world again and again. The direction of evolution should be therefore towards a goal of liberalizing the soul from all material attachment that is all karmas. A process of selection is involved in spiritual evolution and certain rules and principles have to be followed described for ordinary humans and for enlightened souls like *acharyas* and *sadhu* (male monks), *sadhvies* (female monks) etc. A full fledged system of *Navatatva* (Nine elements) has been developed to explain the process of reducing the karmas from past and stopping inflow of new *karmas*. As one's soul evolves, the number of karmas decreases. It appears that the larger the number of karmas associated with a soul, larger will be the entropy.

Several rules have been developed to practically implement these concepts in daily life. Five main principles of Jainism known as *Mahavratasviz. Satya* (truth speaking), *Asteya* (Not to do theft), *Ahimsa* (nonviolence), *Brahamacharya* (Celibacy) and *Aprigraha* (Minimizing materialistic possession) have been developed so as to have a discipline life during all stages of evolution. These are the principles to be followed strictly by monks, *aacharyas* and higher ups in the ladder of evolution. For ordinary human beings smaller *vratas* have been defined which are called *Anuvratas*. These are a simplification of the above rules meant to start the process of evolution at a very stage. Thus twelve *vratas* (rules) are there to be followed by *shravakas* and *shravikas* (ordinary religious men and women). There are different types of fasts (*Ekasana*= eating only once in a day, *Aayambil*= eating food once in a day without oil, sugar, salt etc, *Upwas* = Not to eat anything in a day, not to eat food for days together and their higher version (*Maskhhaman* that is fast for one month and *Varsitap* that is fast for one year), and many different types of meditations.

To distinguish true knowledge from false knowledge, a concept of three jewels is defined known as *samyaka jnana* (right knowledge), *samyaka darshan* (right vision) and *samayaka charitra* (right action or character) etc. Another important concept developed is of three yogas: *Manha*

(through heart), *Vachan* (through communication) and *Kaya* (through physical body) and three *karans* that is bad action should not be done by oneself, should not get it done by others and it should not be supported if some other is doing it. Several sub categories and concepts are given to handle this process in minutest possible details with very extensive description.

It appears that this systems and practices lead to very stable life, increase in self- confidence, recognition of inner strength of soul, and ultimately evolution of one's soul. It is preached that one should reduce one's requirements in such a way that even if there is scarcity of resources, lower consumption will guarantee survival of all in a cooperative way.

7.6. The Jain Concept of Evolution of Soul through Fourteen Stages with Increasing Knowledge and Order

The path of evolution of soul in Jainism is described through fourteen stages, through which one has to pass through before getting liberalized, that is becoming a pure soul from an impure soul which is associated with many material particles known as karmas. These fourteen stages or phases are called fourteen Gunasthanas [3]. They are given in Table 3.

Guna means characteristics and *sthan* means a position or situation. It is very interesting to know that the Jain *acharyas* have gone into great depth to describe these fourteen stages (Kachhara 2014). They are being described through twenty nine parameters. [3]. The logic used in taking up so many parameters is highly impressive and there are several subcategories among these twenty nine categories also. An excellent description is given about the movement of a worldly soul from one birth to another and so on. With each stage of development, the knowledge content of soul goes up and up. A state of highest orderliness is defined as a pure soul, towards which, everyone has to evolve. This is compatible with the formalism of General Systems Theory where definite goals are defined.

Table 3. Different stage of consciousness as discussed in Jainism (Kachhara, 2014) Kindly note the sequence from bottom to top showing direction of evolution.

stages	Name of stage	Degree of knowledge or order (14 is a pure soul)
14	Ayogi kevali	Static Omniscient State
13	Sayogi kevali	Dynamic Omniscient State
12	Kshina mohaniya	CSR with eliminated greed
11	Upshant mohaniya	CSR with suppressed greed
10	Sukshma Sampraya	CSR with subtle greed
09	Nivirati-Badar	CSR with uniformly mild volition
08	Apramat Sayant	Complete Self-restraint (CSR) with unprecedented volition
07	Pramat Sayant	Careless-free Self-restraint
06	Virtavirat (Deshvirati)	EWV with Careless Self-restraint
05	Avirat Samyagya dristhi	EWV with partial Self-restraint
04	Mithyatatva Dristhi (Mishra)	Non-restrained Enlightened World View
03	Samyagya	Mixture of Deluded and Enlightened World view
02	Sasvadan	Lingering Enlightened World View
01	Mithyatatva	Deluded World View

8. Need to Realize That Scientific Knowledge Is Only a Subset of the Total Knowledge System and Actual Knowledge Might Be Structured in the Consciousness

With the advent of science and the resulting technology, a misunderstanding and misconception has developed among the masses that the scientific knowledge is the only ultimate knowledge in the world. Not only this, it also presumed that the knowledge which is experimentally verifiable and repeatable at any place and at any time alone is the actual knowledge. This is far from the truth. The fact is that the so called science is just around 200 years old and the concept of knowledge existed much before that for several centuries. *Vedas, Upnishads, Puranas, Agamas, Mahabharat, Ramayana, Koran, Bible* have lot of knowledge about life and controls to be followed.

Actually the recent developments in computer science and neurobiology clearly show that knowledge is nothing but information organized in some way (Goldsmith 1990). And in turn, information is just organization of data in some fashion. It is also realized that human consciousness (and even animal consciousness) is capable of organizing these data and can generate information and hence knowledge in some way. Therefore what we call as scientific knowledge is just a subset of this grand concept of knowledge, which can exist in the human consciousness, because all interpretations of all scientific experiments are ultimately done by human consciousness.

Actually it is argued that quantum computers like

processes are possible in the human brain even at biological temperature. It is claimed that human sub-consciousness mind works on the basis of quantum computers (through group of tubulin's acting as a cellular automata), and so its activities are hidden from us. When the Orch OR takes place, one enters into classical world. To have a clearer picture, let us look at the following numbers [43]:

- Number of neurons in the human brain: 10^{11}
- Number of synapses per neuron in the human brain: 10^3
- Number of operation per synapses in one second: 10^3
- Number of bit states per second in the human brain: 10^{17}
- Number of tubulins per neuron : 10^7
- Number of oscillation per Microtubule : 10^8
- Nanosecond switching in Microtubule automata per neuron per second : 10^{16}
- Hence for a human brain, number of bits offered per second: 10^{27}

Thus till quite recently, capacity of human brain was assumed to be possess 10^{17} bits states per second in the human brain. It was based on the assumption that there are 10^{11} neurons in the brain, and on the average there are 10^3 synapses per neuron and again there are around 10^3 operations per synapse per second. And these are treated as classical bits. However, with the new discovery of tubulins who individually and collectively (entanglement) behave as quantum systems, this human capacity has gone up to 10^{27} quantum bits of information. It is so because now there are around 10^7 tubulins and there can be at least 10^9 (actually in the range of 10^9 - 10^{11} oscillations per second). So this number of 10^{16} has to be multiplied with the total number of neurons

in the brain, which is 10^{11} . This may be compared with performance of the best supercomputer in the world that is A 1 exa FLOPS (EFLOPS) computer system, which is capable of performing one quintillion (10^{18}) floating-point operations per second. However, in case of brain, these bit states are not classical bits but quantum bits (known as qubits, which are very different from ordinary bits of current computers). Hence this will ultimately leads to almost infinite information, as per the latest work in the field of quantum computers and quantum information. This means that a human brain essentially can possess almost infinite knowledge. This idea is therefore very close to the concept of infinite knowledge possessed by a pure soul in Indian philosophy in general and Jainism in particular. However, this needs to be further updated with some more discoveries in the field of quantum gravity as per them, the smallest unit of quantized space-time geometry which is known as Planck's polygon whose size is 10^{-35} meters multiplied by 10^{-43} seconds. These polygons contain spin foams which in turn can carry information. In that case the information content of soul would be so huge that infinity will not be a right word. It would be rather infinity....infinity. It therefore appears that the ancient hypothesis of Indian monks and *rishies* and *munies* that knowledge is structured in the consciousness is now probably getting a good support from the modern

Scientific discoveries: The whole issue therefore needs further exploration.

9. Need to Study Higher Stages of Consciousness in a Systematic Way: Three Examples Which Show That Concept of Knowledge through Consciousness and Orderliness Should Be Seriously Studied

We now give three good evidences which show that there is a need to take the concept of knowledge through consciousness in a very serious way. These examples are given below:

9.1. Remarkable Memory of *Swamy Vivekanand*

If we look at some meaning of the term consciousness in the scientific perspective than we find that it is a property of all biological systems. When our *acharyas*, *rishies* and *munies* talk of realization of a higher state of consciousness which has certain characteristics, then it is worth examining the following examples. The first concerns with extraordinary sharp memory of *Swami Vivekanand* [32]. As per this Swamiji had such a sharp memory that he almost remembered 11 volumes of Encyclopedia Britannica, which he had just read once. A question is to be raised by the scientific community, "what is the mechanism and how this

state of orderliness is achieved and is related to his/her behavior as Yogi ?"

Figure 2. Swami Vivekanand, who was known for extra ordinary, photogenic memory

Figure 3. Srimad Raj Chandji, Guru of Mahatma Gandhi, who was Known as a shatavdhani

9.2. Shatavdhan: Demonstration of Extraordinary Capability of Memory

It is mentioned in section 7 that a perfect consciousness with the four infinities perceives everything of the universe simultaneously and completely by a single cognition. However, a worldly soul (an enlightened soul but not yet perfect) can also have rich knowledge contents due to spiritual growth and religious practices. One example of this hypothesis is given below which is called *shatavadhan*. *Shatavadhan* (Shat- 100 + *Avdhan*-attention) is a power to cover 100 different activities in a single act of attention. One who reaches the stage of *shatavadhan* is called *Shatavadhani*. A *shatavadhani* can remember 100 different things in a 100 different orders, spoken by 100 different people. This

unbelievable power has been attained by a handful of people over the human history and because it occurs during a very high stage of spiritual development. This is possible only when one is able to have self control in order to experience the power of the soul. According to the modern scientific belief, a normal human being utilizes hardly 2% to 3% of his total mental potential. A common man can hear and remember serially 3 or 4 at a time. This is based on the conscious mind. Anyone with exceptional intellect can extend this number from 3-4 to 10-11. However, taking this number to 100 is beyond the powers of most of the people. *Shatavadhan* is the ability to receive, retain and retain 100 activities accrued through the eyes or ear during one period of attention and carried from the conscious to the subconscious. A *Shatavdhani* can utilize a maximum of mental potential which demands immense concentration. That is the reason that history can name only countable *shatavdhanis*.

In Jain tradition one can name Shrimad Rajchandra, Guru of Mahatma Gandhi [36] from whom he learned the concept of ahimsa (non-violence). Shrimad exhibited his mnemonic powers in late 19th Century in Mumbai. Gandhiji[44] had a great impact of Shrimad of his religious beliefs. This is also narrated in his autobiography.

The procedure adopted by Shrimadji in giving these demonstrations of his rare powers was indeed most exacting. In one demonstration, he could carry out fifty two activities in a sequence (Appendix 2). He would begin all the fifty-two activities at once, simultaneously. He would attend to a portion of each task at a time. He will then attend another second task, next move on to yet another third task, fourth task, and so on. After some time, he would return to the first task. He would cover these rounds, one after the other, until he had covered the entire fifty- two task. He made it a rule not to put down any points on paper while attending to these various activities, nor to take any notes and to ask anyone to repeat anything.

In year 1887 AD, Shrimadji reached the peak of his achievements in this direction. He was Mumbai at the time. There he gave a demonstration of his powers for simultaneous mental attention, this time covering a hundred different activities. He gave these demonstrations at centers including Faramjee Cowslip Institution at Dhobi Talao in Mumbai. The demonstration of powers to attend to a hundred different activities simultaneously earned him a tremendous amount of admiration all around. People were profoundly impressed by his extraordinary mental powers. (Author could not get the list of these hundred activities).

After one hundred and twenty five years of performance of the Shrimad Raj Chandra at the age of 19, another *Shatavdhani* is creating history, again in the same age range. This great young Shatavdhani is respected young Muni Shri Ajit Chandra Sagarji Maharasahab, disciple of Pujyaniya Acharya Shri Naya Chandra Sagarji Maharasahab (sitting on right side of Ajit Chandra Sagarji Maharasahab in the Figure 4). He once reproduced not only 100 facts but 108

facts in ascending, descending and random order. The details of questions are given in the Appendix 3.

Figure 4. Pujyaniya Maha Shatavdhani Muni Shri Ajit Chandra Sagarji Maharasahab, disciple of Pujyaniya Acharya Shri Naya Chandra Sagarji Maharasahab

Figure 5. Pujyaniya Mahendra Muiji of Terapanth Samaj who is known as Shatavdhani

This demonstration was done twice in Ahmadabad (Nov 16, 2008 with one hundred questions and on January 9, 2009 with one hundred and eight questions). The former was held in the Town Hall and author was present there. The other programme was organized in front of Jain medical doctors of the country on January 9, 2009 in Ahmedabad. On March 4, 2012, he gave a demonstration of 200 questions, situations and events in the famous Shan Mukhanand Hall in Mumbai (and again the author was present there) in presence of around 5000 persons. It was a mind boggling experience for a scientific mind. This monk was just 19 years old (in 2008) and is a strictly following celibacy and has not spoken from last few years. Now he is around 27 years old. On November 16, 2014, Pujyaniya Maharasahab Shri Ajit Chandra Sagarji has given demonstration of 500 avdhans in the presence of around 5000 people at Sardar Vallabh Bhai Patel stadium in the National Sports Club of India in Mumbai from around 08:30 am to 04:00 pm in the evening. He listens and observed to 500 questions or events for about five hours and then answered them in same sequence, reverse sequence and

random sequence. The accuracy would be around 99 percent with two or three elapses or delayed in exact response. The whole programme was telecasted live on Arihanta TV channel and the author has seen the whole programme. This will be a unique event in the history after 500 years, when such a demonstration was given. There are few more satavdhanies there in India, but their details are not available, nor documented properly. Pujyaniya Shri Mahendra Muniji of Terapanth Samaj is also one of them (Figure 5).

9.3. Did ancient Jain *Acharyas* Tried to Estimate Size of Smallest Particles of Matter through Some Advanced Knowledge System

Another example is taken from ancient Jain scriptures known as *Triloy Pannati* [3] Appendix 4 gives a Table for measurement of length. It starts from the smallest particle of matter and goes up to one *Yojana* (a commonly used unit of length prevalent in India even now. This is an octal system till step 12. It indicates that ancient Jain *acharyas* have made an attempt to develop a table for measurement of length in 20 steps. As explained in the Appendix, if we statistically interpret it then we find that as per their assessment, the size of the smallest particle of matter is 2.9×10^{-11} cm. Hence the size of the smallest particle of matter that is *avsannasanna skandha* is around 2.9×10^{-11} cm. This value lies in between the size of a modern atom (10^{-8} cm) and size of a nucleus (10^{-13} cm). Now we may not know the meanings of many of the objects used in this Table. But statistically, this is a very significant observation and should be taken quite seriously by the scientists. At least it cannot be ignored. The mere fact that it was arrived at from the telepathy of advance level through which one can see even the smallest particle of space known as a *pradesha* in Jainism, should be a very exciting observation. This again shows that the Jain concept of knowledge should be taken very seriously by the scientific community and should be further explored in a careful way.

Now the mere fact that this concept might have evolved through a realization of this higher level of consciousness is worth examining. It appears to involve advanced telepathy (known as *avadhijnana* in Jainism) or some type of advanced knowledge. An *acharya* who is having this capability must have brain in a very high state of order.

10. Do Spiritual Processes Help to Reduce Entropy Production and Resource Consumption in the Biosphere?

From this analysis, we find that Jain *Acharyas* have spiritually ordered mind and if we look at their behavior and daily practices then we find that they consume minimum resources and hence generate least entropy in the environment. As they go to higher and higher stages of

evolution, their resource consumptions go on reducing. We seriously feel that the various religious and spiritual practices developed by the ancient Indian seers like Yoga, Meditation, *Sadhna* and others are all aimed at an overall decrease in the rate of entropy production of this biosphere. Although the processes initiated at an individual level but it expands in the society through the various interlinkages present in the social system. It appears that as the number of persons carrying out these practices increase the average overall rate of entropy production of this biosphere decrease. In addition this may be accompanied by the appearance of a new kind of order which is being described above and could be linked with an orderly state of consciousness. Therefore there is a need to investigate the different states of human consciousness which can be in highly ordered states as mentioned in the above sections.

11. Some Examples of Order in Nature

Now let us understand what we mean by order in the present context. The following examples attempt to illustrate our point of view.

- (a). Climatological order through precise movement of the Earth around Sun and the Moon around the Earth along with proper mix of various gases in atmosphere with a narrow temperature range etc.
- (b). Three and up to six seasons on various parts of the Earth, which occur in the periodic way.
- (c). Agricultural order like crop cycles, water cycles, weather cycles, soil cycles and their interrelations constitute another example of "order" in nature.
- (d). Various cyclic processes in many biological systems including human systems (cybernetics)
- (e). Self-organized structures in brain and our body.
- (f). Maintenance of economic order in world economy.
- (g). Order in a laser beam
- (h). Order in the life supporting systems, (which could be some combination some of the of the above) and others

In the present context, order can be defined in terms of the Orch OR theory of Hameroff and Penrose as an ordered state of a Quantum Computer made of tubulins of microtubules of neurons in human brain with largest number of memory. Going further, even the information contained in the space-time geometry which can be made fully available to a pure human consciousness can be treated as a highly ordered state.

A very advanced concept of order known as Implicate order in quantum mechanics is also discussed in the Appendix 5 and it may be very relevant in the present context as it could represent a pure soul of Jainism and the ultimate order one can think of.

12. Concept of Five Different Type of Bodies as Described in Jainism Which May Be Useful in Understanding Possibilities of How Soul Interacts with Matter and Travels after Deaths and How Rebirth Takes Place [15]

In Jainism, five different types of bodies are defined which some living beings can have. They are defined as follows.

Audaric body - The body that we see from the outside. At the time of death, the soul leaves this body behind. This body can dissociate and can be cut into parts and so on.

Tejas body - This body is responsible for digestion, heat, etc. in the **Audaric** body. This body is responsible for sending major substances derived from food to various parts of the **Audaric** body. At the time of death, it accompanies the soul and helps to create a new **Audaric** body for the soul.

Aharac body - This body is possessed by some special souls. This body is made from auspicious matter, innocent but useful for executing some tasks. **Aharac** body is very small in size. Through these bodies, one can travel to distant places. Sometimes monks who possess this body or can acquire through a special spiritual exercise known as a "Labdhi", use it to travel to the other part of the universe or to visit a Guru to remove their doubts or to learn new things etc. The whole action is done very quickly.

Vaikriya body - This body can be made very small or very large in size, very thin or very thick etc. It does not contain blood, flesh or bones. It cannot rot nor it can be dissociated. The heavenly beings and hellish beings possess this body by birth. Some human beings do have a capability to develop such bodies using some mysterious *mantras* and *labdhies* etc.

Karmic/Causal body: The karmic matter that covers the soul is called karmic body. At the time of death, the soul is accompanied by this body for the next birth. The karmic body along with **tejas** body forms the basis of the other newly produced **audaric** body.

This concept can help in understanding the movement of soul from one place to another and from one birth to another. There is a need to find out their equivalents in the modern concept in which space-time geometry is used to understand the concept of the consciousness through Objective Reduction. At least this type of interdisciplinary studies in the spirit of GST will provide new avenues of thought.

13. Need to Evolve an Optimal Search Method to Understand Soul in Totality

As General Systems Theory takes into account structures, activities, processes and other connected concepts and even methodologies into account, hence an optimal approach is required for better understanding of soul taking ideas,

concepts and methodologies from all possible sources like Eastern philosophy, Western philosophy, modern science, sharp observations of even mysticism. Following are some of these factors which might be relevant here.

- Non-locality, entanglement and holographic properties of consciousness.
- Meaning of information, information layers and their interrelationships.
- OR, ORCH OR and other mechanisms operating at different levels.
- Several other approaches which might be relevant in this context.
- Evolution of consciousness and its relation with information.
- Mechanism of Backward propagation in time.
- ESP at various stages of evolution.
- Signal to Noise ratio in the brain of yogis and monks
- Systematic exploration of different spiritual systems (particularly in India) to see new concepts.
- Look for approaches involving non-rigid spatial-temporal invariance conditions of the modern science also.
- As per Godel's incompleteness theorems, any formalism about soul has to be non-mathematical and free of any languages.
- Concept of Implicate order of quantum mechanics proposed by David Bohm along with the concept of *para vidhya*, *Keval Jnana*, mentioned in Hinduism (Jainism).
- Higher stages of consciousness and properties associated with them may fall into the domain of mysticism but they may provide new avenues of thought and should be examined with an open mind, not necessarily a scientific perspective. Particularly the forty seven attributes mentioned in Jainism about soul needs to be rigorously studied as such concepts only can provide new ideas.

We do not want to go into developing any approach as such in details, but would like to mention that the above factors should be included in any such approach. Also above sections describe many other ideas and concepts which should be part of any such formalism, before any general hypothesis about consciousness can be developed. A simple example of possible information layers is given below to illustrate the true spirit of General Systems Theory. It illustrates a large number of information layers which might be important in the process of evolution of consciousness. A possible set of information layers and their description is given below. It starts from bottom with vague and very large scale and goes up with decreasing scale and possibility of increasing complexity and information content. The implicate order could be the ultimate. The Universal level is very ordinary scale and provides highly approximate information: (As one goes up from serial number 14 to 1, upwards information becomes very rich).

1. Implicate order.

2. Space-Time geometry level
3. Nuclear level
4. Electronic level
5. Atomic level
6. Amino acid level
7. Tubulin level
8. Microtubule level
9. Neuron level
10. Psychological level
11. Sociological level
12. Biosphere level
13. Astronomical level
14. Universal level etc.

There can be many feedback loops among them at many places. This is an example of a grand system and any formalism about consciousness must explain these hierarchies of possible information layers and all phenomena like those given above for this formalism to be successful. General Systems Theory (GST) can provide such an approach.

14. Discussions and Conclusions

Following are the conclusion of this study.

1. This paper attempts to explore the limitations of scientific methodologies found so successful to study physical systems and infer that they are not adequate to understand biological and human systems. Hence a concept of General Systems Theory (GST) is required to develop a unified formalism which includes both physical and biological systems like social systems and human systems. Through this type of approach, even science and religion can be reconciled.
2. It is mentioned that the concept of information and knowledge has to be also enlarged by taking the concept of knowledge through consciousness into account. We have to realize that all scientific knowledge is just a small set of knowledge structured in the consciousness.
3. In particular it is shown that Jain's concept of knowledge through consciousness (soul) can be very useful to have an enlarged concept of knowledge, which can include extra sensory perception (ESP) also.
4. It is shown that the Jain concept of evolution in which a soul become more and more pure and its knowledge contents increases, along with increase in orderliness is very promising towards better understanding of the concept of soul. Hence it is argued that such processes of spiritual evolution may be accompanied by a decrease in rate of entropy production at different levels. This concept is similar to that of fourteen lokas in Hinduism (Chopra and Hameroff, 2011).
5. Some examples of knowledge and order are given like those of Swamy Vivekanand to illustrate the meaning of this order. Two more examples from Jainism are given which show extraordinary states of mind in highly ordered states of satavdhanies. In another example, it is shown that ancient Jain *Acharyas* might have even tried to estimate the sizes of the smallest particles of matter like atoms and nuclei during the higher stages of consciousness.
6. Jain literature also talks of five different type of bodies which a human being can have. They are also dealt with so that these concepts can be further explored in view of possibility of involvement of space-time geometry in the field of consciousness and possibility of life after death and rebirth etc. This description can provide new ideas as how soul can carry some type of matter also with it even after death.
7. It is also mentioned that the Jain principle of "Live and Let Live" should be compared with the Darwin's principle of evolution described by "Survival of the fittest". The difference between the two will have a totally different impact on the concept of development and the society in general and direction of evolution in particular.
8. It is then mentioned that a new world view provided by the concept of the Implicate Order of quantum mechanics as enunciated by David Bohm is also relevant here and can provide an alternative view to look at the reality. This implicate order could be closely related with concept of *Para Vidhya* (Knowledge beyond) in Hinduism and Jain's concept of *Keval Jnana* (Single absolute knowledge).

This is an exploratory study only but it indicates a need for a multidisciplinary approach where many loosely defined terms and concepts needs further investigations. They need to be further refined and explored.

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Appendix 1. (See Kachhara, [14], Mardia and Rankin [47], Bhandari [48], Kumar Pal Desai [49] and [50] for excellent digital source of books on Jainism

Jainism, traditionally known as Jaina *Dharma* is an Indian religion that prescribes a path of non-violence towards all living beings and emphasizes spiritual independence and equality between all forms of life. The essence of Jainism is concern for the welfare of every being in the universe.

Practitioners believe that non-violence and self-control are the means by which they can obtain liberation.

Jains believe in the notion that truth and reality are perceived differently from diverse points of view. This doctrine is formally called *anekantavada*. According to it, human beings are limited in their perception and knowledge about the reality. They can thus have only partial information. Philosophical and theological disputes arise only because of the partial knowledge of human beings. The Jain doctrine stresses on the existence of soul. According to Jainism, every living being is a soul and have a separate existence from the body that houses it. This soul undergoes a cycle of reincarnations. Jainism postulates the existence of fine particles of matter called *karma*. These karmic particle sticks to the soul on account of the soul's interaction with the karmas and it is through this *karma* that the soul is reincarnated and feels pleasure and pain.

The word Jainism is derived from a Sanskrit verb *Ji* which means *to conquer*. It refers to a battle with the passions and bodily pleasures that the *Jaina* ascetics undertake. Those who win this battle are termed as *Jina* (conqueror). The term *Jaina* is thus used to refer to laymen and ascetics of this tradition alike.

Jainism is one of the oldest religions in the world. Jains traditionally trace their history through a succession of twenty-four propagators of their faith known as *tirthankara* with Ādinātha as the first *tirthankara* and Mahāvīra as the last. For long periods of time Jainism was the state religion of Indian kingdoms and widely adopted in the Indian subcontinent.

Appendix 2. List of Activities that could be carried by Shri Raichandji one after the other without using any pen or paper

1. To play the game of chopat, a kind of checkerboard, with three different player	1
2. To play cards with three different persons	1
3. To play chess with one person	1
4. To keep a tally of the chimes of a Zalar a small gong	1
5. To Keep computing sums mentally invoking addition, Subtraction, multiplication And division	4
6. To count the beads on a thread	1
7. To compose verses on sixteen diverse topics selected afresh, and in metrical forms Chosen by various referees	16
8. To answer about eight new riddles	8
9 To recall four hundred words given at random from languages including Greek, English, Sanskrit, Arabic, Latin, Urdu, Gujarati, Marathi, Bengali, rearranging them in proper Order such as subject, object etc. all the while attending to various other matters.	16
10 To explain certain things to a student	1
11 Commentary on certain items of figures of speech	2
Total activities =	52

Appendix 3. Details of one hundred questions answered in the same sequence by Shri Ajit Chandra Sagarji Maharasahab. (These questions are actually from another demo which he gave during a Jain Doctor's conference held on January 10, 2009 in Ahmedabad, India)

1 to 10	One Line sentences may be in questioners form
11-20	Words of Wisdom in a sentence of 5 to 7 words
21	First line of a Sanskrit <i>Shloka</i>

22 to 30	Synonyms or Antonym in Gujarati
31	Second line of the same Sanskrit <i>Shloka</i>
32 to 40	Idioms
41	Third line of Sanskrit <i>Shloka</i>
42 to 50	Any first line from five <i>Pratikraman</i> or <i>Navsmaran</i> (religious books)
52 to 60	Names of any priest, religious book or religious place
61	A mathematical puzzle
62 to 70	Name of any philosopher, scientist or patriotic person
71	First part of 16 Blocks- mathematical miracle
72 to 80	See and Remember (<i>DarshanAvadhan</i>)
81	Second part 16 blocks- mathematical miracle
82 to 90	See and Remember (<i>DarshanAvadhan</i>)
91	9 Blocks- Mathematical miracle
92 to 99	Mathematical calculation with 8 persons
100	Day of the Birthday
101-104	A line from Religious, cultural or patriotic song
105 to 108	<i>Shloka</i> from Jain <i>Agams</i>

Appendix 4. Table of Measurement of Length as Found in the Jain Literature (Gupta 1975)

(1)	Infinitely many <i>parmāṇus</i> =	1 <i>Avasannasannaskandha</i>
(2)	8 <i>Avasannasanna</i> units =	1 <i>Sannasannaskandha</i>
(3)	8 <i>Sannasanna</i> units =	1 <i>Trutṛeṇu</i>
(4)	8 <i>Trutṛeṇu</i> units =	1 <i>Trasareṇu</i>
(5)	8 <i>Trasareṇu</i> units =	1 <i>Rathareṇu</i>
(6)	8 <i>Rathareṇu</i> units =	1 <i>Uttamabhogbhūmibālāgra</i> (U. b.b.)
(7)	8 U. b. b. Units =	1 <i>Madhyamabhogbhūmibālāgra</i> (M.b.b.)
(8)	8 M. b. b. Units =	1 <i>Jaghanyabhogbhūmibālāgra</i> (J.b.b.)
(9)	8 J. b.b. Units =	1 <i>Karma bhūmibālāgara</i> (K.b.b.)
(10)	8 K. b. b. Units =	1 <i>Liksā</i>
(11)	8 <i>Liksā</i> units =	1 <i>Yūkā</i>
(12)	8 <i>Yūkā</i> =	1 <i>Yava</i> (Barley corn)
(13)	8 <i>Yava</i> units =	1 <i>Angula</i> (Finger breadth)
(14)	6 <i>Angula</i> units =	1 <i>Pāda</i>
(15)	2 <i>Pāda</i> units =	1 <i>Vitasti</i>
(16)	2 <i>Vitasti</i> units =	1 <i>Hasta</i> (Forearm)
(17)	2 <i>Hasta</i> units =	1 <i>Rikku</i> or <i>Kisku</i>
(18)	2 <i>Kisku</i> units =	1 <i>Daṇḍa</i> or <i>Dhanus</i> (Bow)
(19)	2000 <i>Daṇḍa</i> units =	1 <i>Krosa</i>
(20)	4 <i>Krosa</i> units =	1 <i>Yojana</i>

Here a *parmāṇu* has been defined as the smallest particle of matter having no length, no breadth and no height. This is defined as a particle which can be only thought of but is not practically perceivable. The particle which is perceivable is a group of *parmāṇus*. The smallest of such *skandha* is *navasannasanna skandha*. Let us therefore estimate its size by roughly taking the average size of a finger to be equal to 2 cm. We can therefore write the following simple formula by using the above Table: $2 \text{ cm} = 8^{12}$ of size of *navasannasanna skandha*. Therefore Size of *navasannasanna skandha* = $2 \times 8^{-12} \text{ cm} = 2.9 \times 10^{-11} \text{ cm}$. This value lies between the size of an atom 10^{-8} cm and the size of a nucleus that is 10^{-13} cm

Appendix 5. Implicate Order of Quantum mechanics, Para Vidhya and Keval Jnana

An abstract concept of "Order" has been also explored by David Bohm, who proposed a cosmological order radically different from generally accepted conventions, which he expressed as a distinction between the implicate and explicate order, described in the book [22] by David Bohm

In proposing this new notion of order, Bohm explicitly challenged a number of tenets that are fundamental to much scientific work. The tenets challenged by Bohm include:

1. Those phenomena are reducible to fundamental particles and laws describing the behavior of particles, or more generally to any static (i.e. Unchanging) entities, whether separate events in space-time, quantum states, or static entities of some other nature.
2. Related to (1), that human knowledge is most fundamentally concerned with the mathematical prediction of statistical aggregates of particles.
3. That an analysis or description of any aspect of reality (e.g. Quantum theory, the speed of light) can be unlimited in its domain of relevance.
4. That the Cartesian coordinate system, or its extension to a curvilinear system, is the deepest conception of underlying order as a basis for analysis and description of the world.
5. That there is ultimately a sustainable distinction between reality and thought, and that there is a corresponding distinction between the observers and observed in an experiment or any other situation (other than a distinction between relatively separate entities valid in the sense of explicate order).
6. That it is, in principle, possible to formulate a final notion concerning the nature of reality; e.g. a Theory of Everything.

According to David Bohm, in the enfolded [or implicate] order, space and time are no longer the dominant factors determining the relationships of dependence or independence of different elements. Rather, an entirely different sort of basic connection of elements is possible, from which our ordinary notions of space and time, along with those of separately existent material particles, are abstracted as forms derived from the deeper order. These ordinary notions in fact appear in what is called the "explicate" or "unfolded" order, which is a special and distinguished form contained within the general totality of all the implicate order.

In Bohm's conception of order, then, primacy is given to the undivided whole, and the implicate order inherent within the whole, rather than in parts of the whole, such as particles, quantum states, and continua. For Bohm, the whole encompasses all things, structures, abstractions and processes, including processes that result in (relatively) stable structures as well as those that involve metamorphosis of structures or things. In this view, parts may be entities normally regarded as physical, such as atoms or subatomic particles, but they may also be abstract entities, such as

quantum states. Whatever their nature and character, according to Bohm, these parts are considered in terms of the whole, and in such terms, they constitute relatively autonomous and independent "sub-totalities". The implication of the view is, therefore, that nothing is entirely separate or autonomous.

This implicate order of quantum mechanics as interpreted by David Bohm seems to be quite close to the Jain concept of *Keval Jnana* (absolute knowledge) as described in Jainism that is when all worldly knowledge disappear in this state and only absolute knowledge is left. In this state, a pure soul perceives all aspects of all substances in the Universe. Total past, total present and total future of everything knowable in the Universe like all material entities, all living beings, medium of motion, medium of rest and their all infinite properties are perceived in one single glance. Once a person acquires this knowledge, all obstruction to the knowledge disappears. Actually some more research is required to study these two similar aspects of reality visualized in two different systems.

Appendix 6. Can a soul be an entity for which causality is neither obeyed nor violated?

In order to explain, the concept of soul as Indian philosophy in general, Pokharna [46] has introduced an abstract entity for which causality is neither obeyed nor violated. This is an entity for which causality is neither obeyed nor violated. The principle of causal connection points out that for every effect there is a definite cause behind it (or a large number of causes behind it) and every effect in turn becomes a cause of some other effect. Now when we say that causality is violated then it can have the following two different meanings: (i) when the causality is violated then this can mean that temporally the role of cause and effect has been reversed so that first we have an effect and then there is a cause. This is the situation believed to be existing in the case of tachyons (particles moving faster than light). They are assumed to be moving backward in time so it is said that causality is violated by tachyons. (ii) Violation of causality can also mean that there may be some effects (causes) whose causes (effects) may not be known to us or no physically reasonable causes (effects) can be searched for given effects (causes). This is the situation which we have found in quantum mechanics where we have found that there are some uncontrollable fluctuations in the predictability of the state of a system in a given measurement process. These fluctuations are such that we cannot assign any known factors or causes responsible for it. Hence this is an entity in search of perfect determinism. (Prof. B D Josephson admired this idea through a letter, I am grateful to him)

Appendix 7. Forty Seven characteristics of a soul as defined in Jainism: (work is in progress to understand their meanings in the modern context (Kachhara [51])

1. Life Power (*Jivatva Shakti*)

2. Consciousness (*Chiti Shakti*)
- 3-4. Self-awareness and Intelligence Power (*Drisi Shakti* and *Gyan Shakti*)
5. Bliss Power (*Shukha Shakti*)
6. Spiritual Energy (*Virya Shakti*)
7. Almighty Power (*Prabhutwa Shakti*)
8. Extension Power (*Vibhutwa Shakti*)
- 9-10. Power of Omniscience (*Sarva Darsitwa* and *Sarvagya Shakti*)
11. Cleanliness Power (*Swachhatwa Shakti*)
12. Enlightenment Power (*Prakash Shakti*)
13. Power of Non-restrained Growth (*Asamkuchit Vikasatwa Shakti*)
14. Power of Non-interference (*Akarya karanatwa Shakti*)
15. Transformations and Transforming Power (*Parinamya-Parinamaktwa Shakti*)
16. Power of Non-transference (*Tyagopadan Shunyatwa Shakti*)
17. Power of Subtle Changes (*Agurualaghutwa Shakti*)
- 18 Power of Creation-Destruction-Persistence (*Utpada-Vyaya-Dhruvatwa Shakti*)
- 19 Power of Continuity (*Parinama Shakti*)
20. Non-corporeal Power (*Amurtatwa Shakti*)
- 21-22. Powers of Non-doing and Non-experiencing (*Akartritwa Shakti* and *Abhoktritwa Shakti*)
23. Power of Inertness (*Nishkriyatwa Shakti*)
24. Power of Constant Pradesha (*Niyat pradeshatwa Shakti*)
25. Power of Confinement to Self (*Swadharmavyapapakatwa Shakti*)
26. Power of Common, Special and Common-cum-Special Attributes (*Sadharan-Asadharan-Sadharan, asadharana Dharmatwa Shakti*)
27. Power(s) of Infinite Attributes (*Anant Dharmatwa Shakti*)
28. Power of Opposite Attributes (*Viruddh Dharmatwa Shakti*)
- 29-30. Powers of being Self, and Power of not being Non-self (*Tatwa Shakti* and *Atatwa Shakti*)
- 31-32. Powers of Oneness and Multiple-ness (*Aikatwa Shakti* and *Anektwa Shakti*).
- 33-38. Powers of Existence, Non-existence, etc. (*Bhava Shakti, Abhava Shakti* etc. *Chhaha Shaktiyan*).
- 39-40. Power of Self-Existence (*Bhava*) and Power of Action (*Kriya*) (*Bhava Shakti* and *Kriya Shakti*)
- 41-42. Karma Power and Kartritwa Power (*Karma Shakti* and *Kartritwa Shakti*).
43. KaranPower (Instrument Power) (*Karan Shakti*)
- 44-45. Sampradan Power and Apadan Power (*Sampradan Shakti* and *Apadan Shakti*)
46. Adhikaran Power (*Adhikaran Shakti*)
47. Power of Ownership (*Sambandha Shakti*)

This paper is dedicated to Pokharna's parents that are mother Late Shrimati Lahar Kunwarji Pokharna and Late Shri Balwant Singhji Sahab Pokharna who have

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