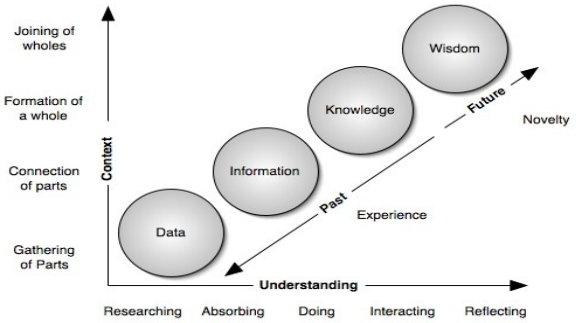
# Science – Definitions

## Introduction

This paper sets out how blockchain methodologies and technologies can be combined with science: the ”systematic enterprise that builds and organizes knowledge in the form of testable explanations and predictions about the universe” (wikipedia).




Today, the scientific endeavor is assumed and as far as we know, only human beings hold the capability to learn and apply knowledge. In the future this human centric assumption maybe not hold and thus this paper is Being centric in its outlook. Blockchain ideas are peer to peer based and put the backstop of trust in the hands of the mathematics of cryptography. This makes a perfect protocol for the collection of data from scientific apparatus (sensors), the computation of the data into information forms that can be shared peer to peer, to be reviewed or applied to/in other scientific projects or even applied to the intelligence of other Beings.

## Scientific method in the future

### Introduction

The history of the scientific method (http://en.wikipedia.org/wiki/History_of_scientific_method) goes back at least 2000 years. As the method on inquiry improved so did the progress of civilization. The question is, given the technological ability now available and soon to be available, what should a future looking scientific method be constructed? This section lays out four broad areas:

### Measurement – can be measured & granularity of measurement

The precision of measurement liberates the opportunity to discover and gain understanding. Simply, can something be measured and to what degree of accuracy? These two qualities in themselves are reliant on previous scientific discoveries. Precision of measurement will soon be and in many places has already come a place where the abstract interpretation of measurement is use to indicate a result. A future looking scientific method needs to provide a framework for such measurements and for all measurements how can we trust the recorded data holding the measurements? The area of Zero Knowledge Proofs provide a software layer on top of measuring equipment and the use of more advance mathematical reasoning, statistics and new maths will needed to be invented. Change will only quicken and thus the fluidity of a new measurement methods must have this built in as a design feature ie an evolving measurement protocol.

### Computation and Complexity

Can the assumption be made the more computational intensive a problem is the more complex the problem is? There are methods for measuring computational complexity but in isolation this says

nothing about the value such computation might or does enable. The goal of the computation and complexity protocol is to provide a mechanism where the evolutionary pressure/incentive is to entourage the simplification of computations and to rewards such efforts.

**Collaboration and consensus**

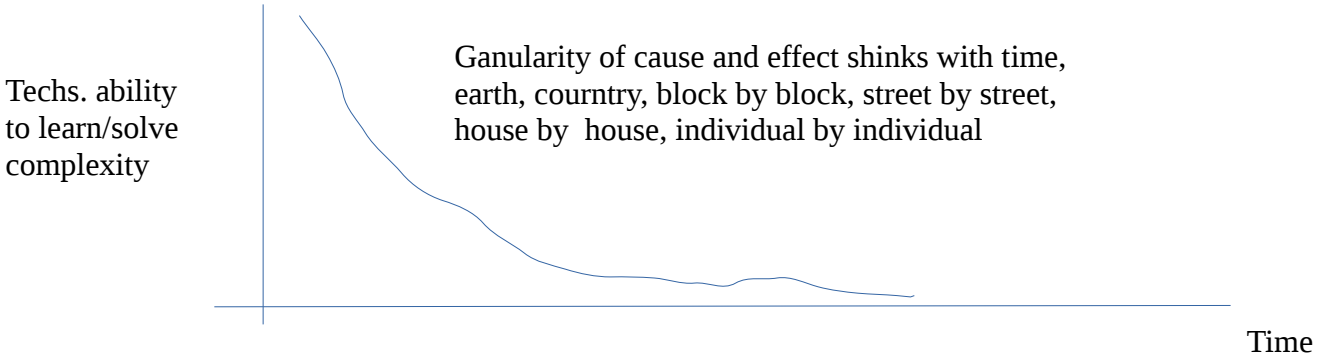
The complexity of computation should give a clear indicator for the need for greater collaboration around a problem. This puts great trust in the complexity of computation protocol correctly identifying the problem. This consensus mechanism of a blockchain will provide the subjective view of the peers in the network and given each individual peers vantage point looking on to the network, their interpretation of the world view will be used to personalize their consensus.

**Cause and Effect - universal and personalized simulations (not predictions)**

The holy grail of science is to discover, cause and effects that are repeatable and can be applied across all environments in the cosmos. Such scientific claims can said to have discovered an underlying '**Law of Nature**'. There are currently very few such discovered Laws of Nature and even then it is understood these will probably be improved upon with time.

If such laws are found, each peer on the network should achieve a working copy of the software or at a minimum a peer network that can execute the law if required.

Further, the implied effect should not be a prediction statistic but a precise simulation of the effect given the computational resources available to the network.




For example: We can measure the CO2 and CO in a outside area but it is hard to know the long term effect those value have on a runner. However, put runner in a chamber with only CO then we know they are going to die.

Does understanding the cause and effect necessarily mean if we simply reverse the process the state will return to the original? In the case of biology this may not always be possible or attainable. Thus even in a world where every cause and effect is worked out challenges still remain to 'solve' current problems.

**Scientific Method**

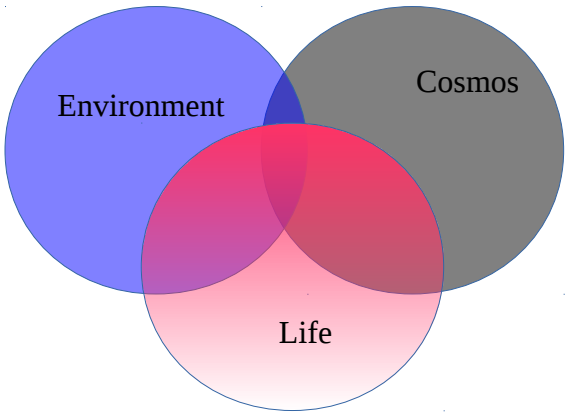
Most scientific research can not claim to have discovered an underlying natural law but the research makes incremental contributions to the stock of scientific knowledge. In a commercial economy the practice of pseudo-science is much in prevalence. An asymmetrical balance of information held on the

supply side of a product combined with financial muscle often creates a persuasive case for use of a product. It is envisioned such pseudo-science will disappear once current scientific information is available to all and in real-time.

**Intelligence**

If pinning down a precise definition for scientific inquiry is difficult then doing the same for the word intelligence is exponentially more so. However, this paper attributes intelligence to each individual autonomous Being rather than to a centralized propriety based monopolization of technology. Further new scientific data and information should be made instantly available across the network of Beings.

**Universality of Science**




**Rise of open science – citizen science**

Many effort going in from mozilla to open source project to establish peer review magaine titles offering data services. All traditional web stack. This paper put forward the case for blockchain decentralized peer to peer data protocol including concept of proof of science.