



MULTI DIMENSION IMPACT ACCOUNTING (MDIA)

TVM White Paper AN INTRODUCTION TO MDIA

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Introduction

The purpose of this paper

This TVM White Paper introduces Multi Dimension Impact Accounting (MDIA), a system that builds on conventional financial accounting concepts to account in a very rigorous manner for impact on people and planet as well as for business profit. These metrics aim to be compatible with and complement the many reporting initiatives for corporate social responsibility (CSR) and other sustainability reporting initiatives that have been introduced over the past few years.

Many of MDIA's money profit accounting principles are identical to prevailing accounting concepts but applied differently. For example, instead of the singular focus on the performance of an organization, there are multiple reporting boundaries so that there can be accounting and reporting about place and product as well as the organization.

With MDIA, analysis about impact on people and planet uses a system of value quantification that is based on 'standard values' similar to how standard costs are used in 'cost accounting'. This enables the accounting for impact on people and planet at the same time as there is accounting for profit.

The paper identifies the main issues with the prevailing metrics, and suggests how the metrics and reporting should be modernized. In MDIA, an economic activity located in a place is the focal point for data about money flows and profit, impact on people, and impact on planet.

Performance of organizations and places are developed by a system of aggregation or consolidation. The same may be done for products as they flow from one economic activity to another through the supply chain, their use, and into the waste chain.

Socio-economic progress is determined by change in 'state', primarily in the place. State is like a balance sheet in financial accounting except that it is built up of 'value' elements rather than money denominated elements

The paper has a focus on the impact of economic activity on people, recognizing that the end result should be better quality of life for ALL people and reduced stress on the planet.

Widespread dissatisfaction with the dysfunction of society

There have been many times in history when there has been widespread dissatisfaction with the dysfunction of society. In most of history the opportunity to solve the problems was relatively limited. At this time the opportunity to solve really big problems is huge, but leadership does not seem to 'get it' and seems stuck in ways of thinking that are out of sync with what is now possible.

I am encouraged by the fact that science and technology have progressed amazingly in the past 50 years, and that so much of what used to be science fiction is now fact.

I am encouraged by the fact that there are more young people around the world with education than at any time in history.

These two facts should mean that our global society has more potential for peace and prosperity than at any time in human history.

But this is not the way our global society functions. There is a huge divergence between what is possible and what is being accomplished.

If we continue to go down the present trajectory of increasing socio-economic dysfunction and no possible solution in sight, it is entirely possible that we could be faced with a repeat of history along the lines of France in the 1790s or Russia in 1917. Whether this will be in one or two isolated places, or much broader in scope is an open question.

*I grew up in the UK and I am just old enough to remember World War II.
My parents remembered World War I. I have a deep aversion to violence
as a way to solve problems ... but unaddressed socio-economic problems
will end up with war.*

There is a massive amount of dialog about the dysfunction of society, how the 1% have become more and more wealthy while the 99% have seen their standard of living going down. There is concern in some places that the world still has too many people in abject poverty and hungry.

Even though there is concern that governments are taxing too much and not delivering on their responsibilities, and concern that corporations use loopholes in the law to do things that are 'just not right', yet there are few concrete ideas for systemic reform.

I argue that the way organizations optimize for performance is inappropriate for the 21st century because there have been some fundamental changes in the behaviors of the economy and society that have taken place in the last 50 years. I argue that this process has to be changed, and that the best way to change this is to have radical reform of the metrics being used for management and about society in the media.

Multi Dimension Impact Accounting (MDIA) is a practical way to change the metrics, and by changing the 'way we score the game. We can change the way the game is played'.

Prevailing metrics are inadequate

These metrics dominate the conversation

The dominant conversation about modern society and the economy uses three metrics for success. These are the 'terrible trio': (1) money profit for the business; (2) capital market prices for investors; and, (3) GDP growth for policy makers.

If there is going to be a successful 'market based' economy, there have to be metrics that deliver the right signals to decision makers. The growing asymmetry of information in almost all markets over the past five decades has enabled decisions that have pushed society and the global economy in a dangerous direction. The metrics encourage maximizing profit, minimizing payroll while ignoring everything that impacts the sustainability of the planet.

There is a huge amount of data to optimize profit performance within the corporate organization and in the hands of product advertisers and brand PR teams.

In contrast there is only a tiny amount of information that has a focus on bettering society and the state of the planet. Maybe the ratio is 99:1, maybe even worse.

All the numbers in the conversation encourage GDP growth, money profit and capital market wealth, without taking into consideration impact on people and planet.

There are no metrics that address ALL the issues of modern society in a rigorous and coherent manner.

Anecdotal material

Where there is little data, there is widespread use of anecdotal material. This may be interesting, but it is difficult to use in a way that will justify changes in policy and practices as part of a coherent ongoing process. The media makes use of anecdotal material all the time, often making it seem more serious by pulling in some statistics that have more or less relevance. The power of anecdotes has become greater with the vast flow of images and videos that is not taking place as a result of technology and social media. None of this does much to improve the underlying lack of metrics that matter.

Accounting is more than 400 years old

Metrics about corporate performance in terms of profit and the return on financial investment are based on an accounting system that was developed more than 400 years ago. It has stood the test of time, and is very powerful. It works well for money based accounting and reporting on profit performance, but there have been no significant enhancements to enable it for Triple Bottom Line (TBL) analysis of the non-money impact on people and planet. This is what MDIA will accomplish, while maintaining the important strengths of the old double entry framework.

A different sort of market long gone

Laissez faire market economics goes back to the 1700s. Adam Smith published his famous book *Wealth of Nations* in 1776. Adam Smith died some years later in the same year that Watt patented the rotary motion steam engine, a key invention that helped power the industrial revolution. Much of the thinking about markets still uses the Adam Smith ideas even though the economy and society have changed. There has been an enormous change in concentration of economic power, and an absolutely amazing change in the power of technology and the progress of science.

Complete exclusion of externalities in prevailing metrics

The role of externalities is completely ignored in economics and conventional money profit accounting metrics that dominate the media conversation in modern society. This is a critical problem and very dangerous.

It did not matter much when economic activity was small relative to the world, as it was when most economic ideas were first articulated, but this has changed. Now economic activities are carried out on a huge scale, and these activities certainly have an impact on the economy outside the boundary of the implementing organization.

Many multinational organizations are now bigger than all but a few countries. Corporate organizations have way more economic clout than governments, and in a world where communications are so easy, these organizations are able to structure their affairs solely

for the benefit of themselves. There is a 'race to the bottom' in terms of arranging corporate affairs to suit the company at the expense of society and the economy as a whole.

The GDP growth fallacy

GDP growth has been used as a proxy for social progress for a long time, but it is deeply flawed. The problems with the GDP measure has been well known for decades, but it has not been replaced. With GDP growth it is much easier to make business profits, achieve increases in stock prices, and argue that everything is better with growth. More profits makes it likely that there will be more investment and then there will be more GDP growth.

Using conventional money profit accounting, this looks like a virtuous circle, but it is not the whole story by any means. Economics and conventional money profit accounting are systems that do not account for externalities. The GDP growth goal is arguably exactly the wrong goal for a sustainable society. GDP growth reflects higher levels of economic activity, but not necessarily in areas of the economy that benefit people the most and likely with significant added stress on the planet. Using MDIA, the negative impact of GDP growth becomes apparent.

Areas of concern

Income and wealth inequality

Over the last thirty or forty years economic performance in many countries around the globe on average has been good. The average hides the fact that income inequality has become great than at any time in the last four centuries.

Average country level data also hides the fact that wealth has become more and more concentrated within a few individuals and families.

While a relatively few have very high incomes and have accumulated very great wealth, the vast majority of people are working harder for less reward.

The role of productivity

The industrial revolution has produced massive increases in productivity. In turn this resulted in improved quality of life for a larger and larger proportion of industrialized society.

This virtuous circle got disrupted several decades ago, because with increased productivity it had become possible to produce all the goods and services needed with less labor. Better yet for profit, the efficiency of modern logistics and communications made it possible to optimize for profit by moving production to the lowest cost areas of the world.

These changes have changed the economic equilibrium in a way that is going to diminish quality of life for everyone that relies on work for their quality of life. Worse, the decline in the use of labor is resulting in lower aggregate demand which in turn will cause business revenues, profits and GDP to decline.

Since the early 90s, the impact of lower buying power from reduced workers wages has been mitigated first by the growth of consumer credit, and later, by mobilizing savings represented by home equity. Eventually this bubble of phony economic strength burst, and it is increasingly recognized that there is an underlying real economic problem that must be addressed.

Money, banking and capital markets

The prevailing system of metrics do not describe the performance of the money, banking and capital markets sector in a useful way. The metrics of money profits, stock prices and GDP growth do not help to describe what these organizations contribute to the economy. To a great extent this sector merely moves wealth rather than creating wealth.

Money should be thought of as a lubricant in the machinery of the real economy. Money is neither the engine nor the fuel. A lack of lubricant and real machinery seizes up. Lack of money, lack of liquidity, and the economy does the same. This is some of what happened in the economic crisis that started in 2007.

Money should not be a constraint on economic activity and progress. Rather the constraint on progress should be the carrying capacity of the planet and the capacity of people to develop and deploy innovations that improve quality of life and reduce stress on the planet. The constraint should be the shortage of people with great brains rather than the money that gets deployed to fund their efforts.

Concentration of economic power

The multinational corporation is a form of organization that allows the organization to optimize its profit performance at the expense of everyone else. They are able to choose the legal regime in any way that will benefit the corporation, and at the expense of everyone else.

In a multinational organization, optimizing for profit and benefit for investors usually has negative results for people and planet unless there are concerted efforts within the organization to avoid these outcomes. This is not common.

Nations and governments

The national economy is one thing, the government is another. They are not the same. The national accounts are about the performance of the national economy which is the totality of both the private and the public sector.

Government accounting is about the government. It is almost exclusively a cash based system, and accordingly subject to all the abuses that cash based systems allow. Government accounts and the government budget are only about the revenues and the payments of government and the public sector part of the national economy. The revenues of government are the proceeds of taxation, user fees and the sale of debt instruments. The payments are everything that are paid for by government. There is no accrual process and there is inadequate differentiation between operating and capital expenditures.

Big needs, unemployed people and no jobs

There is a dangerous systemic dysfunction when there are big needs that go unsatisfied, no jobs being offered by established organizations and a large number of unemployed people, many of whom are young and well educated.

The prevailing system of metrics is not capable of providing the data and analysis that will optimize the operation of society and the economy to address this situation. This is mainly because of the domination of the terrible trio and the focus on organization to evaluate performance.

Critical metrics are missing

Many critical metrics are missing. There are no metrics in widespread use that capture the impact on people and planet from economic activity, especially large scale economic activity implemented by corporate organizations. Many metrics are missing including:

1. Huge amounts of economic activity are carried out with virtually no metrics about the nature and scale of their activities. Privately held corporations are in this category, including some very large companies. Security and military affairs are also in this category.
2. Very little data are available about the impact of economic activity on a place.
3. Very little data are available about the impact of a product or service in people and planet, though there is a huge amount of advertising and PR about the product. Corporate data are used to influence the buy or not to buy decisions of people using advertising and PR. There is nothing like this that informs about the impact on people and planet arising from the life cycle of the product.
4. There is no workable framework to make it easy to account for and report on impact on people and planet.
5. There is no system of quantification of value so that impact can be measured with the same rigor that is used for business profit.
6. There are huge amounts of data inside corporate organizations, and there are substantial economic datasets within government, but no easy way to use these data to improve decision making.

Measuring Using Money and Using a Value Unit

MDIA has two units of measure:

- Money that measures business profit, material value and wealth; and
- TruValueUnits that measure TruCost, TruValue and TruWealth

Measuring using money

The problem with using money as a measure is that it is not really a measure but a 'thing' in its own right.

Measuring the length of a road, by using road as a measure would not make much sense. But that is essentially what is done when we use money as the measure in economics. The length of a road is measured using a unit of measure such as miles or kilometers.

Money is ubiquitous, but even though it is used by almost everyone on the planet everyday, there is surprisingly little understanding of what money is and how it behaves.

One perspective of money is that it is something that is used to facilitate economic transactions, in other words, money is a medium of exchange. In this role, a very good characteristic of money is that it has a stable value which does not change over time.

Over time this concept of money has been diminished in importance, as money has also become a way to control the performance of the economy. This has the effect of destabilizing the value of money more or less depending on the behavior of the controlling authorities.

Money is also a store of value, where as 'specie' or as money denominated securities. This role of money is best served when money is perceived to have a stable value over time.

There was a time when money was 'backed' by something of tangible value like silver or gold. Bankers determined a long time ago that there could be more 'money' in circulation than tangible value backing the money. Eventually, the authorities determined that money could function perfectly well without any backing in the form of tangible value, but merely the backing of the 'Government' of the State. This requires that the commercial community has 'trust' in the Government and the State.

Money and conventional money accounting has a big weakness as a measure of socio-economic state, progress and performance. This weakness is that conventional money accounting only accounts for transactions where money is the medium of exchange. There are many important socio-economic transactions that do not involve the exchange of money, and these are therefore ignored.

Measuring using a value construct

A value construct will enable a very different level of rigor to be introduced into the analysis of economic progress and performance.

One must expect that what such a value unit might be called will be the subject of considerable debate. For this White Paper, it will be called a TrueValueUnit (TVU).

This value construct has some of the characteristics of money, but is not constrained by the limits of conventional money metrics.

Simply applying money measures to transactions that have value but do not have exchange of money cannot capture the variability of value relative to money that occurs in the real economy. Accordingly TVUs have a variability relative to money that depends on context.

The quantification of value is not easy, but many of the things in society and the economy that have the most value absolutely need to be measured and quantified in some meaningful manner.

MDIA uses a system of standard values that is similar to the system of standard costs used in corporate cost accounting. Everything has a standard value. This standard value is initially calculated based on available information and becomes part of a database of standard values.

The database of standard values is improved over time using a system of 'crowdsourcing'. This process means that standards get better and better over time as more people add their knowledge of what the 'right' value should be for the standard.

The database also allows for variability of a standard value depending on different aspects of context. This allows for different standard values to apply in different situations.

Perspectives for Reporting

The MDIA system enables accounting, analysis and reporting from various different perspectives:

- People - Individual - Family - Friends - Community
- Organization - Economic activity
- Product - Supply chain - Use - Post Use Waste Chain
- Place

In each case the underlying data are the same. The only thing that changes is the manner in which the basic data are presented.

People - Individual - Family - Friends - Community

The main purpose of man-made human activity is to sustain and improve the standard of living and quality of life of people. MDIA has one perspective of analysis and reporting that has a focus on people.

The first priority is to have the basics needed for survival. These basics have a huge value because without life depends on them. These basics are the minimum of:

- Food;

- Water;
- Shelter; and
- Clothing.

The author of this paper worked in drought affected areas of Africa in the 1980s and also with refugees and displaced people in areas affected by war. Without these basics people die.

Quality of life has many components. Some may be bought with money, but some are not obtained by simple money transactions.

What can be bought with money

Some of these can be bought with money, and give a direct impact on quality of life. Having money and earning money enables the purchase of the necessities of life. These items are in this category:

- Payments for water and food;
- Payments for shelter;
- Payments for clothing; and,
- Payments for recreation.

Some others can be bought for money, but the impact on quality of life does not come immediately but at some point in the future. These purchases are in this category:

- Payments for healthcare; and
- Payments for education.

What does not get bought with money

Many aspects of an individual's quality of life may not be bought for money alone, but result from behavior that is not directly related to money transactions. These quality of life components are in this category:

- The value of family;
- The value of friendship;
- The value of community;
- The convenience of things (like ease of buying things)
- Accessibility to what one wants;
- Financial security; and
- Physical safety and security ... lack of violence.

There are some aspects of an individual's quality of life that are controlled by fate and by others. These include:

- Some health issues;
- The macroeconomic environment;
- The state of development;
- Catastrophic weather events and natural disasters; and
- The macrosecurity environment.

Quality of life may be complicated ... but quality of life is important. Arguably it may be the most important thing in society and the economy.

Because so much of modern quality of life depends on money, the amount of money that is income to the person and how much money wealth is owned by the person has a significant influence of quality of life. However this aspect of quality of life is not by any means the only thing.

A person who has no money will get a lot of value from a small amount of money. A person already with a lot of money will get relatively little value from an additional small amount of money

The quality of life of a person is affected by what has happened earlier in the person's life, the situation at the present, and what is likely to happen in the future. All of this comes into play in computing the 'state' of a person's quality of life.

The lifestyle choices of a person have an impact on a person both now and in the future. In addition to the impact on the individual these choices have impact on other people in the immediate family and the broader community.

The choices made by an individual also have impact in other parts of society and the economy. Choices about what to buy have ripple effect into the whole of society and the economy. A wasteful material high energy consumption economy is a bad proxy for a high performance quality of life that is going to be sustainable in the long term.

Organization - Economic activity

The conventional money profit accounting

Conventional money profit accounting is used to measure the performance of an organization, and the individual economic activities that go to make up the organization as a whole. This system of measurement ignores everything that is external to the reporting boundary of the organization.

The reporting for a simple organization that has just one economic activity may be done in a fairly simple way. The reporting for a complex organization that is comprised of many economic activities in many different places is done in a more complex manner, but both are constructed from underlying data that has the same architecture.

Essentially reporting for a complex organization is based on the aggregation or consolidation of all the economic activities of the organization.

MDIA ... brings externalities into account

An economic activity has, in addition to data specific to the singular economic activity, data elements associated with these others:

- People;
- Product; and
- Place.

Reporting for the organization will normally have a conventional legacy type money based reporting system with standard generally accepted accounting reports. In recent years organizations have increasingly produced other reports describing various aspects of their business behavior with respect to CSR, sustainability, carbon footprint, waste,

etc. Some of these reports are prepared according to widely used approaches such as GRI which is evolving over time and is currently in its 4th generation.

MDIA reporting has an architecture that expands the conventional money profit reporting that is internal to the economic activity or organization to include the value elements that impact everything.

Converting money costs in value consumed

All of the inputs into an economic activity may be converted into value consumed using a system of standards along the lines of standards in cost accounting.

All of the materials used and the energy purchased has a money cost, but they also have a trucost history that has to be brought into account by a calculation similar to a Bill of Material explosion.

Converting money revenues into value produced

The products produced are sold for money revenues, but they also have trucost profiles that may be computed in a manner similar to a Bill of Material implosion.

Accounting for impact on all the elements

All the elements of the process in the economic activity are accounted for from end to end of their respective life cycles. In MDIA, the economic activity accounts for the impact on on all of the following elements:

1. Money - Surplus or Deficit;
2. People - Impact on Quality of Life;
3. Product;
4. Community - Place;
5. Planet - Resource Depletion - Materials - Energy;
6. Planet - Environmental Degradation - Land - Water - Air;
7. Built Environment - Infrastructure, Buildings, Plant and Equipment;
8. Enabling Environment - Governance, Rule of Law, Taxation, etc;
9. Knowledge - What we Know

Product - Supply chain - Use - Post Use Waste Chain

The money cost analysis, the supply chain may be analyzed along the following lines:

- Cost brought forward;
- Additional materials;
- Materials;
- Energy;
- Labor;
- Use of machinery and equipment;
- Other expenses;
- Financial expenses;
- Knowledge expenses;
- Taxation;

- Pro-good expenditures;
- Profit; and
- Price/cost carried forward.

In the MDIA framework, this is expanded to include externalities and the impact through the supply chain on everything.

1. Money - Surplus or Deficit;
2. People - Impact on Quality of Life;
3. Product;
4. Community - Place;
5. Planet - Resource Depletion - Materials - Energy;
6. Planet - Environmental Degradation - Land - Water - Air;
7. Built Environment - Infrastructure, Buildings, Plant and Equipment;
8. Enabling Environment - Governance, Rule of Law, Taxation, etc;
9. Knowledge - What we Know

When a product is 'used' in production the history of its supply chain carry forward into the production and reemerges in the post production products. As the product goes into production there is a computation something like a Bill of Material explosion and as the new products come out of production there is something like a Bill of Material implosion.

When a product is bought to be 'used' ... such as the purchase of an automobile ... there are costs of use. The purchase and use of an automobile has money costs and it also has the MDIA value flows which have impact on everything.

In due course, a product is no longer used and is 'junked'. This waste may have a modest money cost, while there is a much bigger trucost that is ignored in money metrics but is actually important in truvalue accounting.

The product perspective is very important in the analysis of society and the economy, because product is the link between the society and economy of everywhere that the product flows through from the start in mineral mining, through all the processes of manufacturing, through transport and distribution to eventually use and then post use waste.

Place

Place is important because every economic activity is located in a place, and its performance in a place can be observed in a very specific way. An economic activity in a place has interactions with everything that matters:

- People ... that live and work in the place;
- Organizations ... that implement or finance the economic activities;
- Products ... that are consumed by an economic activity and are produced by economic activities;
- Resource depletion:
 - Land and water use:

- Resource depletion ... the use of materials, energy, water, etc. in the manufacturing of products and services to be used by people to sustain their quality of life;
- Environmental degradation:
 - A result of economic activity ... the production of goods and services;
 - A result of life style choices and the consumption of goods and services.
- Built environment ... the consumption of resources associated with
 - the use of the infrastructure in the place;
 - the degradation of the built environment; or
 - the upgrading of the built environment.
- Enabling environment ...
- Knowledge ...
- Wealth ...

There is both the 'State' of the place and the 'Progress' of the place. Progress may be ascertained by looking at the way 'State' changes over time.

There is also the 'Performance' of the place, which has two parts:

- the relationship between the Progress being achieved as a result of the allocation and consumption of resources.

Money Elements of Conventional Accounting

The Double Entry Construct

Conventional money accounting has these activity components which result in money profit:

1. Money costs; and
2. Money revenues

In conventional accounting, money transactions are recorded in 'accounts'. Accounts are of two types:

- those relating to the balance sheet; and
- those relating to the profit and loss account.

A key feature of double entry accounting is that there is a mathematical relationship between the balance sheet accounts and the profit and loss accounting such that the total of the profit and loss accounts for a period is the same as the change in the sum of the balance sheet accounts from the beginning of the period to the end of the period.

What this means is that progress ... the change in the balance sheet ... may be measured simply by looking at the change in state, something is a lot easier and more accurate than trying to aggregate a very large number of economic transactions.

The Balance Sheet

A balance sheet has these main categories:

- Asset categories
 - Current assets
 - Fixed assets
 - Investments
 - Intangible assets and other
- Liability categories
 - Current liabilities
 - Long term liabilities
- Shareholders' equity

Current assets has these elements:

- Cash
- Inventory
- Accounts receivable
- Prepayments and other

Current liabilities has these elements

- Bank overdraft
- Trade accounts payable
- Taxes payable
- Current portion of long term debt

Working capital

Working capital is the net of current assets less current liabilities. Cash is sometimes included in this and sometimes excluded. It is fairly common for cash needed for operations to be included in working capital, but large balances of cash surplus to operating needs to be excluded.

Fixed assets

Fixed assets are normally valued at their historic cost, less a provision for depreciation. The depreciation provision has its origin in the idea that the value of the fixed assets should be written off over the economic life of the asset. In many companies nowadays, however, it has become normal for depreciation to be computed based on tax strategy to minimize the cost of taxation.

There have been initiatives to change the accounting norm for fixed asset accounting to one where the value of the assets are adjusted in some way to reflect inflation. Generally, these have not been adopted by the accounting standards boards.

Other assets

Some companies have investments. In some cases the investment may give a controlling interest in a company, which then becomes a subsidiary, and may or may not be consolidated into the accounts of the parent company. There are generally accepted accounting principles that guide how to do a consolidation.

Some companies have other assets that are brought into account in the balance sheet.

These include intangible assets such as 'goodwill'. Goodwill arises when in a merger where the acquiring company pays more than the net asset value of the company being acquired. The 'to balance' amount is 'goodwill'.

These may also include the value of 'intellectual property' and the value of patents, trademarks, etc.

Liabilities

On the liabilities side, long term liabilities includes debt financing. Usually any repayments of principal due within a year are included in short term liabilities.

Net assets and equity

The net assets of the business are the total assets less the total liabilities. This is also the same as the shareholders' equity in the business.

The balance in balance sheet is based on total assets being equal to the total of liabilities plus shareholders' equity.

The Profit and Loss Account

The main headings in the profit and loss account are as follows:

- Revenues, cost of sales and gross margin
- Sales, general expenses and administrative overhead
- Interest - Financial charges
- Taxation
- IBITDA - Earnings Before Interest, Taxation, Depreciation and Amortization
- EBIT - Earnings Before Interest and Taxation
- Net income

Revenues, cost of sales and gross margin

The interaction of revenues and cost of sales results in gross margin. These elements are the driver of business and the production of goods and services.

Sales, general expenses and administrative overhead

Gross margin is reduced by the expenses of selling, general expenses and administration.

Interest - Financial charges

In conventional accounting, it is normal to have interest and other financial charges broken out as a separate line item.

Taxation

Taxation is also usually reported as a separate line item.

Pro-good expenditures

To understand the full impact of a business, it is helpful to know how much of the expenses of the company are to do with activities that are pro-good rather than being totally focused on the money profit performance of the company.

IBITDA - Earnings Before Interest, Taxation, Depreciation and Amortization

This is a measure of business performance commonly used in financial analysis of business performance. By excluding depreciation and amortization, this measure gives a better indicator of cash flow than EBIT and net income.

EBIT - Earnings Before Interest and Taxation

This is a measure of business performance before the cost of financing and before the cost of taxation.

Net income

The net income is the amount of profit or surplus that is available to be added to the equity of the business at the end of the period.

Incomplete records

In an organization where the records are incomplete, the profit for the period may be ascertained by looking at balance sheet information, and estimating the increase in the shareholder's equity during the period.

This approach may be used by tax authorities where there are few records about the activity of the business, but it is clear that the net assets of the business have increased. The increase is the profit, and may be used to assess taxes.

In the context of MDIA and impact analysis, the progress may be ascertained by reference to the change in state (value balance sheet) over a period. This is almost always easier than doing a detailed analysis of the activities in the period.

TruValue Elements of MDIA

MDIA has these activity components:

1. Money costs;
2. Money revenues;
3. Value consumption; and
4. Value production

The truvalue elements of MDIA are grouped into a small number of element groups as follows:

1. Money surplus or deficit
2. People - impact on quality of life
3. Product
4. Community - Place
5. Planet - Resource Depletion - Materials - Energy
6. Planet - Environmental Degradation - Land - Water - Air
7. Built Environment - Infrastructure, Buildings, Plant and equipment
8. Enabling Environment - Governance, Rule of Law, Taxation, Organizations
9. Knowledge - What we know

All of the elements are used within an analysis construct similar to the one used in conventional accounting ... that is balance sheet and profit and loss account. In the case of MDIA the balance sheet is 'state', and change in 'state' is progress.

Performance may be reported in many ways, but the most useful are:

- the standard of living or quality of live relative to the net value consumption of the society; and
- the progress or improvement in standard of living relative to the net value consumption of the society

Organizational performance ... money profit and valuadd

Money may appear to be a simple and easy way to measure socio-economic performance, but in fact it is very complex and not at all well understood. At its core, modern money is a 'man-made' construct, that has few of the characteristics that make for a reliable way to measure anything.

Money remains part of the MDIA data framework because there are more data about money performance in the economy than anything else, and this provides a starting point for improvement of the metrics for socio-economic analysis and policy making.

For an organization or economic activity there are two ways to compute money profit:

- by computing the change in the equity on the balance sheet (before any distribution to shareholders); or
- by computing the net of all the accounts in the profit and loss account.

In conventional reporting the financial statements comprise these sections which form a coherent whole:

- the Balance Sheet;
- the Profit and Loss Account; and
- the Cash Flow Statement.

Note that if the profit and loss account information is not available, it is possible to compute the profit for the period by calculating the change in the balance sheet equity from the beginning of the period to the end.

People - impact on quality of life

MDIA is based on the idea that the purpose of economic activity more than anything else is to sustain and improve standard of living and quality of life for people, and to do it with the minimum of negative impact on everything else.

For people and their quality of life, there are many components all of which are connected and inter-related in complex ways. People are complex and every person is unique, but some of the connections are understood and are incorporated in the MDIA approach.

People change over time. What is important as a child is different from what is important as an adult and different again from an old person. Some of the things that happen as a young person have long term consequences and have impact for the older person.

A person's quality of life in the present is a function of:

- what is happening now;
- what has happened in the past; and
- what can happen in the future.

A person's quality of life has these main components:

- family;
- friends;
- community;
- place;
- health;
- income;
- wealth;
- financial security;
- education;
- knowledge;
- opportunity;
- religion;
- interests; and
- security.

At the same time, the behavior of people has an impact on everything else. It has impact on:

- Money surplus or deficit
- People - impact on quality of life
- Product – to use or not to use
- Community - Place
- Planet - Resource Depletion - Materials - Energy
- Planet - Environmental Degradation - Land - Water - Air
- Built Environment - Infrastructure, Buildings, Plant and equipment
- Enabling Environment - Governance, Rule of Law, Taxation, Organizations
- Knowledge - What we know

Product - to use or not to use

It is the interaction between people and product that drives all the human-centric activity in the socio-economic system.

Community - Place

Community or place is not particularly important in conventional accounting or economics. Conventional accounting has a focus on economic activity and the performance of the business organization. Conventional economics has a focus on macro analysis at the level of the nation and regions with little focus on the community or neighborhood.

MDIA, on the other hand has a big focus on the community or place. People live and work in places. Economic activity is located in a place, and economic activity has impact in a place. Impact on resource depletion and environmental degradation may be seen in a place. Accountability, in the end, will happen in a place.

All the activities of people and organizations (at the level of the economic activity) will have impact on all the dimensions of performance:

- Money surplus or deficit
- People - impact on quality of life
- Community - Place
- Planet - Resource Depletion - Materials - Energy
- Planet - Environmental Degradation - Land - Water - Air
- Built Environment - Infrastructure, Buildings, Plant and equipment
- Enabling Environment - Governance, Rule of Law, Taxation, Organizations
- Knowledge - What we know

However, it is by looking at the 'state' of these dimensions in a community or place that makes it possible (practical) to have meaningful data at low cost.

Planet - Resource Depletion - Minerals - Energy - Habitat

In conventional economic analysis, resources are often treated as unlimited. While many of the resources on the planet are large, they are not infinite. The only resource that may be reasonably considered to be infinite is the power of the sun.

Nature knows how to use the power of the sun. Humankind, however, has little knowledge about how the power of the sun might be used efficiently and safely on planet earth.

Minerals

Energy

Habitat

Depletion of mineral resources

Use of most products involves the consumption of mineral resources, and the depletion of the resources of the total planet.

Depletion of fossil fuels

Use of energy usually involves the consumption of fossil fuels, and the depletion of fossil fuel inventory for the total planet.

Degradation of land

Land is limited, and best use should take into account not only the opportunity to make profit, but also the impact of depletion or degradation of the land, and the environment associated with the land including bio-diversity.

Use of water

Water is limited, but for most of the period of the agricultural and industrial revolutions water has been used as if it was an infinite resource. There is a vast amount of hidden water in the 'stuff' we buy. Water is the most important compound in everything, but it is treated in business metrics as unlimited in availability and of little or no cost.

Destruction of bio-diversity

This is a silent problem, but growing dramatically. The survival of life depends on bio-diversity which is now declining at a rate that is many times bigger than anything ever experienced in history.

Planet - Environmental Degradation - Land - Water - Air

Environmental degradation has been a problem for human society for thousands of years. In nature there is an amazing balance between everything that is going on, much of which we do not understand, but what we do know is that nature has something like a circular economy where nothing gets wasted and everything goes around.

Land - Solid wastes

There are a range of impacts on the planet that are related to the waste that results from almost every form of economic activity. There are multiple waste flows in three classes:

- Household waste is generally classified as municipal waste,
- Industrial waste as hazardous waste, and
- Biomedical waste or hospital waste as infectious waste.

The detritus from a consumer society is huge, and it grows with the material prosperity. The cost of solid waste is increasing as it becomes more and more difficult to push the problem into someone else's space.

It is not many years ago that New York City's municipal waste (including hospital waste) was simply put on barges, towed out to sea, and dumped into the ocean. Now it is trucked more than a hundred miles into remote land fills.

Water pollution

Massive water pollution has been the norm for industrial activity for most of the industrial revolution. Rivers have been a convenient way to get rid of liquid and semi-solid effluent from cities and from industrial facilities. Developed countries have only

addressed this problem post WWII, and many developing countries have not yet started to address the issues.

Water pollution from agricultural run-off is also a big problem. The toxic mix of fertilizers, herbicides and pesticides gets into the rivers, and eventually into the oceans.

It is reported that a large part of the Caribbean is now 'dead' because of toxins coming into the Gulf of Mexico from the Mississippi River.

Atmospheric pollution ... particulates

Particulate pollution. At the height of the industrial revolution in Europe, particulate pollution was a serious and dangerous problem. The 'smog' of 1956 in the UK was a countrywide blanket of fog together with industrial particulates that ended up killing hundreds.

Atmospheric pollution ... Sulphur

Acid rain is produced by SO₂.

Atmospheric pollution ... Nitrous Oxides

Nitrous oxides. Urban centers where building boilers are burning diesel for heating and automobiles are burning gas for transport produce massive amounts of nitrous oxides unless the offending compounds are removed from the fuels. This has been mandated in some places, but not everywhere.

Atmospheric pollution ... Greenhouse Gases

Greenhouse gases are primarily carbon dioxide (CO₂) and methane (CH₄). These are invisible and for climate change deniers might as well not exist. But science has shown that these gases are resulting in atmospheric changes that we cannot fully understand and predict. Reduction is a start, but the eventual elimination of the release of these gases into the atmosphere is probably the best goal.

Built Environment - infrastructure, buildings, plant and equipment

The built environment is the foundation which enables much of modern socio-economic productivity. Without the built environment, modern society and civilization would not exist. There are many components to the built infrastructure. In general conventional accounting and economic analysis discounts the contribution that the built environment makes to socio-economic performance. This is a particularly grave issue with government cash based accounting.

The built environment includes everything that has been 'manufactured' rather than simply existing in nature. It includes such things as:

- Housing;
- Commercial buildings;
- Factories, production plant and equipment;
- Facilities for sports and culture;
- The physical infrastructure for transport;
- Transport vehicles;

- Communications infrastructure;
- etc.

The built environment has a huge impact on the performance of society and the economy. A big part of quality of life is determined by the performance of the built environment. The built environment explains why some societies have better performance than others.

There are many big issues with infrastructure. Perhaps the biggest is that existing infrastructure is not being maintained as it should be and the infrastructure is not being upgraded to handle the economic activity that relies on the use of the infrastructure.

Transport infrastructure

There has been huge investment in transport infrastructure during the past 200 years. This includes things like:

- Seaports
- Canals
- Railways ... permanent way, tunnels and bridges
- Roads and bridges
- Airports
- Air traffic control systems

Industrial process infrastructure

There has been a huge investment in industrial processes for the manufacture of everything imaginable. There was a time when everything was made using people and their skills and energy. Over time machinery has been invented to make it possible for less people to produce more goods.

The first wave of industrial process development used windmills and waterwheels to bring power into the process. Over time it was steam and gas engines that delivered power to factories, and now in the 21st century most power is delivered to industrial processes as electricity and process steam.

The positive impact of manufacturing on quality of life should not be discounted, and at the same time the negative impact of depletion of resources and environmental degradation should also be brought into account.

Communications infrastructure

There was a time only about 200 years ago when communications used to be limited to line of sight. And then science made all sorts of other communications possible:

- Telegraph
- Telephone
- Telex and ticker tape
- Satellite telephones
- Arpanet and Internet ... Broadband
- Smart phones and mobile devices

Energy infrastructure - electricity

All developed countries have access to electric power everywhere and all the time. This is taken for granted. In order for electric power to be available 'at the click of a switch' there is a huge infrastructure behind the scenes including power stations that generate the electricity, transmission lines to move the electricity in bulk to areas where it is needed, and distribution lines to get it to individual locations.

This is a massive system that is very complex and surprisingly reliable.

Almost all developing countries are constrained by the lack of electric power.

While electricity has been thought of as clean energy because it is pollution free when it is used, the production of electricity using any sort of fossil fuel is not pollution free. It is only electric power generation using renewables like wind power or solar that are low pollution.

Energy infrastructure - pipelines

Pipelines are a much bigger part of the infrastructure than is commonly realized. They get into the news before they are built and they get into the news when they leak or otherwise malfunction. However, this happens rather infrequently, and compared to the use of railcars or trucks, pipelines are efficient and safe.

Water and sewer infrastructure

There was a massive amount of water and sewer infrastructure built in the late 19th century. By comparison recent construction of water and sewer infrastructure has been small. There is tremendous reliance on legacy infrastructure that goes back more than 100 years.

Buildings

Buildings are of many types for many different uses:

- Housing for shelter
- Churches, mosques and temples for religious worship
- Retail stores, warehouse for commerce
- Factory building for manufacturing
- Office buildings for business

Vehicles

The vehicles of the 21st century are very different from the vehicles of the early 19th century. The performance of modern vehicles is vastly improved and to a great extent taken for granted.

- Ships
- Trains
- Automobiles
- Buses and trucks
- Aircraft

Internal to the organization / economic activity

Some of the built environment is internal to the organization or economic activity. This built environment appears in the conventional money profit accounts in various ways:

- in the fixed assets account at historic cost;
- in the profit and loss account as depreciation; and
- in the profit and loss account under such headings as repairs and maintenance

External to the organization / economic activity

Some of the built environment is external to the organization or economic activity. This built environment does not appear directly in any conventional money profit accounting.

Quantification of the investment that was used to build this infrastructure has essentially disappeared from the accounting, resulting in an enormous distortion of almost all of the economic performance analysis that gets done.

Part of the problem is that much infrastructure construction has been done by governments and other public entities. Most (almost all) governments and other public entities use 'cash based' accounting rather than full accrual accounting. What this means is that there is no 'balance sheet' as part of the accounts, and in turn this means there is no financial accounting for the fixed assets that get funded.

Historic cost and inflation

There is another problem, and that concerns the use of historic costs to account for fixed assets in conventional money profit accounting. Because of inflation, old fixed assets will be recorded in the books of account at a historic cost that bears little relation to the current cost of replacing the assets.

An example – the MTA

The MTA (Metropolitan Transportation Authority) is one of the biggest organizations in the world, and absolutely critical to the functioning of New York City. It has a huge infrastructure much of which dates back a hundred years. The accounting records for this huge infrastructure do not exist:

- because as a public entity it does not use full accrual accounting; and
- because conventional accounting writes down old assets to nominal values.

Maintenance of this huge infrastructure has been routinely underfunded for most of the history of the MTA to the detriment of its performance and the underlying value of the organization.

When a 'replacement' value is put on the MTA infrastructure it becomes clear that a reasonable level of maintenance expenditure would be an order of magnitude more than has been normal for this organization. Every customer of the organization ... many millions a day ... are impacted by this failure. The place is dirty (though not as dirty as 30 years ago) and the service is compromised (though not as badly as 30 years ago).

Enabling Environment - Governance, Rule of Law, Taxation, etc.

Governance

Rule of Law

Taxation

Organizations

Security

A network of support elements

Everything in society and the economy is affected by the enabling environment. Freedom, democracy, rule of law, security, etc. are all things that are important to quality of life and the functioning of society. The enabling environment is a network of support elements that have many components:

- Government;
- Institutions;
- Security apparatus;
- Rule of law;
- Regulations;
- Stability;
- Infrastructure;
- Knowledge;
- Culture;
- Religion;
- People and their ethics;
- People and their skills;
- etc.

Where an enabling environment does not exist or is dysfunctional, society and the economy are constrained. In many places, the strength of the enabling environment is compromised.

Government ... institutions, law, justice, security, etc

Government is an important part of the enabling environment and in most countries government entities are financially bankrupt ... they do not have the money flows to pay their financial commitments and keep things running.

The situation in Detroit that was in the news in 2013 when it declared bankruptcy is a wake up call about the serious financial condition of government entities.

Value of payment to government, into charities, etc

Payments by economic organization in the form of taxes, royalties and user fees is a positive contribution to the enabling environment.

Payments by economic organizations as charity or in some form of 'do-good' spending may also be a positive contribution to the enabling environment, depending on what use there is of the funds.

Knowledge - what we know

Knowledge, what we know, is the foundation for the socio-economic progress that humankind has been able to achieve over a period of many thousands of years.

The speed of knowledge accumulation ... of discovery ... in the last 50 years has been remarkable, and gives the possibility of a world where quality of life for everyone is better than it has ever been.

Sadly, there is a massive disconnect between what is possible based on our knowledge of science and technology and what is possible based on essentially dysfunctional decision making processes throughout society and the economy.

Knowledge that enables technology

It is knowledge as much as anything else that enabled the industrial revolution and the socio-economic progress of the past 200 or 300 years.

This continues. There has been amazing growth in knowledge over the past 50 years, and this growth in knowledge is continuing apace.

Investment in knowledge

Money spent on research and development is a positive contribution to knowledge. Money spent on research in universities has been a big contributor to knowledge over the years.

By its very nature investment in knowledge starts off with investing in something that is not known. It is this basic research that results in critical breakthroughs that enable new technology, and new industries, massive improvements in quality of life, and because of all this, one of the best investments that can be made.

Who owns and benefits from knowledge

The value to society of more knowledge is going to be more or less depending on the way the knowledge is made available to society at large.

A better debate is needed about the way knowledge is controlled and owned. While there is a role for patent law, is patent law serving society in an optimum manner?

It is common for a corporate organizations to make knowledge proprietary to itself, and in so doing deprive society at large from the benefit of this knowledge.

An example of this is the case of 'orphan drugs' which have been developed and would be useful in poor settings, but which do not go into production because they have limited profit potential

More Material ... References

See also these additional papers in the White Paper #1 series:

- Core Concepts for Radical Reform of Metrics
- Metrics about People and Quality of Life
- Metrics about Organizations and Economic Activity
- Metrics about Product ... Life Cycle Impact
- Metrics about Place ... Where People Live and Work
- NEXT STEPS

In addition the following are going to be available on line at: www.TrueValueMetrics.org
They are at various stages of completion, and serve, more than anything else, to track the development of the ideas that are now incorporated in the current version of MDIA

Examples of Economic Activities Using MDIA

A separate paper is being prepared that will show how the MDIA framework applies in a variety of economic activities. The tentative title of the paper is 'Examples of economic activities using MDIA'.

MDIA Value Dynamic Collection

A collection of briefs describing the value dynamic of different types of economic activity, and different economic policy options.

Community Analytics, Key Concepts

A book length manuscript prepared in 2009, and superceded by ongoing work that resulted in the current version of MDIA

New Wave for Development, Some critical reforms to catalyze socio-economic progress

A book length manuscript based on the earlier paper 'Turning Development Upside Down'

Management Information for Relief and Development

A book length manuscript designed to improve management processes in development situations

Conceptual Overview of Community Analytics

A manuscript prepared in 2009 to focus on the importance of the community in socio-economic development

Community Impact Accountancy (CIA)

A manuscript prepared in 2008 ... developed from a slide presentation about analysis of community development performance.

MDIA Data Architecture - Reconciling MDIA topologies with other initiatives

A set of working papers reconciling the MDIA data architecture with other initiatives:

- The IRIS 3.0 topology
- GIIRS Issues and Indicators

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