The Data and Knowledge Domains of the Real-World Community Model

Travis A. Grant,

Affiliation contacts: *trvsgrant@gmail.com*

Version Accepted: 1 April 2024

Acceptance Event: *Project coordinator acceptance*

Last Working Integration Point: *Project coordinator integration*

Keywords: social data, societal data, data structuring, data organization

Abstract

The organization of the social system is a two dimensional layer - it is a data platform, consisting of data that is ordered/ categorized according to some meaningful process. All new information, and all existing information at its axiomatic-unit level, is data. Data can be more or less useful for the purpose of taking decisions (i.e., more or less actionable). Data with some association to the output of experimental science is called, a body of knowledge. Data with some association to the output of rational science is called, a model. Data with some association to the input of a sense or survey is called feedback. Feedback, if allowed, can be integrated with existing knowledge to produce better results for the consciousness intending a better result.

Graphical Abstract

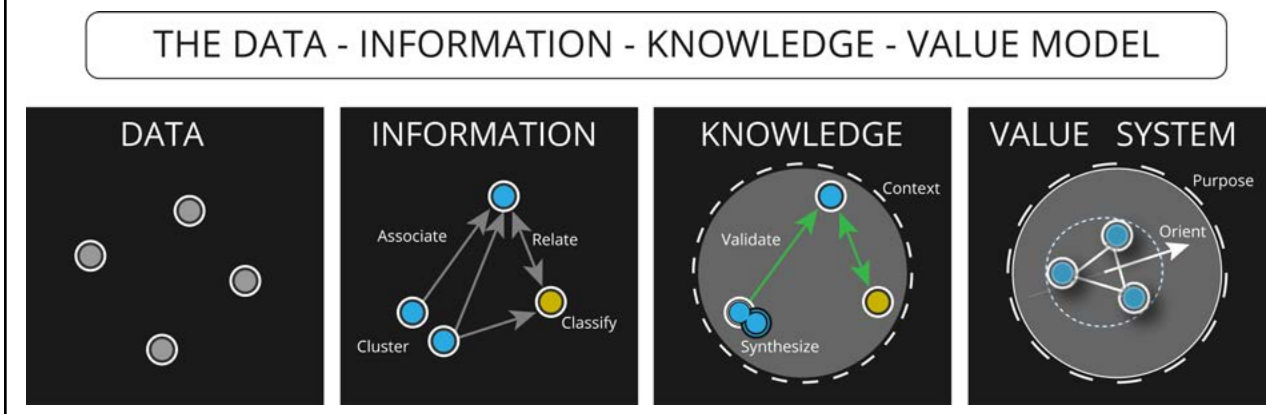

Figure 22. *Progression model from data to Information to knowledge to values.*

1 The percept domain

NOTE: *If "you" don't know that something is an issue (or even exists), then "you" are unlikely to record that data.*

From a philosophical perspective, the Data Domain represents perceptual data and observable phenomena, known as 'percepts'. The term 'percept' refers to perceptual sense data (both human sense data and technical sense data; sensory input) gathered through [open and objective] observation. Percept is the automatic integration of sensation that leads to awareness of a specific existent (or, event in space and time). Herein, concepts involve the mind's organization of percepts [as well as other concepts] into groups based on their essential characteristics that differentiate them from other entities.

For example, take color and texture and solidity, which are perceptually emergent if we consider the behavior of solitary electrons, protons, and neutrons. Color, texture, and solidity are not 'properties' per say, but are 'percepts'. This is how we perceive these properties of the [object] system under observation. This is a phenomenon which belongs to the realm of epistemology (i.e., how do we know what we know?), not metaphysics (i.e., what is reality?). Percepts cannot be reduced to properties, in spite the fact that perception is a valid representation of reality - it is a mental phenomenon. It can only be said that a certain atomic structure is responsible for reflection of light waves of certain frequency and length which we perceive as a "red color". Fundamentally, the perception of color is an extremely complex scientific issue. The perceived color is not just a function of the wavelength of light reflected off a surface. It depends upon the receptors in our eyes; it depends upon the background and surrounding colors in a given field of view. It depends upon the color of light striking the object. Sometimes, it can depend upon the angle of viewing the object.

The elements of perception are:

1. **The object** of perception [in an environment].
   A. **The media** (signal, light waves, sound waves, atoms, etc.) that transfer information and material [in an environment].
      1. **The organ(s)** of perception.
2. **The concept** of consciousness [recognition of environment].
   A. **Conscious awareness** integrating input from perception organ (i.e., the subject, the experiencer, the self, the being).

Note: The conception of a 'percept' is a combination of these elements of perception.

Perception is a process of active interaction between sensory input and information which has been previously stored in brain and modeled by it. In other words we have ready templates of percepts (as subconscious schemata or automata) that interact and interface with sensory input. This makes the process of recognition of objects very quick. But, mental model templates are not identical to sensory input, and hence, the brain has to compensate, which creates the phenomena known as 'perception blindness'. Perception blindness is one of the many reasons it is prudent to account for perception at the social level with common tools and environmental feedback.

Certainly, humankind's current sense organs do not have the same precision and accuracy (or at least have not been trained to) as many of its technical and scientific measuring tools, which have been developed through the shared communication of knowledge. Although we as individuals perceive reality through our own individual sense organs, we can use science and technology to commonly discover more accurate data about reality than our five physical sense organs in their current form are capable of doing. In other words, there are two ways in which a community of individuals might collect data and "percept reality": (1) individually through their own sense organs; and (2) socially through collectively developed technical sense instruments (i.e., scientific measuring & surveying instruments) -- perception that correlates to experimental, clinical, and scientific data. When we seek to socially understand our environment and arrive at decisions that involve everyone, we principally apply those tools that are best for commonly measuring and identifying our common, objective reality. This [in part] ensures that our community's information structures maintain an objective alignment with our intentional direction in a common reality [and are less likely to become delusional trappings]. A reluctance to face [a shared] reality in the name of ego-protection is a common barrier to self-development. The idea that we can acquire common data about our common reality through collectively developed technological instruments as well as common methodologies (and methods) is an essential understanding for a community of individuals who seek common and optimal fulfillment.

Before any systematic (and intelligent) expenditure of energy there must first exist an observation of the environment [for input]. Observation leads to the collection, recognition, and structuring of data, such that it persists in a uniquely identifiable and functionally accessible location – so that it is recognizable by the larger community and its information system. This allows for the systematic prioritization of time and energy in all future accessing and processing of the data.

The data domain represents the collective data-base of the community and it is composed of data from three primary sources, which [in part] represent the analytical and critical approaches:

1. **Scientific inquiry** is used to discover a data set for building reliable knowledge structures of the natural world. Through hypotheses, testing,

and experimentation we discover more about ourselves, our real world, and its existent cause and effect relationships. Controlled experimental [research] studies are an example of scientific inquiry.

2. **Environmental surveys** are conducted to inform the community's information model about the state of the environment. Two common surveys are: surveys of resources, their allocation and availability; and empirical community surveys that collect data about the needs and preferences of the community.
3. Data from electronic environmental real-time **feedback sensors** feed data [in real-time] about every systems of which the community is composed [excluding protected personal information resources] into the Data Domain (Read: technological sensory feedback). There is a continuous feedback loop between our actions and the world. Here, our view of our selves is informed.

Wherein, verifiably conflicting data points call for more data and a re-evaluation of the models and measures used in the collection and structuring of the data. And herein, we are necessarily called to measure how much we are measuring.

If our sensors fail or we fail to recognize that our sensors provide data, then our actions are much more likely to be based on beliefs that are much less correlated with the actual environment, and hence, they are more likely to dis-align our decisions for a common intentional purpose. And, if our actions are poorly calibrated [to the factual environment], then there will be "miss-steps" in

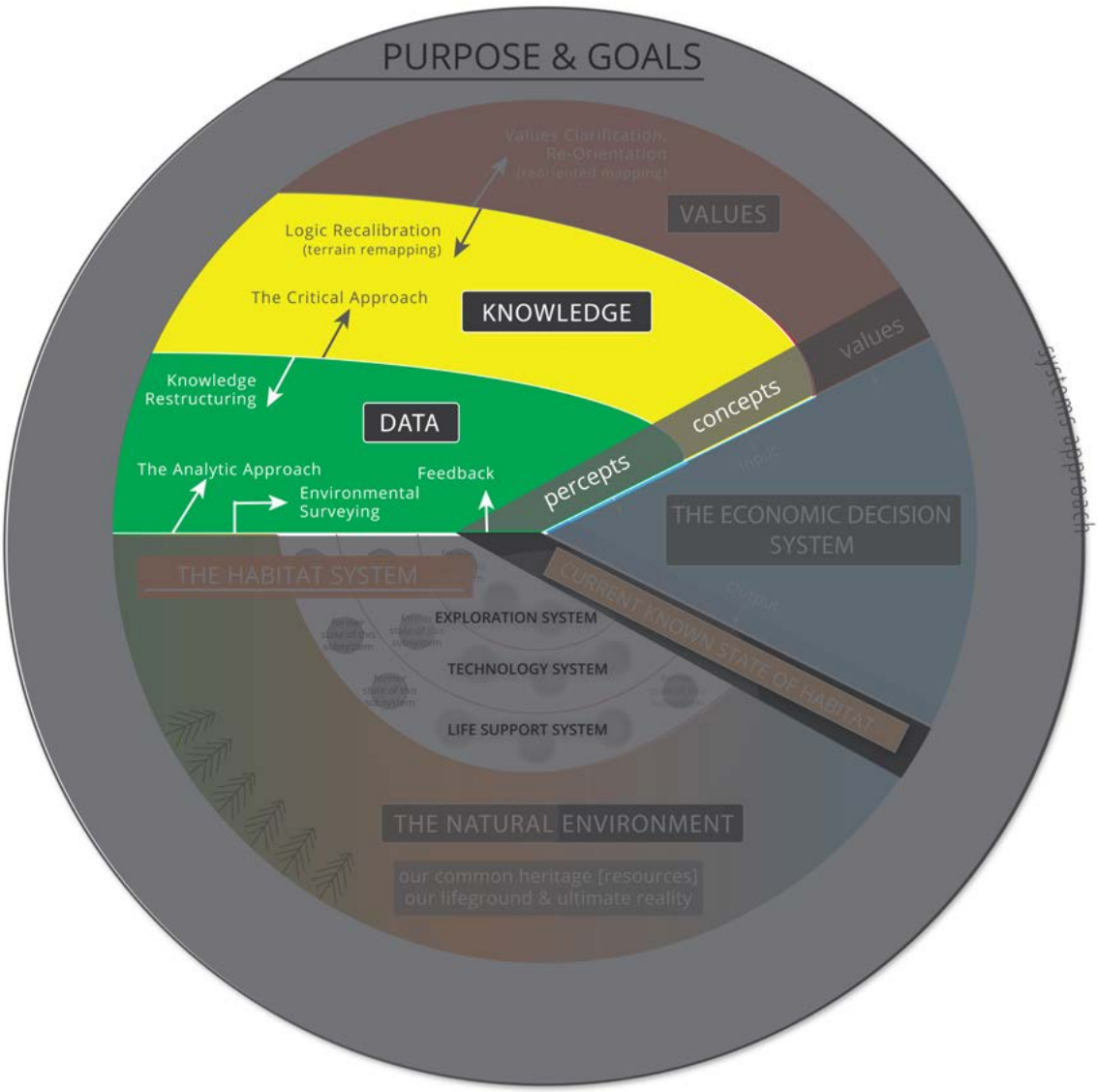

Figure 23. *Isolation of the data and knowledge domains (with the values domain less visible) as components of the social organization of information in the real-world community information model.*

action, which is bad for our survival.

1.1 Philosophical data axioms

Axiomatic concepts are the foundation and precondition for objective data, information, and knowledge. They are irreducible and fundamental. They are a starting point for [scientific] reason. The very idea of objective data has axiomatic concepts built into it; every effort made to perceive facts depends upon concepts that must first be recognized. It is by means of these axiomatic concepts that individuated consciousness is capable of maintaining a state of conceptual awareness of data, information and knowledge as a continuous function of a purposeful orientation within a common reality. Axiomatic concepts represent the first layer of interconnection between perception and mental conception. It is axiomatic concepts that identify the preconditions of conceptual data, information and knowledge: the distinction between existence and consciousness, between reality and the awareness of reality, between the object and the subject of cognition. Axiomatic concepts are the foundation for the continuous conceptual orientation of the human organism in the real world. Data about the real world [system] is: understandable objectively (objective axioms, data), collected scientifically (scientific axioms, knowledge), and processed systematically (systems axioms, information).

In a real world information system there are three known types (or "value sets") of axiomatic conceptual recognition, related to data, information, and knowledge. Respectively, they are the conceptual axioms of *objectivity* (data), of *systems* (information), and of *science* (knowledge). These conceptual axioms provide a source for moral orientation and direction in a real world reality. Axiomatic concepts frame all contexts and understandings - they are the first universal constructs (or encoded abstracts) for the conscious visualization of reality. Herein, frameworks, contexts, and methodologies are regarded as fundamentals for conceptual existence in an information system - how do we come to know what we know (i.e., epistemology).

Without a recognition of axiomatic concepts all awareness, interpretation, orientation, and communication of data, information and knowledge become like the telephone game - where people overlay the source of existence with their own narratives, obfuscating the source and corrupting information pertaining to it. Possibly, something akin to "subjectivism" as described in the Social System specification. Hence, it is always important to perceive the original, the source, rather than copies, and to see it through accurate prototypical perception rather than egoic illusion and programmed belief. In other words, it is necessary to have self-awareness: to remain open to what is, to experience objectively without judgment, and to observe without filtration - to "take in" that which is with as little perceptual and cognitive distortion (i.e., biased analytical overlay) as possible.

When looking at objective data an individual is essentially looking at an identifiable aspect of conscious existence. Existence can either be perceived for that which it is or it can be perceived for that which it is not. Regardless, perception is not the totality of reality. The truth (as that which has occurred or is occurring) exists independent of perception. Perception is "how" an individual perceives those events occurring and "how" they are recorded for future posterity as data. The "how" can either originate from a place of axiomatic truth, or it can not. In either case, truth and existence are (Read: exist) independent of perception. Essentially, when broken down into its etymological roots, 'perception' means "to see through" - to see through the lens of the individual, seeing through their mind (and psyche) - to see through to that which is or is not.

Essentially, perception is a process of active interaction between sensory input and information that has been previously stored in the mind/brain and modeled by it. In other words we have ready templates of percepts which interact with sensory input; metadata are an example of this. Such schema may make the process of the recognition of objects very quick ('subconscious automata'). But, templates are not identical with sensory input, and hence, the mind/brain must compensate, to varying degrees.

The truth is something that has the possibility of being observed and sensed by every other being around it, even if it is not accurately sensed or sensed at all. If it is true for one person, then the perception and sensing of that, whatever the predicate of the subject, it has to be true for all - if it is not true for all, then it is not true for one. Things in reality have commonly identifiable *characteristics*, *attributes*, and *states / dynamics*. This is a foundational understanding for how we engage with our world and how we communicate [truthfully] with others. An inquiry into truth, a philosophical inquiry, eventually fosters a "natural morality" - a morality that recognizes the natural common needs of all ecologically related organisms.

So, the question becomes, is an individual "subjectively" seeing through to that which is objective, systematic and scientifically observable as true, or are they seeing through belief systems and other filters that prevent a perception that is accurately aligned with truth? Said in another way: to what degree does an individual resonate with the potential that may be resonated with? There are many different perspectives, but not every perception aligns with what actually has occurred, which is objective and independent of perception. Perception can be aligned with truth or it can waver widely from that actuality. Accurate perception involves the attuning of an individual's "perceptual axiomatic frequencies" to the truth such that perception comes into contact with truth with a high degree of frequency (i.e., very frequently) and only wavers from it slightly. In part, it is the work of consciousness to align its perceptions with the truth instead of choosing to remain in opposition to that which is by a refusal to accept truth, which may be emergently

known. It could be said that human beings ultimate work is to align perception with reality so that they have a more accurate understanding of the truth and are thus more capable of designing systems and arriving at decisions that align their behaviors and actions with true and verifiable fulfillment.

Herein, philosophy is a process of inquiring into truth, of uncovering and discovering truth. As we become more familiar with that which exists we become more capable of creating in alignment with our real needs. Philosophy is the continual process of engaging will (Read: determined intention) to discover that which is, to align perceptions to reality, and to create in alignment with that which is truly fulfilling, which is truthful[ly shared].

Belief exists in opposition to truth. When consciousness holds a belief, it is essentially just "going with" whatever perception it happens to have in the moment, or whatever it has been told by an accepted authority. Belief does not involve fact checking, it doesn't involve data, it does not involve verification, it doesn't involve an alignment with that which is, and it doesn't involve the attuning of perception to that which has actually happened and is occurring. Instead, it is [in part] a "runaway" imagination.

Imagination is important for it allows consciousness to envision and visualize (a) truth and (b) something different, something which is desired or desirable, and then facilitates creative action; but if imagination goes unchecked, then it can turn into naiveté, blind belief, and a rigid sceptical mindset. A "runaway" naive imagination involves the imaginative creation of "evidence" and the encoding of unverified structures of information. A lack of real evidence leads to thoughts, behaviors, and actions that may be quite out of alignment with real world fulfillment as they are not based upon that which is. Alternatively, someone who is "rigidly skeptical" has imagined something that is not true, and is attached to that imaginative belief such that s/he ceases to openly inquire; instead, such a person has this idea of "knowledge" that they are holding on to that isn't in alignment with that which is; yet, they are so imaginatively convinced that they are accurate that the so-called "knowledge" has become a total believed in paradigmatic system of understanding, an "-ism", to them.

In community, we do not think in belief systems. By recognizing belief systems we maintain critical thought and are sufficiently capable of designing systems that are thoughtful to our resilience and ultimate fulfillment. We are less interested in "what" is believed (although it is relevant) and more interested in "why", in substantiation.

When "you" use certain language some people can't hear "you", but that doesn't necessarily call for "you" to use different language. It may mean that the divide between what "you" are saying and what they are believing is too great for them to overcome [at the present time]. This gap or distance in [f]actual knowledge is sometimes known as an *inferential distance* (or differential difference). It is the gap that needs bridging between a more coherent knowledge model and a more confused mental model of the real world.

Belief has nothing to do with that which is, which was, or with data. It has nothing to do with the ability to discover that which is, which comes about through systematic, critical and scientific inquiry into existence and truth. A belief system does not depend upon a process of inquiry, of discovery, of observation, of logic, of verification, and of synthesis into the understanding of that which has actually occurred. Instead, belief involves the process of developing or passively accepting [as given] imaginative "mental constructs" in an individual's own mind with no actual verifiable evidence to back up that constructed (or "fabricated") perception.

Belief and prejudice are similar concepts. They both conceptualize the idea that someone is prejudging, presupposing, or fabricating an opinion without sufficient inquiry, evidence, and validity. And therein, the beliefs of any one individual affect how s/he interrelates to others in society as well as to his/her own life/learning experience. What is believed is not the truth, otherwise it would not be belief. What is believed is not useful information, otherwise it would be knowledge. What is believed tremendously affects the perception and the experience of the truth and knowledge. Belief systems limit reality to a sub-set of the solution space that does not contain the answer to any real world problem.

"True believers" are people so completely captured by their belief that they can't think (or imagine) of their belief as a trap. True believers don't mind "a little inconsistency"; they just ignore it and go on. When "you" are a true believer "you" don't care if there is information to the contrary; "you" just deny it and go on. Yet, falsifiable evidence is not a thing to deny and go on, it's a thing to embrace and integrate, and move forward. Usefully fulfilling information gets ignored and humans experience suffering when evidence conflicts with true belief.

Ultimately, beliefs begin with someone not wanting (or having been conditioned not) to take on the personal responsibility to discover truth for themselves. Some people [for discoverable reasons] would rather listen to someone else and take that into themselves as a belief instead of remaining open to possibilities and looking at what actually is knowable for themselves. In "early 21st century society, where there exists a high degree of conceptual chaos (i.e., high entropy), any inquiry into truth requires a lot of challenging and diligent work. In early 21st century society, human minds, which would otherwise be used as tools for discovery and fulfilling creations, are highly controlled and have become like an atrophied and unused muscle. Herein, belief ends when open inquiry and self-respect begins, and the individual re-engages their will and desire to do the work to discover the truth for themselves while admitting when there appears contradiction.

All data about something (an object/entity) has to come from somewhere (the real world; space-time).

If information that consciousness uses to take action comes from beliefs and presumptions, then the resulting consequences of the action are likely to be as out of alignment with fulfillment as are the beliefs and presuppositions.

An objective, "natural law" philosophy, which facilitates the collection of objective data about the natural world by consciousness, involves three axiomatic subdivisions (or branches). The three subdivisions of this type of philosophy are:

1. **Metaphysics** - the world as it exists, the world around us, what is (objective reality, entity). What there is to know? What is real? What are the axioms of reality? How may one acquire knowledge until one has established that there is reality to know?
2. **Epistemology** - we are conscious of existence (percept, concept, reason, and logical). The study of knowledge, or more exactly, the ultimate nature of knowledge and how it is acquired. How do you know what you know? How do we know things, and how do we know they are valid? What are the requirements of [living] things in reality?
3. **Identity** - things are what they are (non-contradictory identification). Identity references something specific [in the real world]. How do you identify what you know? What is error and how is it minimized? Identity concerns both metaphysics and epistemology as the identification of [axiomatic] reality and the identification of knowledge.

The purpose for the an objective, natural philosophy is the discovery of truth and "correct" moral action, as that which is logically and empirically aligned with human (and ecological) fulfillment and flourishing, through the non-contradictory identification and logically verified conception by consciousness of that which exists. The term 'natural philosophy' may be used to pertain to the work of analysis and synthesis of common experience and logical argumentation applied toward the explanation and description of nature (i.e., natural synthesis by logically integrating the experiences of consciousness). An objective philosophy has a basis in nature (existent reality), which is based in truth and it is not made or caused by humankind. Objective reality is not a construct that exists only in the minds of human beings. An objective philosophy involves an inquiry into that which is inherent and objective in nature, and may be perceived, but is not perception. It seeks to identify those existing conditions in nature that are both binding and immutable. Thus, its discoveries are considered binding in the sense that it doesn't make a difference whether someone believes in them or not, or even understands their operation [or not], consciousness is and will still be held under its (i.e., natures technical) effects regardless. It is not within a human beings power to change these discoverable conditions (or "universal technical principles"), they are always in effect and they are unchangeable by anything that anyone is capable of doing. This is a philosophy that seeks to discover the immutable and not man-made, binding conditions that act as the ordering principles and "governing systems dynamics" in the world, which have use in designing more fulfilling habitat systems. When this form of philosophy is practiced habitually, it facilitates an individuated consciousness in remaining in [frequency] synchronization with the existent source [system] dynamics of reality.

Epistemologically, the formation of axiomatic concepts is an act of abstraction, a selective focusing on and mental isolation of metaphysical fundamentals; but metaphysically, it is an act of integration—the widest integration possible to humankind; it unites and embraces the totality of someone's experience. From the perspective of source reality it involves the letting go of all abstracted attachment and a stepping into (or reconnecting to) the universal flow of all of existence.

Most concepts that people use in discourse are contingent on some other preceding thing (i.e. concept) that has to be accepted, whether it is realized and has been accepted or not. For example, the concept of 'blasphemy' has no meaning if you don't believe in a divine authority. The concept of 'leisure' or 'holiday' (as defined in early 21st century society) has no meaning unless work is alienating.

Generally in philosophy, reduction occurs along two parallel lines: on the one line consciousness can reduce assumptions, and on the other consciousness can reduce concepts. The axiomatic method is a way to reduce assumptions used in a theory to a few basic principles. Reducing assumptions means that they are derivable from other assumptions; reducing concepts means that they are definable from other concepts. Eventually no further reduction is possible [with the given information available], leading to the emergence of axioms and "primitive" concepts. Primitive concepts are those which are not defined given the information available. Therein, the purpose of axioms is to describe some inherent part of the underlying conceptually structured nature of the real world, accepting that the world has [levels of] structure. Axioms are useful in describing a class of structures, as well as in describing a single structure, though only incompletely.

The axiomatic critical thinking structure is composed of an ordering of meaning:

1. **Axioms** (a.k.a., first principles, foundational principles, universal property principles, core assumptions, basic assertions).
2. **Data** - the raw signal.
3. **Information** - where the raw signal has meaning.
4. **Knowledge** (and visualization/communication) - where the meaning can be shared and used to do

something useful.

A **data axiom** is an irreducible conceptual state expressed in the form of a concept (or proposition) that identifies the origin (or source) of data about a common real world, and it pertains to any further statement of that data, such as those of information and knowledge. In other words, a data axiom is a [conceptual] statement necessarily contained in all others about data, whether any particular communicator chooses to identify it or not. In other words, the objective data axioms also pertain to all objective information and objective knowledge.

'Axiom' is a term of logic and it means an irreducible truth (or proposition) that cannot be proved by means of analysis because all means of proof and evidence depend on this proposition. In philosophic discussion, these axioms become propositions that cannot be argued against and are not a matter of arbitrary choice. They are something that an arguing party would have to accept and use in the process of any attempt to deny them. Here, it is necessary to recognize that not every true statement of a system can be proved by deductive reasoning from other statements, or there would exist infinite regression. These primary (or source) statements and principles on which all others are based, and from which the others are "proved", are known as axioms.

As Rand (1990: 55) explains:

> *"Axioms are usually considered to be propositions identifying a fundamental, self-evident truth. But explicit propositions as such are not primaries: they are made of concepts. The base of man's knowledge—of all other concepts, all axioms, propositions and thought—consists of axiomatic concepts. An axiomatic concept is the identification of a primary fact of reality, which cannot be analyzed, i.e., reduced to other facts or broken into component parts. It is implicit in all facts and in all knowledge. It is the fundamentally given and directly perceived or experienced, which requires no proof or explanation, but on which all proofs and explanations rest. The first and primary axiomatic concepts are "existence," "identity" (which is a corollary of "existence") and "consciousness." One can study what exists and how consciousness functions; but one cannot analyze (or "prove") existence as such, or consciousness as such. These are irreducible primaries. (An attempt to "prove" them is self-contradictory: it is an attempt to "prove" existence by means of non-existence, and consciousness by means of unconsciousness.)"*

In rational philosophy, axioms are perceptual self-evidences. Conscious organisms in their pursuit of useful, objective data about the real world [toward the intention of well-being] necessarily require a set of axiomatic concepts that describe their interaction with the source from which their data originates (a useful relationship and context).

In concern to axioms and fallacies, there is the "stolen concept" fallacy refers to the using of a concept while denying the validity of its requirements (or "genetic roots"). There is absurdity in arguing against a position when the argument depends upon that position.

A data axiom refers to a fact of reality about the system from which the data was derived. It is ascertained by observing the fact that it cannot be escaped, that it is implicit in all data, and that it has to be accepted and used even in the process of attempting to deny it.

When someone declares that axioms are a matter of arbitrary choice, and proceeds to choose complex, derivative concepts as the alleged axioms of their alleged reasoning about data, one can observe that their statements imply and depend on *existence*, *consciousness*, and *identity*, which they profess to negate, but which are smuggled into their arguments in the form of unacknowledged, "stolen" concepts. "Stolen concepts" are an indication that an individuated consciousness has not performed the process of conceptual reduction sufficiently to become aware of those concepts underlying the concepts they are using.

Existence, *identity* and *consciousness* are the axiomatic values of objectivity; and hence, all objective data. They provide an objective framework for the experience and "correct" interpretation of all data. Data acquired under the value conditions of objectivity maintains the attributes of identifiably existent entities and events in the real world, which have a probability of being comprehended by consciousness qualified by the accuracy of the other identified structures used to know it - how do we come to know what we know? Forming a coherent awareness of primary facts is one of the crucial epistemological functions of axiomatic concepts. It is also the reason why they can be translated into a statement only in the form of a repetition (as a base and a reminder): Existence exists; Consciousness is conscious; A is A. This converts axiomatic concepts into formal axioms. An axiomatic concept (argument or proposition) does not "prove" that the objective data axioms of existence, consciousness, and identity are true. Instead, it is only an individuals unobstructed experience that they are axioms at the base of all data, information and knowledge, and thus, inescapable.

The axiomatic philosophical logic of being [in the context of data] includes:

1. Consciousness - It comes into presence.
2. Existence - It is always present.
3. Identity - It moves through presence.

> *Question: If consciousness, identity, and existence, and their corollaries, are not axiomatic conceptual propositions for all data, information, and knowledge in a given society, then what are the axiomatic concepts that inform said society's information structure and all if its frameworked decisions.*

'Existence' is objective, perceptually self-evident, incontestably true, implicit in all knowledge, and conceptually irreducible. It is a challenge to identify a starting point which does not assume the truth of the axiom of existence.

The objective concepts of existence, identity, and consciousness are axiomatic in the design of the social organization of the Community - they are paradigmatic propositions for the adaptive alignment of the orientational value state of the Community toward a fulfilling purpose in the real world. They are presupposed in all cognition, as well as every communication and decision. Individuals that acknowledge these concepts have a level of perceptual cognition that may be said to maintain some form of accurate alignment with the objective characteristics of reality.

It is relevant to note here that the most important question for language bias is whether a concept description language is universal or whether it imposes constraints on what concepts can be learned subsequently. This is relevant because the integration of some concepts and their spatial orientation to other concepts in someone's cognitive schematic model has the potential to set limits on the future integration of more accurate conceptual understandings. If you consider the set of all possible examples, a concept is really just a division of that set into subsets.

Yet, the inaccurate integration of information subsets often leads to obscurity and confusion in the integration and understanding of the system as a whole. Wherein, a universal language is one that is capable of expressing every possible subset of examples. Therefore, it must originate with axiomatic concepts that are universal, and in particular, the axiomatic concepts of objectivity, of systems, and of science to remain sufficiently open and universal to all of real world existence so that existence as a whole system may be perceived and worked within.

Axiomatic concepts are epistemological guidelines. They sum up the essence of all human cognition: something *exists* of which I am *conscious*; I must discover its *identity*.

Additional comments on data axioms include:

1. The standard test for calling two objects the same is **Leibniz's law:** if they are the same, then whatever is true of one is true of the other and whatever is false of one is false of the other. Herein, reductionism's mistake [in identification of that which exists in consciousness] is to confuse a *necessary condition* with an *equivalence*.
2. An **axiomatic concept** is not [identifiably] reducible within epistemology. That means it does not have any other propositions or concepts which are necessary to understanding the axiomatic concept. An axiomatic concept is therefore also one of the first-level concepts, whose meaning is established by its reference to an existent (as opposed to another abstraction).
3. For everything that exists, including consciousness, it is always valid to inquire into how it works and what it is composed of; division rests within composition through the process of 'synthesized reconciliation'.

QUESTION: *What does the data suggest is the optimal and most truthful arrangement and structure of that which exists?*

1.1.1 Existence

INSIGHT: *To wholly understand the world, the world must be looked at as one inclusive [whole] information system.*

The concept of existence, as a singular unit, is undeniable and inescapable. If you are reading this you are experiencing the reality of existence, as well as the data of existence, at this very moment - regardless of how you might be choosing to perceive it - you are sensorially perceiving the signatures of existence with degrees of identifiable accuracy and you are doing so with some degree of self-initiated intention. In any logical structure of systematic concepts and propositions there must be some universal or source starting point (possibly a more encompassing multidimensional system).

Existence is implied in every percept; if it is not, then it is a possible falsehood. The concept of existence is irreducible since it pertains to everything that exists, including mental content, all other concepts, material reality, and all entities which have never been and maybe never will be directly observable. That said, there exists a subset of existence, the real world, and this is our common conscious reality involving natural and discoverable phenomena not composed of chaotic mental constructions. This is the real world that our Community exists within, and it must be accounted for if human fulfillment is sought.

What example can we find of something that is absolutely true at all times and all spaces? The first thing that may come to mind is the axiom of existence: existence exists. Since the concepts 'time' and 'space' presuppose existence as the underlying metaphysical precondition of their meaning, any time must take place sometime in existence, just as any space must exist somewhere in existence. The fact that existence exists is true at all times and all places; although, some things exist in the real world and some things only exist in the minds of those who believe they exist; and, an "objective view" looks at all of this existences as that which exists.

Through existence comes a world space and through a world space comes an [identifiable] 'decision space' that feeds back possibility into the world space creating a navigable environment - a space where consciousness may take choices and cause the world to more greatly respond to our thoughts, for consciousness has that potential as it more greatly understands the nature of the space it is working (or otherwise, being) within.

The identification by consciousness of that which exists in the real world is the first step in turning data into information. Things which exist in the real world have commonly identifiable signatures. Consciousness has a potential [probability] for recognizing these existent signatures and integrating them into the information structures by which it arrives at decisions that lead to greater or lesser entropic coherency and fulfillment. Herein, data allows consciousness to experience patterned space where decisions that are arrived at by consequence lead to greater and lesser states of potential fulfillment.

If it exists, then a basic corollary is that it must all integrate. In order to exist, there must be a larger technical conservation of the ecology - there is a discoverable technical integration that leads to greater states of powerful thought-responsiveness. We must think about how the entire universe can seem to be both physical, yet not made of solids, but of probability distributions. In other words, if we know that there must be conservation in all relationships of all sorts, then how do we both embody and accord with that understanding? What are we doing to improve both ourselves and our community in that regard? We are all transparent in this sense - we all integrate into a commonly identifiable existence.

> **NOTE:** *Imagine if someone said existence exists isn't a primary since it can be reduced by every existent that makes up existence. This is a basic circular argument since what is know, is being confused with, how it is known.*

1.1.2 Consciousness

> **INSIGHT:** *"You" can become conscious of what consciousness is, because you are conscious. Because consciousness is 'now' (i.e., an immediate thing), and you are it, the only way you can know what consciousness is, is by you being conscious of it. Which means, a scientist can't do it for you.*

Consciousness is observed as a self-initiated goal-oriented response[ability] (SIGOR) to an environment[al challenge] through the active perceptual conception of a living entity -- the generation of an em-bodied sensory awareness with a decision space. Herein, biological action is a fractal of consciousness, it is a self-initiated goal-oriented response. The body is [in part] a highly attuned and adaptive sensory array that interfaces our consciousness through with an environment to which we become a part.

Consciousness is an aware and self-modifying system, and hence, it can evolve itself. Consciousness can put in effort to make better choices to produce lower entropy. It takes effort (work) to lower entropy. There has to be input to run counter to entropy. Therein, consciousness can evolve itself through effort. Consciousness can also de-evolve through lack of effort or through poorly directed effort. Critically, a system (e.g., consciousness) that does not understand its environment, and its relationship to that environment, may not understand the value, or the dangers, of self-modification.

Consciousness is awareness that takes choices; it is a choice making awareness (Read: "I am, and I choose this rather than that"). If there is the ability to take a choice, then there is some degree of freewill. For any choice, there is a "before the choice" and an "after the choice". If anything happens, now and then (before and after), then there is time. Hence, consciousness, free will, and time must logically exist for any of them to co-exist. Therein, consciousness evolves by ordering its bits, and as it orders its bits it can do more work (i.e., can accomplish more activities). There is usefulness [to consciousness] to the organization of information.

There is always a decision space when there exists an identifiable consciousness. There is a signal of data in existence that consciousness can identify [through embodied sensation] and use to construct; and through its experience, it feeds back information. Therein, the verifiability of existence is common to all consciousness.

Consciousness is axiomatic precisely since all proof starts with it – You cannot know something without first admitting you know anything. It commits one to no other physical or metaphysical claims. Conscious means being aware of something and the ability therein to self-reflect. To say conscious doesn't exist is self-refuting. Consciousness is essentially a phenomenon of information. Axiomatically, consciousness formation given the information available will integrated into a unified whole so that it is impossible to divide into independent parts. That reflects the experience that each instance of consciousness is a unified whole that cannot be decomposed into separate components. (Tegmark, 2014)

Consciousness identifies its existent environment through the naming of unique observations by conceptually relational patterning (by "fractaling"). Identifiable things (i.e., things in existence of which data is gathered) have properties, attributes and characteristics, and behaviors that become interrelated and more meaningful in a compiled and more completely integrated information system (through emergence). Therein, human individuals are capable of identifying existent objects through cognition after the experience of perceptual data from their senses and collective instruments from the existent, real world. All consciousness is consciousness of something. Consciousness has an object[ive challenge for adaptation and growth]. In some respects, consciousness is the distinction of past from present - time, the iterative identification of that which exists by consciousness and initiates the structuring of a potential space of decisions. In this sense, consciousness is a type of information system.

An information system is made out of bits, which are the smallest piece of information. Bits are a yes or a no, a 1 or a 0. If all the bits are random, the system has no information. Random bits carry no information,

but if the bits are ordered, then the entropy of that information system is lowered. If the bits are not only ordered, but also made meaningful and/or useful [to consciousness], then consciousness lowers its entropy. In a sense, consciousness is itself an information system.

Entropy has two general aspects:

1. Entropy is a measure of disorder. If order is increased, organization is increased and entropy is lowered.
2. If entropy is lowered in a system, then that increases the system's ability to do work. Through order there is a greater ability to do work.

In order to create information in an information system the bits must be ordered and the order must mean something. To raise the entropy the bits must be randomized.

When things are identified and organized, then consciousness immediately begins to feel less overwhelmed for it can perceive the landscape that it is navigating through, what it has to work with, and what the next probable step or action toward fulfillment might be. Most "next steps" (i.e., navigation) are easy once sufficient data about the terrain has been collected, correctly identified, and sufficiently integrated - the solutions to decisions (and hence, problems) "unfold". The folding and unfolding of protein structures might be a good metaphor here.

It is only consciousness that is capable of conceptual errors and "perceptual blindness". It is only consciousness that needs a special identification of the directly given, to embrace and de-limit the entire field of its awareness -- to de-limit it from the void of "unreality" (or delusion) to which conceptual errors can lead.

Consciousness has an awareness of itself and its thought processing. There is introspection with consciousness. There is a space between stimulus and response. When that space is attenuated or even non-existent (as when fear and greed are present], then it could be said that one does not have "conscience", that one is of a "lower consciousness", or that one is not [internally/intellectually] free. But again, these are labels, and so they are imprecise descriptions of that which is occurring.

One might ask, what can consciousness do? Principally, consciousness can re-focus its intention and its attention; it can re-direct and re-orient itself as space-time iterates. Syn-chronously, consciousness (the mind-body) can experience, think and identify.

Within the real world there is the potential for life experience [by consciousness]. The very existence of data opens a 'pattern space' for consciousness - a space where identifiable objects maintain the potential for having deeper and more meaningful similarity and interrelationship, a space for understanding, learning, and ultimately, evolution.

INSIGHT: *There is no learning by consciousness without [the identifiable] data [of existence].*

1.1.3 Identity

INSIGHT: *The only meaning that a concept has is precisely the difference between it and everything that is not it.*

Existence and consciousness reconcile through identity. Identity is the first form of integration; it is the *reconciling force* in the Three Forces Model that is detailed in its full description in the Social System specification. The reconciling force integrates and "balances" the other two forces (as existence and consciousness). In this application of the Model, consciousness (or will) is the *activating force*, and existence (or technically bounded reality) is the *restraining force*.

If someone doesn't "do" identification, and hence, integration, then they might end up in a unpleasant place where seemingly random and threatening information pops in from everywhere and nowhere, almost as if they were in a scary children's cartoon. When existence is not identified and integrated, then individuals end up with an amorphous blob of identities and relationships swirling around their psyche. By not identifying and integrating information accurately there will exist a discordance between consciousness and existence (its absolute environment) because the two are not being identified and reconciled - relationships become frustrat[ed/ing]. When we don't reconcile our differences in [value] orientation then there is the potential for frustration in our social relationships.

Also, if someone doesn't have a method for dealing with and otherwise logically organizing information in their mental model of the world, then the information will be integrated in a disconnected manner and its future access will consequently be inefficient. When identity is applied to action [in an information system], then there is probable causality and the potential for iterative prediction.

Without identification (as in, labelling and defining) people can think they are talking about the same thing and in actual fact be talking about multiple different things with potentially conflicting meanings. If you name something it is easier for to think about it and talk about it, while recognizing that names are constructions, and not the actual existing thing. Without accurate identification the probability of social conflict increases.

There are some significant rhetorical questions to ask in relation to identity:

1. How do someone relate anything to any other thing (i.e., identify relationships) without naming?
2. How do someone come to know anything when things do not have identifiable signatures or names?

INSIGHT: *In nature things neither hide nor*

reveal, but signify [to consciousness].

1.2 Perception and cognition

The human mind perceives things not perceptible by the five senses, including relationships, patterns, mathematical entities, and meaning in general. Human beings have real needs and the derivation of meaning from experience by cognition facilitates the more effective and efficient fulfillment of the real needs of the human organism. Wherein, it is a part of the role of cognition to collect and generate knowledge by synthesizing and testing hypotheses, by observing and exploring the stuff of existence, and by searching for a higher potential fulfillment by explaining and logically reasoning what [if anything] these observations and results mean to our evolution in the universe.

The human mind is capable of both experiencing the real world and penetrating into the conceptual space of formative ideas. The empirical can be integrated with the "ideal" (Read: abstract object or mental representation), to structure the facts of consciously identifiable experience into a larger context of meaning and a commonly fulfilling, purposeful direction. Physicist David Bohm calls this combination of relationships the "undivided wholeness in flowing movement". Gregory Bateson called it, the "pattern which connects".

Conception and perception are interrelated; when one is changed the other maintains the potential for change also. The human mind uses concepts to organize its percepts into an information set consisting of systems of knowledge (orienting) and systems of belief (disorienting). Both systems of knowledge and of belief represent conceptual frameworks. Thus, we can talk for example about the Aristotelian conceptual framework, the Newtonian, the Darwinian, the shamanistic, the Christian, the Islamic, the Buddhist, or the philosophical systems framework. Conceptual frameworks are systems of concepts used to organize and explain the occurrence and behavior of phenomena detected by sense data. Some conceptual frameworks are also paradigms (or "viewpoints"). A 'paradigm' is a way of thinking, which is often so ingrained in people's behavioral thought patterns that they aren't even aware of it. It is a set of the most fundamental conceptual relationships adopted by a population that maintains a shared approach to perception and to engaging with an environment. Paradigms might involve assumptions, concepts, values, and practices that constitute a way of viewing reality (i.e., a viewpoint) for those who share them, especially in an intellectual discipline. The 'systems paradigm' is one of the few, if not the only known paradigm that acknowledges the value of emergently open and active inquiry through a recognition that understanding about a system is derived from an inquiry, discovery, and integration into its supra-system through an approach that maintains a corrective feedback mechanism (i.e., material experience) and facilitates in the sustained emergence of a system of knowledge versus a system of belief. To understand emergence means to recognize the potential for the appearance of new information, which allows for openness to new information. A deep understanding of the emergent nature of thought is essential for any individual to transcend his/her self-limiting and irrational thought processes and behavior. Essentially, 'emergence' facilitates in the individual the logical ability to appreciate when they are proved to be [verifiably] wrong, rather than feeling upset or angry.

It would still appear that consciousness can only know what its perceptual and conceptual processes (or "apparatuses") allow it to know. Hence, for an individual to remain in alignment with his or her higher potential s/he must seek accurate perceptual data and logical conceptual integration into knowledge void of bias and contradiction, and full of recognized patterns and context.

1.3 Logical reasoning to information

> **INSIGHT:** *Community is a reflection of each individual having an abundance of accurate information about the whole.*

The process of *logical reasoning* takes percepts and integrates them into identifiable concepts for purposes of delineation, to find distinguishing characteristics and relationships in reality for use in reducing the entropy of our information systems and generating greater states of fulfillment and more fulfilling systems. This is not an arbitrary process, and to consider it as such undermines a human's ability to comprehend the existence of a commonly objective, scientific, and systematic reality. What exists is what we as a community have to deal with. If there is evidence of something we must have the courage in ourselves to address the unknown, to apply our observations and skills of identification and definition, our ability to recognize patterns, to dismiss the arbitrary and eliminate the noise so that we are left with a clear and coherent understanding of that which is; so that we may apply that which is toward decisions and actions that better fulfill our common needs (i.e., that which also is). Truly, this is what we are all looking for because it is that which allows us to act with self-confidence and maintain an accurate orientational alignment with a commonly fulfilling purpose.

Concepts and assertions must be capable of being reduced to facts. If they cannot be reduced to facts then why would a community base its decisions on them? The "risk" or unpredictable consequences of a decision increase as the absence of accurate information increases.

Reality exists independent of perception. There are approaches which may be used to determine what is truth and fantasy, what actually exists in the real world versus what is just a figment of someone's imagination. It is possible to follow the truth to wherever it leads. The systems approach is part of that process of discovery and integration. Regardless of what approach is chosen,

ultimately, humankind must align its perceptions with the reality of that which actually exists in the real world if there is to be any real world progress [beyond politics and power and authority and fear].

When someone states, "we cannot know the facts of reality", then metaphorically speaking, they are cutting a community off at the knees. If we cannot know the facts of reality, then we cannot learn and adapt. Herein, the fallacy of the stolen concept becomes salient. This particular instance of this fallacy makes a claim to the belief that human individuals cannot know anything for certain. Although this statement is said with absolute certainty, it must be asked, how can anyone be so certain, for one must apply the concept of certainty to assert a proposition that nothing can be known for certain? The word "certain" in the statement could be replaced with the word "absolute". The fallacy of the stolen concept consists of using a higher level concept while denying or ignoring its hierarchical roots (i.e., denying one or more of the earlier concepts on which it stands). Errors of this kind are widespread and are the intellectual equivalent of standing on an upper floor of a skyscraper while dynamiting all of the earlier floors. The statement that there are no absolutes is an absolute statement in itself, and thus, exists in a state of contradiction -- it cannot be coherently integrated and may lead to the corruption of someone's perception of that which really exists.

As a community we "arrive" at informed decisions using a systematic, analytic, and critical process, as opposed to "making decisions" via subjective human opinion. A pilot can have an opinion concerning his/her altitude; however, this is not sufficient to fly a plane carrying multiple people with a predictable degree of safety. When the pilot arrives at a conclusion about his/her altitude by consulting the Doppler radar readout on the aircraft's instrumentation panel, s/he will know exactly how far s/he is off the ground due to this collectively developed sense instrument, Doppler radar. Today, automated aircraft piloting systems (autopilot) fly and land many commercial aircraft. Most "new" aircraft have 'autopilot'. Therein, Doppler radar is incorporated as a sub-system of a larger collectively developed and formalized automated decision system known as autopilot (with degrees of functionality and complexity). Now, apply this same thinking to the way in which a digital, technological community might organize itself socially and economically. What weight does opinion have when compared to the availability of observable, factual data, which provides someone's cognitive reasoning with an accurately informed decision space? Surely, an opinion is just that, an opinion. If it was based upon fact and data with a real world referent, then it wouldn't be an opinion. As such, when it comes to a social orientation in a finite habitat opinions serve as nothing more than a means to state a perspective. An opinion exists merely as a temporal stance prior to the receipt of verifiable data. Ideologies are wholly composed of opinionated information. A philosophy aligned with the logical integration of reality seeks to filter opinion.

The logical organization of information is important to our well-being as a community, for without it we might drown ourselves in repetition and confused oblivion. We might create and repeat things that continuously generate states of suffering and inflict suffering on others.

> *"Objectivity is both a metaphysical and an epistemological concept. It pertains to the relationship of consciousness to existence. Metaphysically, it is the recognition of the fact that reality exists independent of any perceiver's consciousness. Epistemologically, it is the recognition of the fact that a perceiver's consciousness must acquire knowledge of reality by certain means (reason) in accordance with certain rules (logic). This means that although reality is immutable, in any given context only one answer is true, and the truth is not automatically available to a human consciousness. It can be obtained only by a certain mental process, which is required of every man who seeks knowledge—that there is no substitute for this process, no escape from the responsibility for it, no short-cuts, no special revelations to privileged observers—and that there can be no such thing as a final "authority" in matters pertaining to human knowledge. Metaphysically, the only authority is reality; epistemologically, it is one's own mind. The first is the ultimate arbiter of the second. The concept of objectivity contains the reason why the question "Who decides what is right or wrong?" is wrong. Nobody "decides." Nature does not decide—it merely is. In issues of knowledge, man does not decide, he merely observes that which is. When it comes to applying his knowledge, man decides what he chooses to do, according to what he has learned, remembering that the basic principle of rational action in all aspects of human existence, is: "Nature, to be commanded, must be obeyed." This means that man does not create reality and can achieve his values only by making his decisions consonant with the facts of reality."*
>
> *- "Who Is the Final Authority in Ethics?". The Objectivist Newsletter, Feb. 1965, 7.*

1 The data domain

APHORISM: *To truly understand, one has to understand what the data (e.g., the numbers), are telling one, without advertising.*

The Data Domain functions to identify observable, measurable, and calculable elements of the natural, existent real world and place them into an emergent and initial information structure for functional access by the community, and in particular, *the Knowledge Domain*. The Data Domain's internal structure represents that of an organized and digitized information system for data (i.e., a 'data management system'). The Data Domain involves the identification of data from existence, and the processing of that data into a structural formation for meaningful access and orientational usefulness by consciousness.

Generally, 'data' are a description of empirical facts or observations in the form of identifiable signs (symbols, signals, or signatures) about phenomena; they are the objective facts of reality. A fact is an undeniable observation. A fact is a verbal statement that expresses a relation [of high certainty] between two or more named objects or events. The fact is the effect that we measure. Data are the recorded facts (as attributes or variables) of events, entities, states, relationships, or conditions in the real world. Data is the product of 'research and discovery', and it may or may not be devoid of context, meaning, or intent.

A single piece of data (a 'datum') has little potential for meaning unless the context from which it originated is also understood. A datum (singular of data) is a discrete and communicable reference point to (or descriptive representation of) an event, entity, state, or condition in space-time as the first [identifiable] indicator that orients [consciousness within a common existent reality]. Accurate and timely data is vital for a community that seeks to arrive at decisions that facilitate its continuation and adaptation (i.e., resilience). The Data Domain involves the collection and structuring of data about systems (the real world; the habitat; and the habitat service systems), which is later organized into a system of knowledge through common data processing methods. Data about systems is collected objectively through the methods of science, filtered through critical thought, and put toward the design of new and more fulfilling systems that more accurately express our fulfillment and reflect our nature in the real world. Through data we adjust our orientation as individuals and as a community.

To navigate together using data, the following information sets are required:

1. Semiotics: The iterative process of generating and applying intelligence through data.
2. Data: The symbolic representation of sensations and measurements.
3. Information: The relationship among data elements.
4. Knowledge: The meaning of the relationships among the data elements.
5. Stakeholders: Those affecting and affected by the data.

In concern to science and data processing (a.k.a., data manipulation), altering data for use in science is only acceptable if:

1. The original data set is preserved,
2. An explanation is provided for how the data set was modified.
3. A reason is given for why the modified data set was created.
4. A description is given for how the modified data set is being used.

The Data Domain involves a long list of processing activities for data with the purpose of collecting, structuring and ordering data into the information space known as "knowledge". Some common collection activities in this domain include: gathering of parts (content); surveying; testing; researching; capturing; discovering; sensing signals, observation and measuring; trial and error; and exploring. The structuring and ordering of data can include a multitude of processing activities, such as calculating, collating; grouping; linking; connecting; aggregating; categorizing; comparing, sorting, associating, relating, clustering, and classifying. Where applicable these processes provide an initial re-organization of the data into a usable [information] structure (i.e., into 'knowledge').

People often use the terms 'data' and 'information' interchangeably. However, it is better to view data as "the raw referential signatures of existence" that are processed into knowledge-oriented information as an output of the Data Domain for access by other systems. Then, information can be defined as the set of patterns, or expectations, that underlie the data.

Here, 'information' may be viewed from two equivalent data-perspectives. First, information is data that have been structured into a "meaningful" and "useful" context for specific forms of access in a larger semantic information structure known as the Real World Community. And second, information is a pre-existing structure in the real world that data [with degrees of accuracy] describes and references. In both cases, information is composed of data that have been given a functional meaning by way of the identification of existent relational connections between data, information, and knowledge. Essentially, when facts are put into a context and combined within a [patterned] structure, then information [which was always present] emerges into the awareness of consciousness. Herein, consciousness is capable of identifying and measuring between that which it has awareness of. In other words, information is data in some form of a patterned

and [measurably] meaningful structure (i.e., data "information"). Information and knowledge are a data construction (herein, "con-" means together with a structurally defined purpose, iterative prediction and our fulfillment). Also, 'data' describes information in a discrete manner - it describes that which it is referencing, and it is essentially referencing information.

Everything is information for there are always associations in the real world, even if they are not recognized. And, the data is there, we may just not be experiencing it. Information "resources" (digital resources) are data -- in a digital system, information is composed of individual units called "bits". A bit (binary digit) is the smallest unit of data that a computer can process and store. A bit is always in one of two physical states, similar to an on/off light switch.

'Data' is bits of information collected to more greatly understand the real world information system and to facilitate the design of community systems that more accurately orient toward higher states of fulfillment. In general, the process of turning data into information involves the identification of similar relationships and patterns between data, information, and knowledge. And, when information is validated and placed into a more cohesive and useful context, then knowledge [of the objective and real world information system] emerges. What is the purpose of science if not to discover what identifiable 'tasked objects' exist in the real world?

Herein, it may be interesting to note that relational information systems (e.g., a relational database) can generate data from the data stored within them. This fact is one of the reasons why the human species is presently seeing the exponential growth of data about the world in which it exists. It is possible to computationally simulate (and synthesize) information from relational information (which is a redundant thing to say). Fundamentally, all data can be tested in simulation.

Data is the first input in an information system [as the first indicator that orients within a system]. Hence, any method for handling information must first account for the data of which the information is composed. The three methodological approaches described in the Social System specification (i.e., the systems methodology, the scientific method, and the trivium method) all account for data first, or they account for data synchronously with other inputs.

The Data Domain correlates [in part] with the general grammar stage of the trivium method, which involves the gathering of data prior to any other logical, critical, or exploratory thought, and prior to inductive logical thinking and reasoning. The gathering of data under the general grammar stage of the trivium method includes the processes of observing, collecting, recognizing and identifying, categorizing, associating, and relating data from an environment.

There are four system-level aspects to data in an information system:

1. **Data availability** – The data exists (or does not), and existing data remains accessible (or available) to the system.
2. **Data collection** – Data is collected via any number of different means, which the system uses to remain in a state of equilibrium and functional adaptation.
3. **Data processing & Structuring** – The processing of data into a structure for coherent integration by the system.
4. **Data as information** – After data is processed and converted to information, its new structure is more complex, more ordered and less entropic (if the data were accurate).

Scientific data are usually "subjected" to data processing in the Data Domain during which:

1. Their form is aggregated, structured, patterned, and otherwise organized.
2. Their content is analyzed and statistically evaluated.
3. They are placed in a proper context for later access.

Within the data domain, data processing occurs. Here, data processing involves the identification of implicit, previously unknown, and potentially useful information from data.

Data domain processing include, but are not limited to:

1. **Data categorization**
   A. Do categorization (set/group pattern recognition).
2. **Causal understanding**
   A. Look at an object and identify its causal properties.
   B. Do connections between data to produce understanding.
   C. A societally mandated module that demands that you figure out the consequences of your actions.
3. **Causal encoding**
   A. Look at a process and identify its causal properties.
   B. Do connections between understandings to produce orientation (i.e.,values, objectives).
   C. A societally mandated module that demands what to minimize and what to maximize. What are the goals and what are the goals to be rejected.
4. **Decision system (data extends into the decision system)**
   A. A computation design module that generates a new system state based upon demands.

The processing of data leads to the initial structuring

of data into 'information' in the Data Domain. There are four primary data processes (or data processing techniques) that accomplish this functional task:

1. **Classifying** - a [problem] process of assigning a data object to one of several pre-defined categories based upon the attributes of the object. In general, in classification you have a set of predefined classes and want to know which class a new object belongs to. This process is sometimes known as *classification learning*.
2. **Clustering** - a [problem] process of grouping objects based upon distance or similarity. Clustering tries to group a set of objects and find whether there is some relationship between the objects. A cluster is the resulting collection of similar or same items from acquired data.
3. **Associating** - a [problem] process of identifying any association among features between [data] objects, not just ones that predict a particular class value. This process is sometimes known as *association learning*.
4. **Relating** - a [problem] process of relating new object [data] instances whose class is unknown to existing ones whose class is known.

The processing of data [through logic to derive critical understanding] involves three general sub-steps:

1. **Filtration** - data is filtered after gathering to ensure relevance and accuracy.
2. **Correlation** - data is mutually related by context.
3. **Analysis** - data is inspected, cleaned, transformed, and modelled with the goal of discovering [relationally] useful information, suggesting conclusions, and supporting decisioning.

The characteristics of data include:

1. **Accuracy** - The accuracy of tourism statistics is the degree to which the data correctly estimate or describe the quantities or characteristics they are designed to measure. In general, accuracy can be characterized in terms of errors in statistical estimates and is traditionally decomposed into bias (systematic error) and variance (random error) components.
   A. **Validity** refers to whether a data collection tool or concept truly captures what it is intended to measure. In other words, a variable or measure is valid if the values estimated are close to the true values.
   B. **Reliability** of data refers to whether the instrument or source of the data would produce consistent results under identical circumstances regardless of who uses it.
   C. **Precision** refers to an aspect of the reporting of data, or of statistics or indices derived from original data and is not, in itself, an intrinsic quality of the original data.
2. **Timeliness** - The timeliness of tourism statistics refers to the delay between the end of the reference period to which the data pertain and the date on which the data are released and available to the public. This dimension usually involves a trade-off against accuracy. The timeliness of information also influences its relevance, as

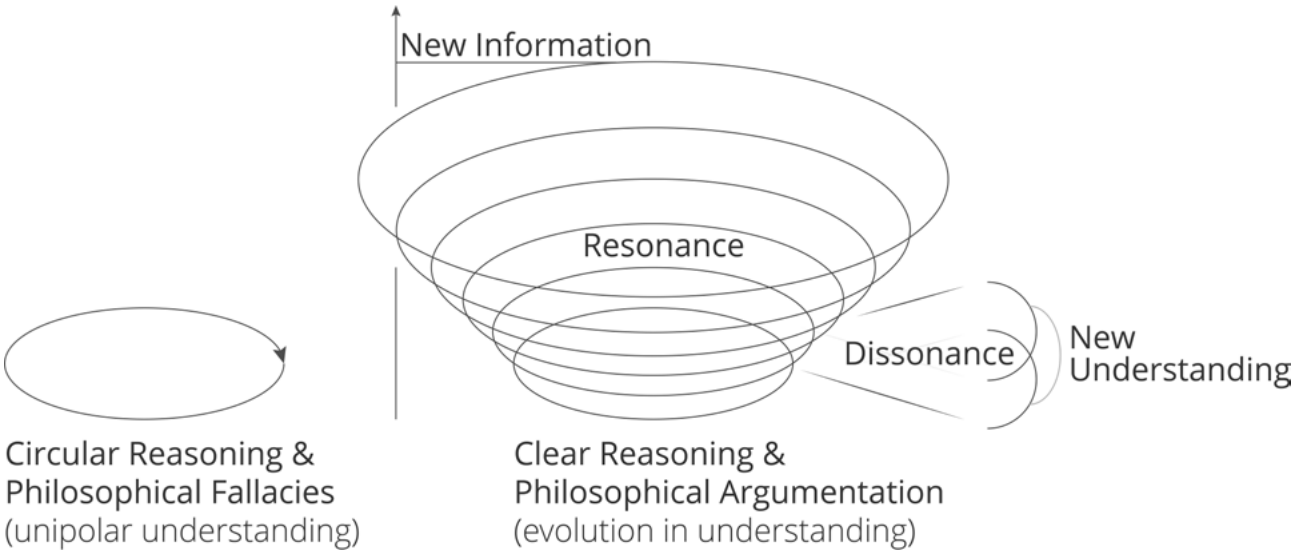

Figure 24. *A philosophical argument evolving into greater awarenesses of understanding positioned in contrast to the process of circular reasoning.*

accurate data that are not timely are of limited usefulness.

3. **Methodological soundness** - The methodological soundness of a data source refers to the application of international standards, guidelines and good practices in production of tourism statistics.
4. **Coherence** - Coherence reflects the degree to which the data are logically connected and mutually consistent, that is, they can be successfully brought together with other statistical information within a broad analytical framework and over time. The use of standard concepts, classifications and target populations promotes coherence, as does the use of common methodology across surveys when relevant. Coherence has four important subdimensions:

   A. Coherence within a data set implies that the elementary data items are based on compatible concepts, definitions and classifications and can be meaningfully combined.
   B. Coherence across data sets implies that the data are based on common concepts, definitions and classifications, or that any differences are explained and can be allowed for.
   C. Coherence over time implies that the data are based on common concepts, definitions and methodology over time, or that any differences are explained and can be allowed for
   D. Coherence across countries implies that the data are based on common concepts, definitions and methodology over countries, or that any differences are explained and can be allowed for;

1.4 Information

> **INSIGHT:** *The information must exist in the information system if action is to be coordinated that necessary involves that information.*

Information is data in some contextual formation (after re-integration). Effectively, everything is data/information. To separate data and information, it is possible to state that information is data that has been processed, analyzed, and presented in a form that facilitates decisioning. In the market-State, actionable information is known as "intelligence"; where, there is political intelligence, business intelligence (competitive intelligence), military intelligence, etc.

1.4.1 Information constructor theory

> *A.k.a., Task-based construction of information theory.*

The basic principle of constructor theory is that all fundamental laws of nature are expressible entirely in terms of statements of which tasks (i.e. classes of physical transformations) are possible and which are impossible, and why. This is a new mode of explanation, intended to supersede the prevailing conception of fundamental physics which seeks to explain the world in terms of its state (describing everything that is there) and laws of motion (describing how the everything changes with time).

By regarding counter-factuals ('X is possible' or 'X is impossible') as first-class, exact statements, constructor theory brings all sorts of interesting fields, currently regarded as inherently approximative, potentially into fundamental physics. These include the theories of information, knowledge, thermodynamics, life, and of course the universal constructor. In constructor theory tasks are performed by constructors. Possible tasks are those which physics allows the presence of a constructor. A constructor is an object that can perform a task and retain the property to perform it again. Basically, it is everything that can do something and retain the property to do it again.

This theory says that the way we describe the world is in terms of transformation. In this transformation, there is something that is changed (a substrate) and something that changes it (a constructor). And, those are the two fundamental conceptual elements for the presence of creative physical processes. Here, we realize that information can provide instructions to coordinate the transformation of a substrate (which is itself, a task).

An instruction is information that is acting as a constructor. Of course, in the real world there are only approximations to the idea of constructors [because there is a continuum]. And, knowledge is one of the best approximations of a constructor as it gets preserved [because it is an abstract constructor]. DNA might be considered a constructor for it provides instructions to a cell [as to what to do] to build certain chemicals and so forth. When all the unnecessary details are identifiably abstracted away you are left with something that has to do with information that asks as a constructor and that is acted upon by the environment.

If a task, a transformation, is impossible, then there is a rule that makes it impossible. If there is no rule that makes it impossible, then it is possible. There is no third possibility. What does possible mean? In the overwhelming majority of cases, though some things are possible because they happen spontaneously, things that are possible are possible because the right knowledge embodied in the right physical object would make them happen. Since the dichotomy is between that which is forbidden by the laws of physics and that which is possible with the right knowledge, and there isn't any other possibility, this tells us that all evils are due to lack of knowledge. It claims that the whole of science is to be formulated in terms of the difference between transformations that are possible and those that are impossible, and there isn't a third possibility.

Also, 'task information criteria' describe short-term, locally measurable effects which relate directly to a [transformation] process.

> *"There's a notorious problem with defining information within physics, namely that on the one hand information is purely abstract, and the original theory of computation as developed by Alan Turing and others regarded computers and the information they manipulate purely abstractly as mathematical objects. Many mathematicians to this day don't realize that information is physical and that there is no such thing as an abstract computer. Only a physical object can compute things."*
> *- David Deutsch*

1.5 The smallest amount of data

An information system is made out of bits, which are the smallest piece of information. Bits are a yes or a no, a 1 or a 0. In other words, a bit is the smallest unit of information in an information system, represented by a single binary digit 0 or 1. The smallest amount of information consciousness can have is the answer to a yes/no question. The outcome to such an inquiry can be represented as a [binary] probability spectrum (0 or 1 = 1 bit of information).

> **INSIGHT:** *Information is not only conceptual, but also everything physical. Everything in the real world is information; the real world is an information system and there is also the potential for creating a software (digital) information system to manage the total information space.*

1.6 Data collection

Data collection is the process of gathering data for use in decisioning. In a socio-technical society, data collection happens at many levels. Data can be collected from one or more sources as needed to resolve inquiries and provide the information that's being sought.

The methods used to collect data vary based on the type of application. Some involve the use of technology, while others are manual procedures. The following are some common data collection methods:

5. Collection of data from information services.
   A. Automated data collection functions built into internet-software (applications and websites).
   B. Manual reporting by working group members.
6. Sensors that collect operational data from industrial equipment, vehicles, and other machinery.
   A. Automated data collection functions built into machinery sensors and software.
7. Collection of data from habitat services.
   A. Manual reporting by habitat team members.
   B. Automated data collection functions built into sensors and software.
8. Surveys, questionnaires and forms, which may be completed: online, in person, by call/phone, by electronic mail (email), or regular mail (postal mail).
9. Focus groups and one-on-one interviews.
10. Direct observation/experience of users (a.k.a., user feedback).

Well-designed data collection processes include the following steps:

1. Identify an issue that needs to be addressed and set goals for the project.
2. Gather data requirements to answer the inquiries or deliver the information solution.
3. Identify the data sets and sources that can provide the desired information.
4. Set a plan for collecting the data, including the collection methods that will be used.
5. Collect the available data and begin working to prepare it for analysis and integration in order to completely resolve the issue.

There are four primary types of data that can be collected:

1. **Object observation and naming** ***(is object)*** - is the name of the object (label of object; recognized by shape). Data about and naming of objects can be collected.
2. **Quantitative data about object(s)** ***(is count and mathematics)*** - is numerical (includes a count). For example, quantity, price, percentage, etc. Data about the count of objects can be collected, and mathematical computations can be performed on counted data to provide further [mathematical] data.
3. **Qualitative data about object(s)** ***(is static concept)*** - is descriptive in nature (includes properties/ characteristics) For example, color, smell, appearance, texture, etc. Data about the descriptive characteristics of objects (static concepts) can be collected and visualized.
4. **Process data about objects** ***(is dynamic concept)*** - is explanation in nature (includes visualization objects moving and concepts on a graph). Data about the movements of objects can be collected and visualized.

1.6.1 Evidence

The "gold" standard of "evidence" of causation is randomized clinical or randomized control trials. Only experimental, controlled and falsifiable (or, interventional) studies can verifiably demonstrate

whether a particular activity is the cause of something. Observational (or epidemiological, associational, correlational) studies may find an association or a correlation between a thing and an outcome, but they cannot say with statistical certainty that one is the cause of the other. Correlation does not necessarily imply causation. Empirical observation by itself does not prove or explain *how*. It shows spatial proximity, but does not prove causation; the scientific method demonstrates causation through its falsifiability and controlled [experimental] design.

The relationship between correlation and causation is a fundamental concept in statistics and research methodology. Correlation refers to a statistical measure that describes the extent to which two or more variables fluctuate together. A positive correlation indicates that as one variable increases, the other variable tends to increase as well. Conversely, a negative correlation signifies that as one variable increases, the other tends to decrease. Causation implies that one event is the result of the occurrence of the other event; there is a "cause and effect" relationship. Note that it is not possible to prove causation from correlation, but if it is shown that there is no correlation, that proves there is no causation. There obviously has to be at least a correlation if there is a "cause and effect" relationship. In other words, while a correlation between two variables does not inherently indicate that one causes the other, the absence of correlation is a strong indicator of the absence of causation. Causation necessitates correlation; if a cause-and-effect relationship exists, the variables must change in conjunction in some manner (positively or negatively correlated). Correlation alone is not sufficient to prove causation. Establishing causation requires further evidence that goes beyond the mere observation of correlation, typically involving controlled experiments, longitudinal studies, and the elimination of alternative explanations. Therefore, while correlation can suggest the possibility of a causal relationship, it is not definitive proof of its existence.

The concept of evidence in research is foundational to its integrity, ensuring that findings are reliable, transparent, and reproducible. The highest-level standard for research integrity, as mentioned, incorporates several key practices that are directly related to the generation, presentation, and evaluation of evidence. The highest-level standard for research integrity includes all of the following (adapted from: Nylenna, 2006):

1. Open data.
2. Open protocols.
3. Open code.
4. Pre-registration.
5. Version control.
6. Declared biases and conflicts of interest.

1.6.2 Socio-technical data structure (reality coherence)

A.k.a., The techno-socio, techno-social, techno-informational-material, informaitonal-spatial structure.

There is an intertwined informational-material rope that composes whole data structure of human reality (Read: the real-world community model). A civilization/society exists in terms of a socio-technical structure (note: these are axiomatic dimensions):

1. **Techno-structure (materiality)** - the whole technology ecosystem of the society.
   A. **Infra-structure** - the whole technology "stack" by which the people meet their needs (the means of production and end products themselves; i.e., the habitat service production systems).
2. **Social-structure (information)** - collective agreement fields and social organizations that mediate it (i.e., the user's community profile).
   A. **Super-structure** - the values, beliefs, knowledge, needs, preferences, wants, ideologies, opinion, identities, and other influencing and mediating understandings of what is and what could be. In particular, what identity people have (or, associate themselves with) influences what information people pay attention to.

Changes in any of these structure influences and drive changes throughout; they inter-related and inter-influence one another.

1.7 Database

A.k.a., The collection of data, ledgers of data.

Data is stored in a database. Virtually all computer systems require a persistent storage medium of some sort, a database. Databases enable the effective management of information. Without databases it would literally be impossible to effectively store and track data, and trace all the relationships between various data items required by the multiplicity of applications that comprise computer-based information systems. The unified information system is a stored in a database. Applications and tasks, therein, will involve information being stored in the database.

Database coordination (a.k.a., database management) systems provide [at least] the following:

1. Organize data so that unnecessary duplication is avoided and redundancy is reduced.
2. Allowed many different applications to share

common data is a secure and efficient
3. Isolate physical data storage and retrieval from the application programs that consume it.
4. Provide concurrency controls and serialization methods so that shared data can be updated by multiple concurrent users or programs.
5. Provide common authentication along with access control administration, enforcement, and logging for data and relationships.
6. Enable concurrent transactions so that changes to data can be committed or "rolled back" depending on other conditions that might arise within the environment or the application program, etc.
7. Provide detail audit trails that describe who/when/why, etc. data was accessed, modified, deleted, etc.
8. Provide various indexing and query optimization techniques that make it possible for the volume and velocity of data to scale to the expectations and requirements of the modern enterprise, WWW, etc.
9. Provide for distributing data across large computing networks because it is no longer possible for single, monolithic computers to handle modern data requirements.

NOTE: *In market- and State-based information organizations, the database is often hidden from users.*

1.8 Metadata

A.k.a., Meta-data.

Essentially, data is a discrete communicable reference point to an event in space and time. The reference point originated from somewhere and so it has some additional data accompanying it. This additional data is known as 'metadata'. Metadata represents the first structuring of data (or, pre-defined structuring of data).

All data must be accompanied by contextual auxiliary information if it is to be accurately structured, processed and accessed by other systems. This auxiliary (or additional) information that accompanies the generation and collection of data is known as 'metadata'. Metadata is information about [the meaning and context of] data - sometimes defined as "data about data". It is descriptive information about a particular data set, object, or resource, including how it is formatted, and [at least] when, how, and by whom (i.e., source) it was collected. In an information system, metadata is a standardized information descriptor for data - a "data descriptor" that allows for the processing of all data in that system. In other words, metadata accompanies data to aid in its interpreted explanation and processing. In the Data Domain, data is processed with its metadata to obtain more detailed information about the data in systematic association with other information. Activity in an information environment generates data, but it needs to be in a workable format and accompanied by meta-contextual information for it to have usefulness and for it to remain accessible to the whole community.

INSIGHT: *It is the insight we gain, not just the data we gather, that makes a difference.*

The conceptual idea of "metadata" has been in use for as long as collections of information have been organized. And, metadata is an essential component of the engineering of information systems and of technological design in general. It involves the codification and description of data in a standardised manner; and hence, it allows for the system-wide interoperation and openness of data.

Metadata can originate from one of two sources: (1) it can be automatically derived from the digital resource itself (as *intrinsic* or *implicit metadata*), or (2) it can be created and associated with a resource by human beings (*extrinsic* or *explicit metadata*). In other words, metadata may be generated automatically using software or it may entered manually by an individual. Through the use of digital technology, data may be easily collected, stored, structured, and communicated using electronic or other media that self-generates (Read: self-populates) or facilitates in the generation of metadata to provide an initial propositional context for structuring the data inside the Data Domain.

The process of formally standardizing metadata is three-fold:

1. Metadata models (or schemas).
2. Metadata semantics.
3. Metadata syntax.

Technically, metadata has three basic sub-types:

1. **Structural metadata** - describes the containers of data (i.e., the format of data). **Structural metadata** describes the physical and/or logical structure of an information resource to facilitate relationships between or within resources.
2. **Descriptive metadata** - describes the content of the data (i.e., metacontent). **Descriptive metadata** describes the content of an information resource and is used to find, identify and understand a resource. Descriptions involve qualifications.
3. **Administrative metadata** - describes data management. **Administrative metadata** facilitates the management of information resources through elements such as version number, archiving date, and other technical information for purposes of information management and preservation. It is used to manage the creation, use and preservation of the resource (includes technical and preservation metadata).

Together, these metadata types facilitate in the identification and retrieval of data as a 'resource', 'record' or 'log'. These are not always discrete sets of metadata, and there is often a considerable overlap.

Metadata facilitates the association of data and can describe any number of data association signatures, including but not limited to:

1. A data source.
2. A process(es).
3. An event.
4. An organization.
5. A particular collection of data (a file or a database or a table in a relational database or a class in an object-oriented database).
6. An instance of data (in a relational database table, object instance in a class within an object-oriented database).
7. Data associated with the values of an attribute within a domain, or the particular value of an attribute in one instance.
8. Metadata can also describe data models.

Metadata has clear purposeful usage in:

1. Describing data for the purposes of data exchange.
2. Describing data for the purposes of system access from query (including update) to optimise recall and relevance.
3. Describing data for the purposes of query optimisation.
4. Describing data for the purposes of upstream information integration and explanation.
5. Describing data for the purposes of correct analytical processing or interpretation, representation or visualisation.
6. Describing the data to overcome multi-linguality and multimedia heterogeneities.

All of these purposes require that the data be described:

1. Such that the resource is constrained formally (i.e., identifiable via a standard structure) to ensure integrity [in communication].
2. Such that the resource is reachable by directed and automated means (i.e., searchable and retrievable).
3. Such that there is sufficient description for purposeful usage of the output - input data, output information (i.e., it is useful).

In order for data to remain useful and accessible over time its structuring must be updated and corrected. Most of the updating and correcting of data structuring over time actually involves changes to data's metadata as opposed to the data itself (although it might conceivably involve changes to the data).

2 The knowledge domain

> **QUESTION:** *Without facts, upon what is there to base knowledge (i.e., upon what do we base our knowledge without facts)? Knowledge may be said to be the "mental grasp" of facts.*

The Knowledge Domain functions to identify a greater complexity and understanding of relationships and patterns in information from the Data Domain and integrate them into a relational, logical, and systematic knowledge structure (a "semantic web"). This structure defines the forms, functions, and principle processes of the real world. Herein, data about systems, which has been collected through empirical and experimental means, is organizationally integrated and otherwise structured into a 'system of knowledge' for useful access by the Community, and in particular, the Values Domain and the Decision System Domain. Accurate and timely knowledge is vital for a community that seeks to arrive at decisions that facilitate its adaptation and dynamic fulfillment. Knowledge is all about an accurate representation of reality (i.e., it is a representation of reality with high certainty). In a way, knowledge is simply actionable information developed over time, and with a specific certainty rating. Information with known degree of certainty, informed by science (scientific information), and useful for action (actionable information). The Knowledge Domain represents the humanity's most current and comprehensive understanding of itself and the real-world (a.k.a., reality) within which it resides. Herein, knowledge is discovered over time.

> **INSIGHT:** *Society ought to be organized according to scientific knowledge about how humans are most optimally fulfilled.*

Note that among community, it is important to realize when someone has passed the limit of one's knowledge and has begun to conjecture, and that is not a failure. It is "ok", there is no punishment that will be inflicted if someone says the words, "I don't know". For individuals in society to act continuously based upon conjecture and presupposition is inefficient, and certainly, ineffectual for their own and everyone's fulfillment. And herein, it is important to recognize that if there is a topic about which no one knows anything and won't be honest in communicating that they don't know, that maximizes the degree to which people have opinions.

The Knowledge Domain involves knowledge, as highly structured and integrated information about the systems of which the real world community is composed. The Knowledge Domain involves the clarifying of perceptual and relational identities and the integration of object[ive] data and conceptual understandings by individuals, instruments, and systems in the real world into a more cohesive and useful model for orientating and for deciding as a community.

The term knowledge refers to a set of emergently corrected and objectively identifiable conclusions about the real world. Knowledge is a structurally and relationally organized collection of facts, truths, or principles that explain the experiential and consequential probabilities of relationships in existence, it has predictive properties, and it results from the integration of information generated by inquiry, discovery, perception, and fundamentally, experience into the existent. Since knowledge explains [in part] real world systems, it is therefore useful in designing, developing and predicting the behaviors of systems it [correctly] describes.

Knowledge is communicated through conceptual language. Visually, knowledge is represented by a semantic (relational meaning) and syntactic (logical arrangement, rules) network consisting of concepts (nodes) and links (edges). Nodes represent objects and edges represent relationships. Hence, concepts are definable by their internal attributes and external relationships.

Knowledge is an emergent organizational resource commonly informed by individuals and systems in the Community. Knowledge is "more integrated" data or "highly informed" information, and it has significance beyond its mere presence. Better knowledge results in better decisions, better actions, and better performance. Knowledge has meaning to an entity with a decision space for its usefulness in optimizing predictions and decisions in the systematically spatial and relational world where the entity with a decision space exists. Knowledge comprises of everything that data comprises of (facts, observations, and asserted perceptions) structured into a complex relational model (also known as map, schema, mental model, connectome, or concept model, among others). It is relevant to note here that such models are evaluated by their ability to explain the existing data within a self-consistent and coherent system reflective of the real world by some probable (and predictable) degree.

When a model is tested and it "hits a roadblock" (i.e., its logical prediction does not align with what was expected in 'negative feedback'), then there is the appearance of a boundary in the information landscape of our understanding of our resolving of that which exists. Some strategies, those of adaptability and resiliency, see this as an opportunity to optimize the knowledge structuring of themselves and society. A gap in our understanding may be overcome through learning. Often, the key to understanding is casting out belief (or "false knowledge"). The idea that knowledge is "justified belief" is a contradiction in terms. If something is reasoned and "justified" with verifiable evidence, then it is not a belief. In other words, if something is reasoned and verified, then it is not a belief. When there is understanding then there is useful forward movement and accurate navigation (i.e., once you have the understanding you can move forward). Efficiency in this sense, involves a self-initiated, goal-oriented strategy toward a new model of reality with a higher potential [structural platform] for navigation and re-creation.

The derivation of knowledge from observed data

requires the application of processes. The Knowledge Domain involves a long list of processing activities with the purpose of structuring, ordering, and patterning representations of reality into a single, unified, and increasingly accurate 'knowledge model' of the real world. Some common structuring and ordering activities include calculating, synthesizing; analyzing; reasoning, critical thinking, relating; identifying; connecting; logicizing, contextualizing, and ordering. Where applicable these processes (and methods) provide a complex re-organization of information into an integral (as systematically cohesive) information structure (i.e., knowledge). Knowledge typically involves the logical processing (and structural patterning) of information to obtain a meaningful and probable indication of trends or patterns in data. Together, these activities are the mechanisms by which data is [more greatly] structured into knowledge. It is also relevant to note that the quality of any knowledge stored in an information system must be maintained by the continual processes of correcting and updating the knowledge, its structure, and the process by which it is derived, as more information becomes available.

Engineering academic, Milan Zeleny, stated in 1988 that, "While data and information are piecemeal components, partial and atomized by their very nature, knowledge and wisdom are "holistic" concepts, related to and expressed through systemic network patterns and thus integrative by definition." (Gupta, 1988) A more simplistic view of knowledge considers it as the highest level in a hierarchy with information at the middle level and data at the lowest level; a hierarchy that "openly" reflects reality. Also, according to this view, knowledge refers to information that enables "informed" actions and decisioning.

It might be of interest to also note that in the corporate and government "intelligence industry", actionable information which policy makers "are said to use to make decisions" is called "intelligence". This type of "intelligence" is not equivalent to 'intelligence' in the real world. 'Intelligence' in the real world isn't information that some so-called authority uses to make subjective decisions; instead, it is the ability of consciousness or some technical entity to pattern recognize and to process information into a more accurately aligning decision space. Intelligence describes the processes a system goes through to synthesize available information. Intelligence could be perceived as a continuum representing the quality of the processing of information - leading to states of low entropy and high integration, or states of high entropy and confused, contradictory integration (i.e., not-integration; "litigation").

Fundamentally, consciousness derives and verifies knowledge from experience. Knowledge starts as an observation by consciousness and its refinement allows for the material creation of useful technologies for consciousness. Technology is the product of knowledge. Therein, humanity can use knowledge to address its global and common needs. Individuals may more greatly understand themselves as they more accurately model the universe within and through which they exist, while creating systems that align with their value coordinates, which are explained by their knowledge base, toward a direction of commonly understood fulfillment. Therein, knowledge has the potential to dispel fear embedded within consciousness for humans have a tendency to fear that which they do not understand.

Regardless, knowledge is the resulting integral structure of a specific set of system processes. When intelligence is low and the system integration processes are of low quality, then the resulting knowledge structure will be of poor quality, and it will not mirror real world; hence, decisions and conclusions made or arrived at from this poor quality model are likely to direct consciousness away from fulfillment, which requires actual knowledge.

In a community, knowledge is a collection of useful information about a predictably existent reality placed in a "pool" (or commons) for common access.

Knowledge is the result of a particular type of inquiry. In order to arrive at useful decisions and to correctly orient, '*why*' questions about oneself and the real world must be asked. '*Why*' questions [about systems] are answered through synthesizing and assimilating (integrating) the results of multiple '*how*' questions into a unified model with some degree of "certain[ty]" alignment with the real world. Effectively, knowledge answers '*how*' questions and provides an indication of '*why*' [often with a degree of statistical certainty]. If all knowledge were the conclusion of a proof, then we would have an infinite regress, void of any starting point, void of the real world (i.e., subjectivism).

Knowledge of the phenomenological world describes at least "mechanisms of action" in the phenomenological world. A 'mechanism' is a systems process that drives or influences the outcome of a perceptible event.

Research into phenomenological mechanisms reduces uncertainty in a specie's information system and it facilitates the evolution of technology for that species. In many cases, human scientists have tested, analyzed, and examined theories so thoroughly that their chance of being wrong is infinitesimal, which doesn't mean to say that there might not be more to know about them and their relationships. Other times, uncertainties linger despite lengthy scientific research. In those cases, scientists make it their "job" to explain how well something is known. When gaps in knowledge exist, scientists qualify the evidence to ensure others don't form conclusions ("claimed knowledge") that go beyond what is known. Even though it may seem counter-intuitive, scientists like to point out the level of uncertainty. Why? Because they want to be as transparent as possible and it shows how well certain phenomena are understood. Certainty provides focus, power, decisiveness, action, and orientation. And, uncertainty allows for openness, possibilities, and ultimately, humility.

Buckminster Fuller defined the idea of "wealth" in terms of knowledge, as the "technological ability to protect, nurture, support, and accommodate all growth needs of

life." His analysis of the condition of "Spaceship Earth" caused him to conclude that at a certain time during the 1970s, humanity had attained an unprecedented state. He was convinced that the accumulation of relevant knowledge, combined with the quantities of major recyclable resources that had already been extracted from the Earth, had attained a critical level, such that competition for necessities was not necessary anymore. Cooperation had become the optimum survival strategy. "Selfishness," he declared, "is unnecessary and henceforth unrationalizable ... War is obsolete."

Knowledge is both *a priori* and *synthetic*. It is a priori, for it goes beyond what is merely given to sensation or to empirical perception -- it reflects reality with a degree of probability, both material and conceptual. It is synthetic because it adds an explanatory unification and useful structural composition to the merely given -- it becomes useful for navigation. An organization and unification of knowledge leads to a single philosophic and scientific body of knowledge – a single, unifying information system in some sort of probabilistic alignment with the system from which it was sensed (or perceived).

The degree of unity, consistency, or relatedness among entities in a system is a matter to be consciously ascertained. Natural sciences presuppose that there is a unifying system that is universally true and can be known through structured inquiry, through a "process of being, doing, and having". The task of individuals (i.e., scientists in community), if they so choose, is to continuously discover information of the unknown and to build accurate knowledge models [of reality] so that a community's actions coherently lead to greater states of fulfillment.

Knowledge is a continuous and incremental process of integration toward ever greater understanding. Knowledge may guide the direction of a society and the design of its systems. If a community seeks to maintain an alignment of its information structures with actual reality (the real world), then the community's knowledge and understandings must remain emergent and subject to update as new data, information, knowledge, and value is acquired (or becomes available). As the community's understandings change so too must any and all theories and designs based upon the old concepts (i.e., the information and decisioning systems must be updated in its designs for our habitat). To stubbornly cling to old outdated systems when newer, more scientifically accurate studies and discoveries disprove their usefulness [in sustaining fulfillment] is unwise. The gaps we perceive in reality are just gaps in our understanding. The belief that science already understands the nature of reality in principle (i.e., scientism) is delusional and is not scientific. Science is a tool for coming to understand that which existed, exists, and may exist.

Knowledge has no value judgment, it is neutral. Any value judgment upon commonly verifiable knowledge is a projection of oneself (a possible state of the self-reflecting "ego"). The more these judgments are inspected, the more they are found to be projected aspects of the self (i.e., psychological projections).

The Knowledge Domain has some similarities with the discussion section of a scientific research paper, and of the body of knowledge known as 'science'. The discussion section of a scientific research paper is a sapient exercise in logic, brevity, and clarity. The discussion section involves the identification of logical relationships between that which was known and that which is newly known, as well as conveying a deeper understanding of the results of the research; at the very least it involves logic and critical thinking. Generally, the discussion section is the most useful part of a research report and helps readers to integrate and understand the implications of the findings (i.e., data and percepts). It often elaborates on how the results fit into the larger theory or system, and it may or may not place the findings in the context of a value system, a moral orientation toward fulfillment and better decisions. Of note, for effective access by the community, the language in the discussion section of a research paper must be clear and unambiguous, otherwise technological engineering would be impractical.

At this very moment humanity is seeing the exponential growth of technology through the growth of knowledge at a real-time, global pace.

The purpose of thinking is [in part] to identify knowledge so that we can orient ourselves in the real world and meet our real needs. Knowledge might be seen figuratively as "getting onto the same page", so we can meet our common needs. That is why we use language; we use language to commonly identify.

We can come to rationally conclusive identifications and understandings about issues of interest. And, we can design our systems in conceptual/digital form and arrive at logically probable solutions prior to iterative technical creation. Through transparency of data and logical simulation the world appears more clear to us and we may freely navigate within it.

> **INSIGHT:** *There are many inquirers who have come before "you" and have added to the common pool of knowledge that "we" collectively hold as humankind, and there are many who will come after "you". If "you" have accomplished anything it is only by standing on the shoulders of others; for in order to accomplish that which "you" have there were many who came before, and "you" may help the many who come after (or, "you" may not if you do "not" share).*

2.1 System-based knowledge

Data about real-world systems are organized into a 'system of knowledge'. The real-world is organized into systems, and hence, all knowledge [about the real-world] is systems-based. Systems maintain [at least] hierarchical and contextual relationships, and hence, knowledge about systems has both hierarchical and contextual characteristics. In concern to the hierarchical nature of knowledge, for example, consciousness must

know of chairs and tables if it is to also integrate the concept of furniture -- into a complex material system that provides a functional architectural structure for the needs of individuals. Conceptual information (i.e., concepts) are built upon and develop into hierarchical systems of knowledge that become increasingly unified the more knowledge is learned about them. Knowledge cannot exist as disconnected bits on a flat plane, where one data point has no relation to another, where everything is non-relational, and thus, out of [embodied] context -- we are operating in a total information system.

Both the idea of a *hierarchy* and of *context* signify a more complex structural relationship between bits of information about a commonly experienced system. The implication exists that there is a larger interrelated system (or "reality") within which discoverable and identifiable things have knowable interrelationships.

A hierarchy of knowledge might be visualized as a body of data points, concepts, relationships and principles structured in order of logical dependence, one upon another, according to each item's distance from the base of perceptual data and any "pre-cognition" with which cognition accepts inputs. Moving down the hierarchy involves conceptual and assumptive reduction, as well as sensory attunement and possibly sensory re-mapping.

The hierarchical view identifies a particular kind of cognitive relationship: one that has an inner structure of logical dependence, rising gradually from a base of "first-level" items. Herein, logical reduction is the means of connecting an advanced knowledge to reality by traveling backward through the hierarchical structure involved (i.e. identifying in logical sequence the intermediate steps that relate a cognitive item to perceptual data). Please note that the logical process of reduction is not reductionism - incorrectly reducing causes to a variable of the overall cause, which is not the cause, possibly through [emotional] attachment or [psychological] belief. Reductionism can often be manipulative in nature, for when it is done in a sophisticated manner it can appear to prove a point by concealing and misdirecting logical relationships. It is "reductionist" to apply a "reductionist example" to a larger and systematically more complex situation.

In concern to context, knowledge has relationships at every level. Knowledge is an organization of claimed similarity with the real world, each unit of knowledge relevant to and bearing on the others. Knowledge is not a juxtaposition of independent items; it is a unity. All units in reality are interconnected, and nothing is a completely isolated fact, object or system. In a knowledge system the term 'context' means "the sum of cognitive elements conditioning an item of knowledge." 'Context' sets an item's relationship to situational reality, and thus, the item's meaning and potential use. *Remember that meaning never comes from the system itself, but its supra-system.* Contextual relationships must never be dropped for a system to be understood and for systematic solutions to be adopted. Without *interconnectedness*, *relatedness*, and *wholeness* (the axiomatic conceptual values of systems), information is disconnected and has no potential value to a real world decision space, and it is not systematic. Similarly, without *consistency*, *evidence*, and *openness* (the axiomatic conceptual values of science), knowledge has no basis and also has no potential value to a real world decision space, and it is not "scientific".

Unfortunately, context and hierarchy are often disregarded in early 21st century society in favor of the belief that consciousness cannot relate one thing to another thing in a non-contradictory, logical, and unifying (i.e., integrated) way. Without an integral approach to the discovery of knowledge and creative design, which involves non-contradictory identification and logical pattern integration, it becomes difficult to ferret out reality and truth against falsehoods; it becomes difficult to create in alignment with fulfillment -- consciousness stumbles (or, thrashes) around its environment [without a unifying relational model] instead of flourishing with and having the knowledge to caretake (or steward) for its environment.

Knowledge systems in accurate alignment with the real world account for the hierarchy and context of their knowledge such that individuals in a community might base their real world decisions on accurately structured information about the real world in which they live. Higher level concepts and understandings must be founded upon the facts of reality to be useful in structuring the arrival at decisions that generate states of fulfillment in systematic relationship with a community of individuals and systems.

To disregard the hierarchical and contextual nature of knowledge is a sure way to manufacture intellectual pollution and social discordance. In an information system, information processes can generate more information about the system (i.e., processing units can generate information from information). To develop functionally useful community systems we must acquire more knowledge (or as much knowledge as possible) about how nature organizes life; this will facilitate our resiliency. And technically, the more accurate information a community collects, the more complex systems it can evolve.

> **INSIGHT:** *Once discontinuous integration gets started, it is tough to turn around. When 'merge conflicts' go unnoticed, then the whole information system starts to de-order.*

2.2 Knowledge and power

Power is the ability to affect change. Knowledge is power, with knowledge there is the ability to take informed decisions, to predict and influence the world, to solve complex problems, and to empower oneself to navigate the complexities of life with confidence and competence. Knowledge is power, but it is also a limit, as one can only do (or at least do well) that which is known. Herein, more knowledge is more power, because knowledge conveys ability to change the environment intentionally.

The phrase "knowledge is power" encapsulates the idea that possessing information and understanding can provide individuals and societies with significant advantages and influence. Knowledge is power because it enhances understanding, and improves decisioning, problem-solving, innovation, influence, and overall empowerment. It enables individuals to adapt to their environment, achieve their goals, and contribute to the betterment of society. As a result, the pursuit of knowledge is a fundamental driver of personal and collective progress. Knowledge about systems is predictive in nature. Knowledge increases the range of understanding and of potential application. When consciousness has knowledge of a system, then it can utilize that knowledge to predict and to create. When power is defined as the ability to do work, then without knowledge, there is no ability to do work [in a particular system]. Not only is knowledge of something a useful representation of "power", but knowledge can be used against individuals as a form of power. Knowledge gaps [between individuals within a competitive society] can create power differentials that can be extremely caustic to society. In a society that neither understands nor values human potential, knowledge about human potential can become hidden behind paywalls and competitive façades.

> **NOTE:** *The exploitation of gaps in knowledge has the potential for generating fear, which might then be exploited for energy acquisition and human resource management.*

Data and knowledge are not necessarily "power" in themselves, but they are a potential means to power. A differential in the dissemination of accurate information has the ability to create a differential in power. Ultimately, power comes from acting upon knowledge, and when knowledge is hidden or "occulted" from people, it is possible to keep them at a distinct disadvantage, influencing their mind and ultimately their behaviors for selfish agendas. In competition, accurate information provides leverage. In a system where information equates to leverage over others, then of course there will be establishments that seek to control information (e.g., industries and States). Fundamentally, the information we have available matters [to our fulfillment].

The "elite" maintain a power differential through the ignorance of the masses. When an individual's will is weakened through centuries of manipulation and attachment, then individuals might stop the acquisition and integration of knowledge at an early age, or they might be enculturated [en-cult-urated] to only accept and integrate [as much as possible] the "knowledge" of leaders, authorities, and power figures. This would represent a very unsafe social environment. And, the people trapped within it might not realize how unsafe it actually is because the "knowledge" they are presented with by the authority or some other uncriticizable leader might not provide any immediate indication of such.

In discussions on political matters we quickly find that if we don't agree on what ethical foundations we have, then we don't get very far talking politics. And, when we have an ethical discussion we find out that if you don't agree on epistemology (Read: on how we know anything), then you don't get very far agreeing on ethics. And, epistemology in turn is based on metaphysics (Read: what actually exists). In truth, everybody in their own way has to work through the foundations of truthful understanding in their own self-initiated way. A community environment can facilitate the more rapid acquisition of this experiential quality of the self. Yet, if there is disagreement at the level of axiom, premise, and system [of approach], then two people are just going to keep talking past each other (i.e., coordination is not possible). If there is a difference in direction, orientation and approach, then there is a fundamental difference in the structure of the information being communicated between us, which will lead to confusion and may generate conflict. And herein, those who may desire a greater competitive edge (or concentration of power) are presented with the opportunity to take advantage of a situation with disarranged understanding and possible emotionally intense contention.

Summarily, knowledge is considered a source of power in the following ways:

1. Empowerment through understanding: Knowledge enables individuals to understand the world around them. It encompasses a broad range of information, skills, and insights. This understanding empowers individuals to make informed decisions, solve problems, and adapt to various situations.
2. Enhanced decisioning: Informed decisioning is a key aspect of how knowledge translates into power. When individuals possess knowledge, they can inform objectives, evaluate options, assess risks, and select the most suitable course of action.
3. Problem solving: Knowledge provides the information needed to address challenges and solve complex problems. People who possess the relevant information and skills can find solutions to issues that others might find insurmountable.
4. Innovation and progress: Knowledge drives innovation and technological advancements. In fields like science, medicine, engineering, and technology, knowledge enables breakthroughs that improve the quality of life and lead to societal progress.
5. Influence: Those who have knowledge have influence over those who do not.

> **NOTE:** *Profit-driven entities competing in the market are building things with knowledge. Humans with common human needs and ecological relationships, are constructive creators, and can build things with knowledge too. Humanity can build structures to create and*

sustain states of fulfillment, instead of structures to generate states of scarcity.

Scholarly references (cited in document)

- Gupta, M.M., Yamakowa, T. (Eds.) (1988). *Parallelism, Integration, Autocoordination And Ambiguity in Human Support Systems*. Fuzzy Logic in Knowledge-Based Systems, Decision and Control. Elsevier Science Pub. Co.
- Nylenna, M. (2006). *Scientific misconduct: a new approach to prevention*. The Lancet. 367(9526). https://doi.org/10.1016/S0140-6736(06)68821-1
- Tegmark, M. (2014). *Consciousness as a State of Matter*. arXiv. https://doi.org/10.48550/arXiv.1401.1219

Book references (cited in document)

- Rand, A. (1990). *Introduction to Objectivist Epistemology*. Binwager, H., Peikoff, L. (Eds.). NAL.

Book references (non-cited)

- Binswanger, H. (2019). *How We Know: Epistemology on an Objectivist Foundation*. TOF Publications, Inc.
- Gleick, J. (2012). *The Information: A History, A Theory, A Flood*. Vintage.
- Holtz, Brian. (2005). *Human Knowledge: Foundations and Limit*. https://humanknowledge.net/
- Hayakawa, S.I., Hayakawa, A. R., MacNeil, R. (1991). *Language in thought and action.* Harvest Original.

Online references (cited in document)

- *Axiomatic concepts*. Ayn Rand Lexicon. Accessed: January 28, 2020. http://aynrandlexicon.com/lexicon/axiomatic_concepts.html
- Rand, A. (1965). *Who Is the Final Authority in Ethics?* The Objectivist Newsletter. p.7. https://courses.aynrand.org/works/who-is-the-final-authority-in-ethics/

Online references (non-cited)

- *Ladder of influence*. (2004). Systems Thinking. https://thesystemsthinker.com/the-ladder-of-inference/

The Auravana Project exists to co-create the emergence of a community-type society through the openly shared development and operation of a information standard, from which is expressed a network of integrated city systems, within which purposefully driven individuals are fulfilled in their development toward a higher potential life experience for themselves and all others. Significant project deliverables include: a societal specification standard and a highly automated, tradeless habitat service operation, which together orient humanity toward fulfillment, wellbeing, and sustainability. The Auravana Project societal standard provides the full specification and explanation for a community-type of society.

This publication is the Social System for a community-type society; it is a standardized social system for the organized structuring of a mutually fulfilled social population. A social system describes the organized structuring of a social environment. A social system is a grouping of units of individuation (here, units of consciousness) forming a cooperative network in which information is shared and integrated through a whole, data structure. The term social system is used, in general, to refer to lifeforms in definite relation to each other, which have enduring patterns of behavior in that relationship. This social system standard identifies humanity's aligned interests, and that which everyone has socially in common. It is an organizing system for social navigation that specifies a direction, orientation, and approach to socio-technical life. The standard details the purpose for the society's existence (a direction), its value system (an orientation), and its approach (a methodology and methods). Herein, these concepts, their relationships and understandings, are defined and modeled. Discursive reasoning is provided for the selection of this specific configuration of a social system, as opposed to the selection and encoding of other configurations, and their consequences are evidenced. The social system provides a description of who humanity is, and where humanity is going, by identifying its social organization.

Fundamentally, this standard facilitates individual humans in becoming more aware of who they really are.

All volumes in the societal standard:

auravana.org

$11.00
ISBN 979-8-9861436-3-7
51100>
9 798986 143637