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Please see below.

*** This paper has implications for Policy and Governance, Architecture and Security and is submitted to all the relevant DCGI working groups for their consideration. It has particular relevance to the introduction of CBDCs.**

# MONEY METHODOLOGIES FOR SUSTAINABILITY AND INCLUSION

## Money as a tool and methodology

**Without humans and their activities, money wouldn't exist. The purpose of money and its methodologies are to sustain the individual, the group and society at large.**

**Through exploration of how humans have managed their activities and relationships historically, we can identify two methodologies used to mediate interactions between humans: *complex* and *simple* methodology. Simple methodology is known today as *money*.**

**Simple money is the product of simplifying complex methodology to achieve scalability with the introduction of the concepts of exchange of value(s) and trustless relationships.**

**Complex "money" methodology accumulates data on needs, capacities and links (between entities) and provides knowledge of how to do things thereby informing ongoing decisions and activities for sustainable development.**

## Complex "money" methodology

This methodology predates any other form of money methodology and has been in consistent use since its genesis – proto sustainability. This section formally describes the elements of complex "money "and its historical roots/foundations which exhibited the characteristics of co-operation and sustainability.

This is the enduring methodology used in the main by families and, in some cases, is the method of choice within and between small group entities and some companies.

The basic elements forming this methodology:

- Associated or Embedded Ledgers
- Capture of unique values
- Verifiable Links

A form of ledger is associated with human activities and used as a method of storing individuals' and group unique needs and capacities: how and when needs are satisfied and by whom as part of the verified links between the various parties to communal activity. These embedded ledgers are integral elements of the method for storing and retrieving knowledge to sustain the family or group. This method constantly re-evaluates its stored values, i.e. needs and capacities based on the knowledge generated.

The embedded ledger can be either explicit or implicit, i.e. in human memory.

One notable example of an implicit communal ledger of value taking physical, symbolic form are Rai Stones.[1] These symbolic representations of Value are representative of the Needs and Capacities that sustained the community both within living memory and before, i.e. handed down through generations of humans. Such implicit ledgers persist in complex "money"methodologies irrespective of symbolic representation.

Rai Stones are early evidence of technology being used to extend the nuclear family proto sustainable methodology to the wider community.

Trust results from satisfying sustainability criteria.

The community is sustained by trust developed and fostered within it. It is less about the trust-worthiness of the individuals and more about the integrity of the data relating to individuals and their unique needs and capacities that give rise to sustainability.

Open source software is a prime example of this sustainable complex "money " methodology that not only satisfies those consciously involved in creating and using such software but has extended way beyond its community to the billions of devices and users across the globe. This is also known as free software because it satisfies the criteria for complex "money" methodology without reliance on current, exchangeable money.

How did this evolution occur? Through the use of available technology in the sense of the Greek origins of the word.

> [Technology ("science of craft", from Greek τέχνη, techne, "art, skill, cunning of hand"; and -λογία, -logia) is the sum of any techniques, skills, methods, and processes used in the production of goods or services or in the accomplishment of objectives, such as scientific investigation]

Complex "money" methodology is necessarily *endogenous*, i.e. an integral part of human activity - informal accounting of the capacity to satisfy needs.

> **en·dog·e·nous** (ĕn-dŏj′ə-nəs)
>
> adj.
>
> 1. Originating internally.
>
> 2. Originating or produced within an organism, tissue, or cell: endogenous *hormones.*

## Attributes of Complex "Money" or The Sustainability Methodology

Attributes of complex "money" methodologies can be derived from the description of the groups involved in the descriptions below:

*Family signifies "the subjective meaning of intimate **connections** rather than formal, objective blood or marriage ties" Silva & Smart, 1999* [2]

*A family is a group of individuals in which there is a generational connection present (i.e., a parent-child relationship is found). Additionally, family members provide close intimate contact (usually characterized by deeply held commitment, **trust**, respect, and a sense of **longer-term obligation**. It is assumed that sexual intimacy is an element of the relationship between the parents and that this family group seeks to achieve **goals by acquiring, allocating and distributing resources** (i.e., time, money, space, and close personal contact) (Day, 2010, p. 14)*[3].

*A family is "a **psychosocial group** constituted by at least one adult member and one or more others who work as a group **toward mutual need fulfilment, nurturance, and development** (Fitzpatrick & Wamboldt, 1990 quoted in Edwards & Graham, 2009, p. 193).*[4]

*Perhaps in the broadest sense of the word, a family is a group of people who have intimate **social relationships and have a history together** (Leeder, 2004, p. 25).*[5]

The family and its historical success as an entity that uses complex money methodologies was examined by people in the past in an attempt to rationalize societal dynamics or propose a way of social order. In other words, such people were seeking to scale this family or group methodology to organise a country or even the world.

Karl Marx and Friedrich Engels specifically explored these ideas, as explained in ***The Origin of the Family, Private Property and the State: in the Light of the Researches of Lewis H. Morgan***[6]. The book is an early anthropological work and is regarded as one of the first major works on family economics.

Some of **their conclusions were fundamental in relation to the origins of Private Property and the State**:

*"The Origin of the Family, Private Property and the State* begins with an extensive discussion of *Ancient Society* which describes the major stages *of human development as commonly understood in Engels's time. It is argued that the first domestic institution in human history was the matrilineal clan. Engels here follows Lewis H. Morgan's thesis as outlined in his major book, Ancient Society. Morgan was a pioneering American anthropologist and business lawyer who championed the land rights of Native Americans and became adopted as an honorary member of the Seneca Iroquois tribe. Traditionally, the Iroquois had lived in communal longhouses based on matrilineal descent and matrilocal residence, an arrangement giving women much solidarity and power. Writing*

*shortly after Marx's death, Engels stressed the theoretical significance of Morgan's highlighting of the matrilineal clan:*

*The rediscovery of the original mother-right gens as the stage preliminary to the father-right gens of the civilized peoples has the same significance for the history of primitive society as Darwin's theory of evolution has for biology, and Marx's theory of surplus value for political economy*.[7]

At the time of Marx's and Engels' discoveries, it wasn't possible to apply the essence (data) of complex "money" due to the lack of suitable technology thus denying those and subsequent generations the opportunity to benefit from its implementation at scale.

Furthermore, global sustainability wasn't, at that time, recognised as an imperative.

Thus the choice remained within the understanding of a need for external, simple, exchange money guaranteed and enforced either by private corporations or the state which is where we remained, until today.

Simple exchange money continued to augment, as it does today, complex "money" methodologies used by FSG (Families and Small Groups).

## Simple Money Methodology

> **money**
>
> /ˈmʌni/
>
> noun
>
> 1. a current medium of exchange in the form of coins and banknotes; coins and banknotes collectively.
>
>    "I counted the money before putting it in my wallet"

The dictionary explanation states that exchange is one of the attributes of money methodology that underpins current money.

Humans, at a particular point of their development, with limited access to technology, alighted upon the methodology of exchangeable money as a mechanism that was suitable to manage relationships and activities beyond communities, where the family or community dynamic involving trust and sustainability were neither visible nor achieveable.

Evidence of early use of exchange methodology comes from the early use of coins. From about 1000 BC, money in the form of small knives and spades made of bronze was in use in China during the Zhou dynasty, with cast bronze replicas of cowrie shells in use before this. The first manufactured actual coins seem to have appeared separately in India, China, and the cities around the Aegean Sea 7th century BC. While these Aegean coins were stamped (heated and hammered with insignia), the Indian coins (from the Ganges river valley) were punched metal disks, and Chinese coins (first developed in the Great Plain) were cast bronze with holes in the center to be strung together.

The current formal money we call Simple Money is the product of simplifying complex methodology to achieve scalability with the introduction of the concepts of exchange of value(s) and trustless relationships (i.e. the medium of money is trusted rather than the parties to a transaction).

All Simple Money is comprised of Tokens that are used to represent value in a fungible (nonspecific) way. They may or not be recorded in a ledger and are external to the activity that creates the value they express.

Some well-known examples of simple exchange money methodology are:

- Fiat currencies such as US Dollar cash
- digital US Dollar (commercial)
- other nation state variations of currency (*Lex Monetae*)
- other non-*Lex Monetae* digital currencies, e.g. Bitcoin, Etherium, Cello, etc.
- CBDCs (Central Bank Digital Currencies)
- Gold, Silver and other materials used for exchange, historically and today

## Money Theory

- Money replaced barter

It's very clear that simple money did not replace anything, it was introduced and coexisted with the base complex "money" methodology; the idea that humans went *from Barter to Banknotes* is a popular myth that was reinforced by Adam Smith's claim in *An Inquiry into the Nature and Causes of the Wealth of Nations* (published 1775). Smith claimed that money replaced barter:

> This division of labor, from which so many advantages are derived, is not originally the effect of any human wisdom, which foresees and intends that general opulence to which it gives occasion. It is the necessary, though very slow and gradual, consequence of a certain propensity in human nature, which has in view no such extensive utility; the propensity to truck, barter, and exchange one thing for another.[8]

for which no empirical, archaeological or anthropological evidence exists. The advantages claimed by Smith run counter to the facts in terms of actual sustainability and inclusion. What he describes as “human nature” is the modification of human behaviour adapting to simple exchange money methodology.

“Division of labour” led to an exclusion of “labour” from its place and purpose, manifested as financial exclusion due to the shift of focus to maximise the external value that proxied the real value of human activity.

Sustainability that was formerly underpinned by complex “money” methodology was no longer embedded in all human activity.

# Goals Without Incentives

## Financial Inclusion

As we see from the above, when labour is excluded from the sustainability methodology, it excludes and disadvantages those who are represented by the term “labour”. The purpose is no longer to provide sustainability for all involved but to optimise exchange and the related universal proxy value, money. Exchange stops when the available services have enough customers at the value determined externally rather than by need.

Those without access to money remain structurally disadvantaged irrespective of the availability of bank accounts, unique identity and financial services. See DCGI-PG-I-051 Digital Currency for Financial inclusion[9]

In contrast, complex “money” methodology excludes no-one because it captures the unique needs of everyone as well as their capacities. The value is manifested either when needs meet capacities or when knowledge is stored. The purpose is to satisfy everyone’s needs using minimum capacity.

## Sustainable Development

World trade grew through the latter half of the 20$^{th}$ century into the new millennium but was accompanied by the economic marginalisation of a growing proportion of the global population. “International Development Targets’ were first adopted by the OECD in 1996 in an attempt to bring the disadvantaged into the global economy as active participants. These were succeeded by the more widely endorsed ‘Millennium Development Goals’ (MDGs) agreed during UN Millennium Summit in September 2000. Recognition of the failure to adhere to the timeline of the MDGs led to the reinvigouration of efforts for sustainable development with the adoption of the Sustainable Development Goals (SDGs) in 2015. Delivery of these too, is lagging behind expectations.

We would argue that the SDGs are focusing on symptoms of the current method of societal organisation. This method involves the use of simple exchange money, as described above, in which the division of labour seperates labour from sustainable human activity due to the method’s primary goal of optimisation of exchange value. Meanwhile, there is lacking the means to capture needs, capacities and links between them and thus there no store of knowledge.

For human activity to be successful requires wisdom and knowlege that isn't captured within the current method of societal organisation.

The reason that many are unable to successfully adapt to their circumstances and environment is because they are forced to **adapt** based on simple exchange money methodology which sees their circumstances and enviroment only through the proxy of exchange value.

Sustainable Development needs a clearly defined purpose and requisite data in order to formulate and satisfy that purpose. We assume the purpose is sustainability for all rather than only for those with access to simple, exchangeable money.

The base premise of complex "money" methodology is sustainability for all irrespective of their particular circumstances in line with the native human cycle of evolution, i.e **adapt** (to environment), **do** (to satisfy needs), **reflect** (relay past experience).

In other words, no matter how challenging people's individual limitations or environment, their unique needs and capacities are captured and stored, thereby facilitating requisite responses of others generating activity to make them sustainable.

## CBDC Implemention of Complex "Money" Methodology

Current digital currencies are private in the sense they are controlled externally and provide exchange through proxies that don't account for needs, capacities and the links between them, i.e. *sustainability parameters*.

Exploration and development of ideas, tools and techniques around tokens, ledgers, identity etc. have opened up the possibility to replicate complex "money" methodology at scale.

CBDCs (Central Bank Digital Currencies), being public, in the sense of being **for the public good** and the stated ambition of providing universal access, offer a transitional mechanism to achieve sustainable development. They have this potential, if they aren't limited to a means of exchange although the exchange value attribute is useful to attract other parties to engage in sustainable development initiatives.

We live in a simple exchange money environment and to be able to co-exist with complex methodology at scale, a bridge is required between the two.

Externally provided resources, backed by CBDCs, relevant to the circumstances and environments where they are applied, can prime human activities within a complex "money" methodology framework that quickly become self-sustaining and inclusive.

Complex "money" methodology offers ubiquitous access and the unique capture of needs, capacities and the links between them to sustain internally generated development within which all members of communities can be engaged and included.

[1] https://en.wikipedia.org/wiki/Rai_stones

[2] Silva & Smart, 1999 quoted in Lindsay & Dempsey, 2009, p. 6

[3] Day, R. D. (2010). Introduction to family processes (5th ed.). New York: Routledge.

[4] Edwards, A. P., & Graham, E. E. (2009). The Relationship Between Individuals' Definitions of Family and Implicit Personal Theories of Communication. Journal of Family Communication, 9(4), 191-208. doi: 10.1080/15267430903070147

[5] Leeder, E. J. (2004). The family in global perspective: a gendered journey. Thousand Oaks, Calif. ; London: Sage Publications.

[6] (German: Der Ursprung der Familie, des Privateigenthums und des Staats) is an 1884 historical materialist treatise by Friedrich Engels. It is partially based on notes by Karl Marx to Lewis H. Morgan's book Ancient Society (1877)

[7] *Engels, Friedrich (1884). "Preface to the Fourth Edition". The Origin of the Family, Private Property and the State. New York: Pathfinder Press. pp. 27–38, the quotation is on p.36.*

[8] Adam Smith, An Inquiry into the Nature and Causes of the Wealth of Nations https://www.ibiblio.org/ml/libri/s/SmithA_WealthNations_p.pdf

[9] Alex Nikolov, & Robin Renwick, DCGI-PG-I-051 Digital Currency for Financial inclusion