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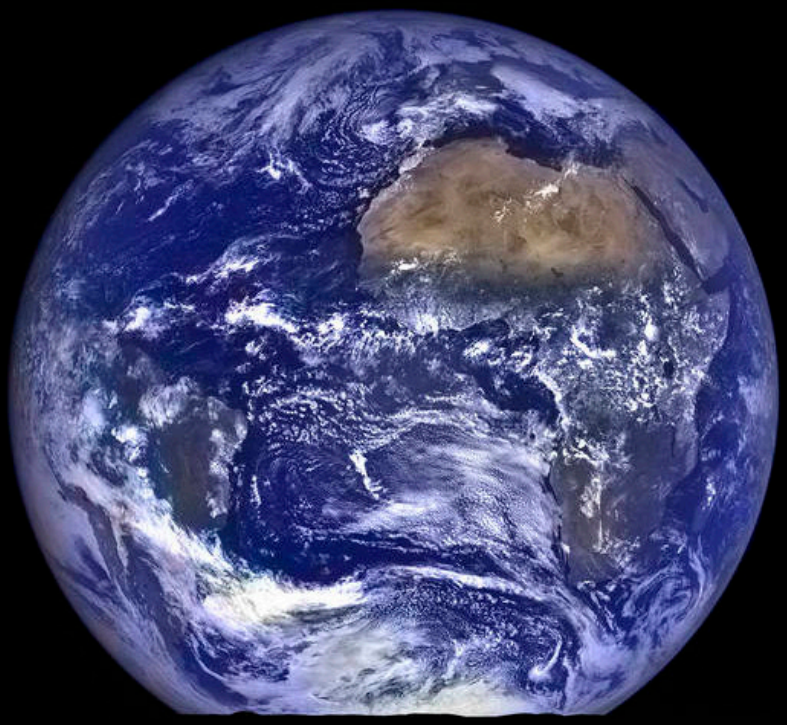
SPACE VALUE OPTIMISATION

A New Approach to Designing and Measuring Impact



Armen Papazian

Finoptek™

Image Credit: NASA

To attain our Global Goals by 2030 we must reel in the vast pool of capital currently deployed outside the guidelines of sustainable investing. To achieve this, we need to transform our mainstream risk and time based financial models. Armen Papazian proposes a new principle of value, Space Value of Money, and new metrics of value that seamlessly extend our existing equations, integrate impact and return, and provide us with a space value optimisation tool aligned with our Global Goals.

Space Value of Money

Space Value of Money establishes our spatial responsibility to ensure that a dollar invested in space has, at the very least, a dollar's worth of positive impact on space.

$$Net\ Space\ Time\ Value\ (NSTV) = Net\ Present\ Value(NPV) + Net\ Space\ Value\ (NSV)$$

$$\boldsymbol{NSTV = -II + \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t} - II + \sum_{t=0}^{n} CE_t(1+s)^{n-t}}$$

$$\boldsymbol{NSTV = -2II + \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t} + \sum_{t=0}^{n} CE_t(1+s)^{n-t}}$$

$II = \sum CE_t = Sum\ of\ Cash\ Expenditures$

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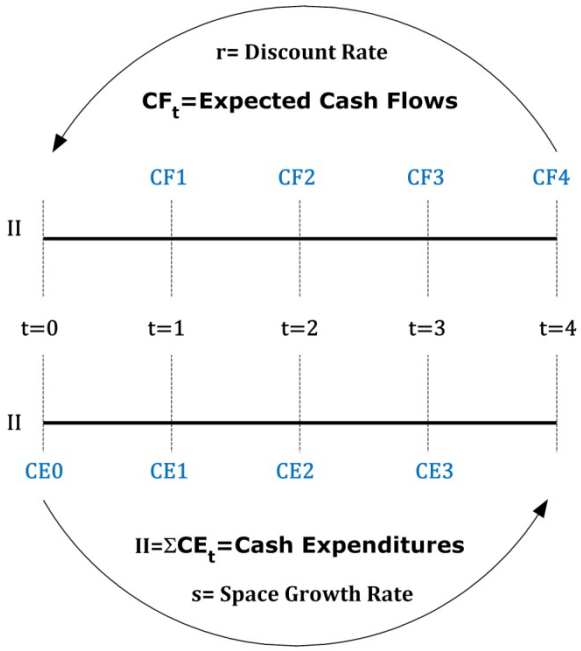
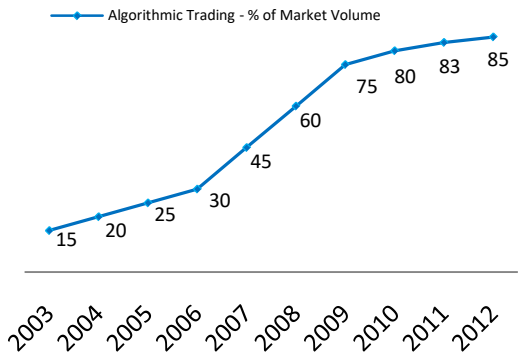


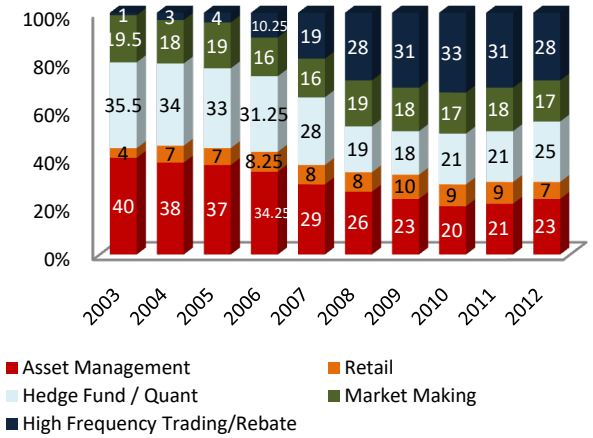
INTRODUCTION

The market share of sustainable investment strategies has been growing steadily over the last few years. Between 2012 and 2014 global sustainable investment assets grew by 61%, from $13.3 to $21.4 trillion. In this same period, the proportion of total professionally managed assets that are deployed based on sustainable investment strategies increased from 21.5% to 30.2%. This means that in 2014, 69.8% of all professionally managed assets were *not* invested according to sustainable investment strategies.[1] Meanwhile, by mid 2014, total global wealth was estimated at $262.6 trillion.[2]

While we are making great progress, if we are going to attain our Global Goals by 2030, we must reel in this vast pool of capital into the fold. To achieve this, we must transcend our risk/time models, and build on and expand our current approaches to sustainable investing.[3] This is so due to the limitations of our risk/time paradigm, and the rise of algorithmic trading, which has made programmability a key to the success of any type of investment strategy (Charts 1 and 2). With the rise of Fintech and Blockchain, this trend is set to grow further, deeper, and wider.

Charts 1 and 2: Algorithmic Trading as % of Market Volume and Market Participants (US)[4]





Building the 2030 world according to our Global Goals will require a number of important changes in the way we measure, design, and value our investments. We will need to address impact and return together, and allow investors the opportunity and possibility of optimising their space impact in line with our Global Goals, across projects and different asset classes, using the latest technology.

I propose a new analytical tool for Space Value Optimisation that can help finance functions design and value investments in a way that optimises their space impact, and maximises the positive contribution to our Global Goals.

The Space Value Optimisation tool fills an important market gap, and supports the widespread implementation of ecologically and socially sound investment models and algorithms that are seamlessly integrated with our current models.

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[1] GSIA, Global Sustainable Investment Review, 2014.

[2] James Davies, Rodrigo Lluberas, and Anthony Shorrocks, Credit Suisse Global Wealth Databook 2015.

[3] GSIA, Global Sustainable Investment Review, 2012 and 2014, identify the following seven main approaches: 1) negative/exclusionary screening, 2) ESG integration, 3) corporate engagement and shareholder action, 4) norms-based screening, 5) positive/best-in-class screening, 6) sustainability themed investing, and 7) impact/community investing.

[4] *Source:* Robert Kissell, The Science of Algorithmic Trading and Portfolio Management, Academic Press, 2013.

CURRENT VALUE FRAMEWORK

Our current financial value paradigm is built on two principles, Risk and Return and Time Value of Money, which describe a universe where time and risk parameters define the value of an investment opportunity or a series of expected future cash flows.

$$\textbf{Net Present Value} = -II + \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t}$$

Having the nature and space impact of the Initial Investment in its blind spot, this model is effectively incapable of distinguishing between a solar-powered asteroid mining company and a coal-powered cement factory.

Using the Net Present Value equation as an example, we can see that the model discounts the future expected cash flows to the present with a discount rate *r,* which is the opportunity cost in the form of the return on an alternative investment with the same level of risk.

The equation applies time and risk parameters to the expected cash flows in the future (*t* and *r*), and leaves the Initial Investment (II) as an abstract theoretical sum to be subtracted from the present value of the imaginary cash flows in the future.

The equation does not consider the *impact* of the Initial Investment, which, when and if addressed, is addressed outside the key parameters of the model, as an externality.

THE MISSING PRINCIPLE: Space Value of Money

Space Value of Money is built on the observed premise of reciprocity between our thoughts and actions, and what happens to and in space. Indeed, what goes around comes around, and as we think, design, choose, and define our actions in space, we define our impact on space.

Space Value of Money establishes our spatial responsibility to ensure that a dollar invested in space has, at the very least, a dollar's worth of positive impact on space.

Space Value of Money complements Time Value of Money and Risk and Return, and requires that *while we are maximising our returns and minimizing our risks we also optimise our space impact.*

THE NEW METRICS of SPACE VALUE

The Space Value metrics help us fulfil this responsibility by treating the impact of the Initial Investment (II) as an integral element of the value of the investment, and thus of the investment decision. Gross Space Value (GSV) provides an assessment of the aggregate space impact of an investment taking into account the New Assets (NA) and New Money (NM) that the investment will create, and its Carbon and Waste Footprint (CF and WF).

$$\boldsymbol{Gross\ Space\ Value\ (GSV)\ =\ Initial\ Investment\ (II) + New\ Money\ (NM)}$$

$$\boldsymbol{+NewAssets\ (NA) \pm Carbon\ Footprint\ (CF) \pm Waste\ Footpint\ (WF)}$$

$$\boldsymbol{GSV = II + NM_n + NA_n \pm CF_n \pm WF_n}$$

$$n = Project\ Timeframe$$

$$NM = New\ Money = II * DR * BLR + (II + X - M) * mm$$

$$mm = Money\ Multiplier, \quad DR = Debt\ Ratio\ , \quad BLR = Bank\ Loan\ Ratio, \quad M = Imports, \quad X = Exports$$

$$NA = New\ Assets = aINV + bRE + cT + dIP + eFIN + \cdots$$

$$a, b, c, d, and\ e = Coefficients$$

$$INV = Inventories, RE = Real\ Estate, T = Technology, IP = Intellectual\ Property, FIN = Financial\ Assets$$

$$CF = Carbon\ Footprint = CO2\ Equivalent\ Emissions\ in\ Toones\ of\ CO2 * Verified\ Carbon\ Unit\ Price$$

$$WF = Waste\ Footprint = Waste\ Output\ in\ Tonnes * Cost\ of\ Treatment\ per\ Tonne$$

$$\boldsymbol{Net\ Space\ Value\ (NSV) = Gross\ Space\ Value(GSV) - Initial\ Investment(II)}$$

Net Spacetime Value (NSTV) brings into one equation the risktime metric Net Present Value and the spacetime metric Net Space Value, providing us with an aggregated measure of the space and time returns of the investment, while accounting for risk. It also introduces the Space Growth Rate, which reflects an investment's present and/or planned impact in monetary terms, from Initial Investment (II) to Goss Space Value (GSV).

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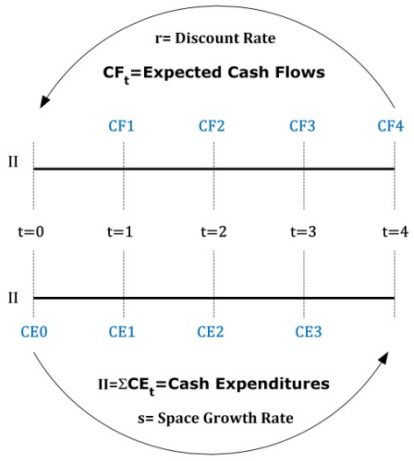

SPACE VALUES & GLOBAL GOALS

Setting a required space growth rate for a project has practical implications for the investment, its management, and execution. By setting a positive space growth rate target, we are in effect requiring that the investment's new money and new asset impact, as well as its ecological and waste footprint, are designed in line with our Global Goals.

Indeed, much like discount rates, a benchmark *Space Growth Rate* can be defined as a target rate across an economy. This provides governments the opportunity to prove their commitment to the environment and set high standards of space growth rates for public investments, thus raising the bar for private investments.

Directly Impacts

Indirectly Impacts

The Space Value Optimisation toolkit allows the finance function to define its own unique equation for *New Money* and *New Assets*.

For example, one could decide to attach a monetary space value to employment/personnel, even though the latter is not categorised as an asset under our current accounting standards. This could be achieved by adding *gEMP* to the New Asset equation, and assigning relevant coefficients that reflect our goals regarding gender balance, full time employment, fair wages, benefits, education, etc.

The assets and their mode of creation and utilization make the difference between a positive and a negative space growth rate. For example, when valuing a defence or oil company we face an important question regarding the value of their inventory. The inventories of these firms, when used, have a proven track record of negative space impact, spreading pollution, destruction, and a host of other negative effects diametrically opposed to our Global Goals.

Indeed, what would the value of oil and defence companies be, if we were to integrate the impact of their inventory on the planet into our value models?

It could be argued that, in fact, if we are ever going to achieve our Global Goals, oil and defence companies should be assigned an inventory coefficient of at least -1, as the damage they cause could actually be far greater than the value of their inventory.

OTHER APPLICATIONS

In November 2015 the US Senate passed legislation H.R. 2262, which states that: "any asteroid resources obtained in outer space are the property of the entity that obtained them, which shall be entitled to all property rights to them, consistent with applicable federal law and existing international obligations."

The Space Value Optimisation tool supports the growing ambitions of humanity, and provides a framework that integrates our spatial responsibility and spatial expansion plans.

CONCLUSION

2015 was an inflection year. The UN Global Goals, the Paris Agreement, and the US Senate legislation H.R. 2262 reveal an irreversible awareness of o*ur space, our physical context.* We have now officially recognised our role and responsibility in taking good care of it on Earth and beyond.

The Space Value Optimisation tool supports the finance function in fulfilling its responsibilities in the age of responsible growth.

ARMEN PAPAZIAN, PHD (CANTAB)

Founder & CEO, Finoptek Ltd

Armen is a financial economist with a global experience in industry and academia. He is the founder and CEO of Finoptek Ltd, a Fintech startup developing a unique multi-tool, multi-instrument, cloud-based platform that introduces *Spacetime Valuation* capabilities based on a proprietary model designed and created by Armen Papazian. Armen's model introduces a new principle of value, Space Value of Money, into our current Risk and Time based paradigm. Armen describes his model, equations, and approach as Spacetime Finance, and he is currently writing a book on the same due to be published by Palgrave Macmillan in 2017.

Armen is at the cutting edge of global finance and economics, and contributes to the global debate through his publications, speeches, presentations, and interviews (Financial Management, Investment Europe, Gamechangers, International Banker, Technology Banker). To mention a select notable few, Armen has been a guest speaker at the Roundtable titled 'Thinking the Unthinkable' organized by the Chartered Institute of Management Accountants and Churchill 2015, at the 'Launch of the Solar Age' by the Institute of Chartered Accountants in England and Wales, and at the Technology Venture Conference 'Beyond the Now' organised by the Cambridge University Technology Enterprise Club (CIMA, CUTEC-TVC2014).

Previously, Dr. Papazian established a boutique financial modeling and consulting firm Keipr. He has served clients around the world, providing project and policy design, development, evaluation, and implementation. While at keipr, he was invited to act as a Judge for the Banker FT Investment Banking Awards in 2011.

He is a former Managing Director of Innovation and Development at Nasdaq Dubai (DIFX) where he led the launch of the Middle East's first Structured Products platform with Morgan Stanley, Deutsche Bank, and Merrill Lynch, the creation of the region's first tradable fixed income indices with HSBC, and the first fungible dual listing with a US exchange in the region (Reuters, Reuters , Gulf News).

Dr. Papazian has previously held the honorary position of Fellow and Research Associate at the Cambridge University Judge Business School, UK. He has numerous publications in a variety of outlets, and contributes regularly to policy debates in various media globally. Armen holds a PhD in financial economics from the University of Cambridge, UK.

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Finoptek

Finoptek is creating a new cloud based infrastructure with unique features that aim to improve the *research-analytics-reporting-presenting-decision* value chain of projects and investments.

Our platform is multi-dimensional and provides under one roof the capabilities of space value optimisation, impact assessment, and other standard tools commonly available as separate applications. Through a secure and user friendly interface, our technology caters to a variety of investment products and instruments, covering public and private equities, projects, bonds, funds, portfolios, and other alternative instruments.

Saving time and resources, our multi tool platform increases the efficiency of financial analytics many fold, and links data and analysis to the decision making process in a dynamic and interactive way. Furthermore, with scenario development and simulation tools, communication and coordination extras, Finoptek's platform replaces tediousness with analytical effectiveness and fun.

Our technology also allows the design and instantaneous coding of user created algorithms into the platform, thus providing the user with the opportunity to grow the platform exponentially, by adding functions, models, and equations, all in code. Furthermore, users can make their algorithms publicly available to other users if they so wished, or keep them as their own intellectual property.

We aim to make Finoptek a vibrant community of ideas and value that integrates impact and return at every step. Finoptek is designed to serve entrepreneurs, businesses, analysts, investors, scholars and students in the age of responsible growth.

A unique cloud based financial valuation and optimisation platform

- ✓ *Increases the efficiency of investment decision making*
- ✓ *Enhances the effectiveness of business and financial analytics*
- ✓ *Expands the toolkit of financial analysis*
- ✓ *Provides a fast and smart user experience*
- ✓ *Allows for safe, secure, and flexible management*
- ✓ *Ecological and waste footprint calculators*
- ✓ *Unlimited User algorithms coded into software by one click*
- ✓ *Comparative and portfolio tools*
- ✓ *Modelling and scenario development tools*
- ✓ *Unique 3D charts and charting*
- ✓ *Dynamic reporting and presentation tools*
- ✓ *Communication and meeting module*
- ✓ *Team building and Brainstorming tool*
- ✓ *Discussion and exchange community*
- ✓ *Library of openly shared user created algorithms*
- ✓ *User performance monitoring interface*

Finoptek™

Value . Impact . Earn

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