



Peter Burgess

Triple Bottom Line (TBL) Accounting Using MDIA

Introduction

Experience over the last 40 years suggests that there has been a growing dysfunction in the systems driving global society and the economy. There is some amazing progress in knowledge, technology, and manufacturing productivity, but there has been far less progress for society, for most people and their quality of life. There is dangerous depletion of resources and degradation of the environment. Progress for some has been wonderful, but not for others. For too many people, opportunity has become a cruel mirage. This is a system problem, and calls for a system solution ... but what might that be?

In spite the amazing progress in technology over the past 50 years ... with computational power millions of times more powerful, materials are better, knowledge is growing faster and faster, more and more people have decent education. But in spite of all of this, the state of society ... the state of the world is something of a shambles.

Conventional approaches to problem solving and policy making do not seem to work. As an engineer / economist turned accountant, I see the issue of metrics as being a major component of the dysfunction. Most of the metrics used every day to determine progress and performance of society and the economy are badly designed and cannot work. Corporate profit, stock prices and GDP growth are the dominant metrics, and they do not correlate to better quality of life and standard of living for the majority of the world's population nor do they provide any incentive to sort out the problems of resource depletion and environmental degradation.

At the outset I want to acknowledge that there is an enormous amount of work going on to address the problems of the environment, society and the economy that have been identified. These include both legislation and voluntary initiatives to improve the reporting by companies of their social responsibility, sustainability, workplace conditions, environmental impact and so forth. In general, these initiatives address the issue of reporting, with less attention to the matter of underlying metrics and accounting.

The Achievements of Conventional Capitalism

Progress ... by almost any measure ... has been amazing over the past (say) 300 years. There has been amazing progress in man's ability to grow food and produce goods. A free laissez faire market driven capitalist system has done very well in improving the quality of life and standard of living for a lot of people over this time.

The free market capitalist system has performed way better than state driven communist systems, but performance relative to a theoretical best possible has been dismal. I worked on a mainframe

computer in 1967 with 4K of memory. Almost 50 years later a smart phone has 4G or 40G of memory ... a million or 10 million times more. Only a tiny bit of the increase in the power of technology is being used to drive decisions needed to make the enviro-socio-economic system function more nearly at its top potential.

Capitalism has evolved into a system that has an unhealthy focus on the ownership of financial wealth ... an unhealthy focus on 'me', with not much attention being paid to important issues outside financial wealth and the things that are traded for money. Financial capital is at one and the same time an amount of money and a measure ... a circular computation that has terrible implications.

The data suggest that the system of capitalism that served very well for a long time started to become less effective about 50 years ago. In large part, this was because the global economy went from being a 'shortage' economy to a 'surplus' economy. Higher productivity enabled this important change, and productivity also made it possible to make more profit while using less labor. With this change, labor lost its bargaining power ... a little at first, and eventually almost all of it.

The Genius of Conventional Accounting

Few people are aware of the genius of conventional double entry accounting. Developed more than 400 years ago, the concept of double entry makes it relatively easy to account for the assets of an enterprise and to understand the transactions that have taken place. First used by investors funding merchant adventurers in the 15th century, the system has stood the test of time, and is still at the core of every modern accounting system, which in turn is at the center of every good corporate management information system.

Double entry accounting and the classification of accounts between balance sheet accounts and profit and loss (or transaction) accounts is at the heart of conventional business accounting. Periodic reports are summaries of the balance sheet accounts ... the balance sheet ... and the transaction accounts ... the profit and loss account. A key construct is that the change in the balance sheet from the beginning of the period to the end of the period is the same as the net total of the transactions ... that is the profit or loss for the period.

With conventional accounting the financial performance of a very very large organization can be summarized with just a few numbers ... the balance sheet and the profit and loss accounts. ... just two or three sheets of paper to summarize the performance of a company with hundreds of thousands of employees! On the other hand, up to now there has been no systemic way for the impact on all the externalities ... impact on people and planet ... to be summarized and reported with the same efficiency.

But not applied widely

Though it is widely recognized that there are many important things in life that have value but do not get associated with a money measure, there are no metrics for these things that have anything like the power of conventional accounting. Conventional accounting embraces cost and embraces price but does not embrace the issue of value.

Financial analysis has devised ways to incorporate a notion of value into financial analysis for capital markets, but this does not carry into the underlying accounting. A company balance sheet has real assets and liabilities, but the 'value' of the balance sheet is computed based on the

present value of the anticipated future cash flows and profit. All of this analysis ignores the impact the economic activities have on people and planet.

The genius of conventional accounting is only applied to the business organization. Conventional accounting does not take into consideration any of the impacts beyond the 'reporting envelope' associated with the enterprise. The reporting envelope may include subsidiaries of the company, for example, but the reporting envelope excludes everything else. Impact on people and planet are externalities beyond this reporting envelope and not part of conventional accounting, analysis and reporting. Business schools teach about how to improve the performance of the company, but there are no equivalent 'society schools' that focus on how to improve the performance of every aspect of society and take care of the environment.

Capitalism and conventional accountancy were powerful factor in enabling the agricultural revolution and the industrial revolution and improving quality of life and standard of living for many over a period of several hundred years, the system has performed less well in the last fifty years. Poor performance was aggravated by measures like Gross Domestic Product (GDP) at the macro level which was introduced in the 1930s to help understand the Great Depression and subsequently the economic impact of war. GDP only measures economic flows, but it is used as a proxy for the state of the economy, assuming in a very crude way that the more the GDP, the better the economy and the better off people are. In reality, this correlation is very weak ... but paradoxically, the bigger the GDP the easier it is for the performance of business to look good. More there is of GDP growth, the easier it is to have corporate profit growth and higher stock prices.

Most engineering students learn something about feedback loops. The feedback loops that are needed for a better society do not exist within the existing system or are broken. An important step to having a better society is to have better feedback loops and for this to have better metrics.

Multi Dimension Capitalism for the 21st Century

The idea of equating progress to an increase in capital ... financial capital ... can be applied in a broader sense to everything ... to every dimension of capital.

Financial wealth has come from somewhere. It has come from the use of all sorts of resources in all sorts of ways to produce goods and services that people needed and wanted to improve their quality of life and standard of living. All of this could be accounted for by 'accounting for the money' associated with all of these transactions.

In times past impact on the resources, on the people, on the environment were not a part of the accounting, and the capital changes ... depletion or increase ... in all these areas was simply ignored. Nor did this matter very much. Better business did translate into more need for labor and the scale of economic activity relative to the available natural resources was modest. To put this in perspective, in just over a hundred years the level of economic activity on the planet has increased more than 40 fold ... the population was 1.7 billion in 1900 and grew by 2014 to around 7.1 billion. Standard of living is maybe 10 times better ... or more. This puts stress on resources and the environment that is dangerous and we have little or no idea what consequences there will be.

For the 21st century we should not be ignoring the other dimensions of capital. They should be accounted for with as much rigor as there is for financial capital and the associated money transactions.

A Three Component System with Seven Capitals

The big picture is that there are three segments making up the global enviro-socio-economic system. These are:

- Nature and natural bounty;
- Man built structures and systems; and
- People.

Within these three components of the system there are seven (7) capitals:

- Nature and natural bounty:
 - Natural Capital (NC)
- Man built structures and systems:
 - Physical Capital (PC)
 - Institutional Capital (IC)
 - Knowledge Capital (KC)
 - Financial Capital (FC)
 - Social Capital (SC)
- People
 - Human Capital (HC)

Natural Capital (NC)

There are many components to natural capital. There is the sun. There is life ... whether this is human life or all the other life forms from single cell organisms to all sorts of fish and animals and to plants in all their varieties. There are minerals and there are fossil fuels that represent millions if not billions of years of sun energy capture. There is land and water and atmosphere. There are ecosystems and biodiversity. Nature works in many mysterious ways that we know nothing about, but are essential to the good health of people and the planet. We now know something about the important services that the natural world provides which enable a natural environment in which animals, including humans can thrive. We do damage to natural capital at our peril. Despite this, there is no accounting for the impact economic activity has on natural capital ... no accounting for the depletion of resources, no accounting for the degradation of the environment, no accounting for the good that arises in nature (biodiversity, ecosystem serves, etc). This has to change.

Physical Capital (PC)

Physical capital is man built. Some of the physical capital is owned by people, some is owned by companies and some is owned in the commons by the state. There are factories, machinery and equipment, jigs and dyes, vehicles, furniture fixtures and fittings that are assets of companies and on their balance sheets. There are roads and bridges, airports, seaports and water systems and sewer systems that have been built by government and are maintained by government or others. There is working capital, and specifically inventory of product, that is mainly owned by private sector organizations. There are products that are consumed by people to satisfy their needs and their wants. There are houses owned or occupied by people. There are commercial buildings. There are city transit systems. There are parks, theaters for cultural events and stadiums for

sports events. There are hospitals and there are schools, universities and research apparatus. Money is in part a piece of physical capital in the sense that physical money (or its virtual equivalent) is needed to make transactions efficiently. Everything in physical capital has been built using resources and impacting the environment.

Institutional Capital (IC)

Institutional capital is also man built. There are institutions that have a role in enabling an efficient economy and better society. There are laws, rules and regulations that are man made and part of an enabling environment. There are a variety of organizations that enable efficient economic activities, and provide all sorts of services that make for a better society. There are security services, there are police and courts and prisons. There are religious organizations and a variety of organizations for recreation, the arts and sports. There are organizations that specialize in healthcare and organizations that specialize in education and the creation of knowledge. There are utilities that take care of the supply of water and sanitation and utilities that generate and distribute electricity. Institutions are a critical part of the enabling environment for efficient economic activity and for people's quality of life.

Knowledge Capital (KC)

Knowledge capital is man made. Some might argue that it is mankind's ability to build knowledge capital that has differentiated mankind from the other animals. Knowledge has grown at an amazing pace for the past 200 years, and continues to accelerate. The technical limit to knowledge capital is the ability of the human brain to process information and understand. There is a prevailing system constraint associated with money not being available to deploy and pay for the available brains. There are other issues with knowledge. One is that some knowledge is hidden and/or controlled by knowledge ownership otherwise referred to as intellectual property (IP) which is used or not used at the owner's option. Another issue is that knowledge has the potential to be used for bad rather than good. In many cases the use of knowledge results in change with some being winners and others being losers.

Financial Capital (FC)

Financial capital is also man made. Financial capital is the only capital that really does not exist per se, but is a function of the ownership and deployment of the other capitals. This is clear from a company balance sheet where the financial capital of the company is represented by the (physical) assets of the company less the liabilities. Similarly an individual's wealth (financial capital) may be represented by ownership interest in various assets ... house, car, personal property, stocks and bonds, insurance policies, etc ... less liabilities. Financial capital presently is the dominant component in the perception of success.

Social Capital (SC)

Social capital is not the same as human capital, but is closely related. It is about community and friends and the good that emerges from a group of people. Social capital feeds into human capital and vice versa. Social capital is what people as a whole contribute to a community or place. Social capital is influenced by the institutional capital that exists in a place, especially things like religious organizations, cultural organizations, sports organizations and the security services that keep violence at bay.

Human Capital (HC)

Human capital is about an individual. An individual's wealth (financial capital) as described above is a part of an individual's human capital, but only a part. Human capital in the present has

been achieved by an individual's history ... such things as parenting, nutritious food, good healthcare, good education, good surroundings, role models and so forth. Skills and experience are accumulated over time. There is a historic cost to getting these things, but the value accumulation is reflected in the present. Past earnings that are not spent but saved, factor into the human capital of the present. Society or community also feeds into an individual's human capital. A society that has no violence and is supportive of an individual adds to human capital. A society where there is a future full of opportunity is also part of the state of human capital in the present. The present value of the future depends on what the future looks like, but also depends on what the individual has done in the past to be in a position to take advantage of the future.

Multiple Perspectives

The conventional perspectives about the economy and society are these:

1. Organizational performance, corporate profits and stock market prices
2. Macro economics at the country level, with some drill down to more local issues

These perspectives work for the owners of physical and financial assets, for investors in corporate organizations and corporate executives, as well as providing the political class with talking points. However, there are other perspectives that are essential to enable an efficient society and economy that optimizes for everything and has people as a top priority and planet at the center. The singular focus on business performance as the driver of good results at the macro level has to be supplemented by multiple perspectives so that everyone may be involved in making better decisions for themselves and for the environment, society and the economy as a system ... as a whole.

The Product Perspective

In the end the economy is driven by the decisions of people who have needs and wants and are consumers. They buy products ... that is goods and services ... that they need and want. In turn companies produce these things, and so on back through the supply chain. Companies know this and invest heavily in the advertising of their products and the building of their brands. Society does not have any equivalent to convince consumers to act in the interest of themselves, of society and the environment. The only interest behind advertising and influencing the consuming public are the product manufacturers and marketers. This asymmetry is dangerous and has to be changed.

A big step will be to have multi dimension metrics about products. The buy or not to buy decision by a consumer should be guided by a clear information of what goes into that product through its whole life cycle. There has been a lot of work on life cycle assessment but this work remains academic and is not deployed in a systematic way to inform every consumer all the time, and especially during the buy or not to buy decision time. Business informs consumers all the time with their advertising and brand promotion ... but independent objective information about the life cycle of the product and its impact on society and the environment is missing.

The Place Perspective

Another big step will be to have better information about place. The reality is people live, work and play in a place ... or places. Places are for ever and progress or deterioration of a place can be observed relatively easily. Better metrics about places will make it possible to track progress and performance of a place in much the same way that analysts are able to track to performance of a company over time. At the moment, the relationship between progress and performance in a

place is not at all clear, but it should be and could be with better analytical metrics about the place.

The Person Perspective

Finally, there should be a better way for people to account to themselves for their progress and performance. The idea that being wealthy is the only goal in life, is such a diminution of what people want and are capable of ... and misses completely the value of what people can contribute to society. There is a whole lot of life that is good and valuable, but never expressed in terms of money and money transactions. People have passion, energy and ideas that are of enormous potential ... but ignored in policy formulation that gets driven by the conventional metrics around organizational performance and GDP growth.

The Planet Perspectives

The planet perspective is 'big picture' and important to understand, but action for change has to come where action can be tangible. Pollution has an impact on the planet, but pollution has to be addressed where it is created in a place, but use of a product, by an individual person or group or by an organization. The resources of the planet and the energy of the sun are big enough to support a huge people population if ... and only if ... knowledge and technology are used in a very smart way to deliver quality of life.

The Organization Perspective

In the prevailing system of socio-economic analysis there is an assumption that what is good for an organization is good for society. This had some validity in the past, but no more. In many ways higher performance by an organization results in lower performance for people and the environment. This is not captured in conventional accounting but knowledge about this and metrics are required for the optimization of the whole enviro-socio-economic system.

Accounting for the 21st Century

Accounting for the 21st Century must include metrics that are relate to the environment, society, and the total economy rather than merely being for the organization. This is accounting for every part of this amazing and complex system that is the environment, the society and the economy.

The initiative for development of Multi Dimension Impact Accounting (MDIA) addresses these problems. The goal is for MDIA to be an easy to use tool that will expand the capabilities of conventional accounting so that the impact of economic activity on everything is brought into account. Conventional accounting has a focus on the single dimension of money, while MDIA accounts for not only money transactions, but also the impact of economic activity on everything else ... hence multi dimension and impact accounting. MDIA will enable analysis that embraces not only the impact profit has on financial capital, but how economic activity impacts all the other capitals.

MDIA aims to be a tool that can be used in many different situations. The same data and data architecture works for a person, for a product, for a place and for the profit and impact of an economic activity or an organization.

The logic is relatively simple ... but as usual, the devil is in the detail.

Quantification ... Measures Beyond Money

MDIA will incorporate multiple units of measure ... and use standard values for the accounting. Standard values are something like standard costs in cost accounting.

Money had its origins in being a measure of the price in an economic transaction. It facilitated trade and was very much more efficient than barter. How money became a store of value is a long story, and how money became a key component in money wealth creation an even longer story. Money has its uses, but it is a very poor unit of measure for almost everything that is important in the world we live in. The size of a money unit has no definition at all ... it is determined by a market that is also impossible to describe and replete with 'invisible hands' that may or may not control everything.

The value of a product ... goods or service ... is not the amount that it can be bought or sold for. That is a price. The value is what a product contributes ... to a person directly and to society in general and also taking into account the impact there is on natural capital. What this means is that there is a need for several units of measure and related quantification along the following lines.

Quantification of Human Capital – Life Units

A unit of measure for quality of life may be driven by reference to the value of life itself. There is life, and there is quality of life. The value of life should not be directly related to a money unit, but be defined independently from money. The unit could be defined as 1 life = 1 million life units. Everything to do with quality of life is associated to this unit.

Quantification of Natural Capital – Life Units

Natural Capital – Resource Depletion and Environmental Degradation

There need to be several units of measure within natural capital (NC) because of the many roles that natural capital plays in the success of everything. It would be good if these could be summarized or consolidated into a single unit of measure of natural capital as a whole, but this requires more understanding of natural capital values than there is at the present.

Water The value of water should be related to the value of life more than to the value of money. The price or cost of water varies depending on the abundance of water and whether or not water is renewable in the place where it is used. The cost of water must include the cost of release of polluted water into the environment. The unit of measure for water could be that 1 liter of net water consumption = 1 water unit. Many things associated with water and water pollution could be related to the idea that 1 liter of fresh water has a value of 1 (say).

Land The value of land should be related to a land value unit, and adjusted to reflect all the various uses there are for land, and not just those that are priced into money units as a result of trade. There is value in land when used for eco-services (forests for carbon, wetlands for fisheries, wildland for bio-diversity, natural land for water purification, etc). The unit of measure of land could be that 1 hectare of land = 1000 land units. Land use is constrained by a limited and fixed amount of land, and the value will change depending on the use being made of the land. Land may be used for urban development, suburban communities, rural agriculture, industrial use, tourism and various forms of ecoservice and habitat for bio-diversity. Many things associated with land and land use could be related to the idea that 1 hectare of undeveloped natural land equals 1000 (say)

Mining and fossil fuel extraction. The use of minerals and fossil fuels in economic transactions puts of price on the resource, but the loss of this resource must also be accounted for in the loss of natural capital. The value of the resource does not need to be quantified when it remains in situ, but when it is depleted the value could be accounted for based on the value the mineral or energy contributes to economic performance. The unit for this can be money ... the same as for Financial Capital.

Greenhouse gas emissions. Environmental degradation includes the impact of greenhouse gas emissions on the atmosphere and the equilibrium of the weather. A unit of measure could be based on the idea that one metric ton of carbon dioxide emissions = 1000, and everything to do with air pollution gets related to this unit. Many things associated with atmospheric pollution could be related to a ton of carbon dioxide emissions where 1 ton of CO₂e equals 1,000 (say).

Man-Built Structures and Systems (MBSS)

Quantification of Financial Capital - Money Units

The money measure needs to be better understood. It is common to use a reference currency like the US dollar, but local currency also matters, and there may be funding currency as well. Besides the US\$, other reference currencies might be the Euro, Japanese Yen or Chinese Yuan

Quantification of Physical Capital – Money Units

Physical capital includes products, the goods and services needed for people to have a decent quality of life, it includes buildings and infrastructure. Physical capital needs to be measured both in static and in dynamic terms, and in terms of money units and in terms of various impact units. Of special note are products that flow through the enviro-socio-economic system delivering impact in the form of quality of life and impact on everything else as they go through the life cycle.

Quantification of Institutional Capital

Institution capital has impact. There are money costs to support institutional capital and impact costs when institutional capital is inadequate. There is both a static and a dynamic dimension.

Quantification of Knowledge Capital

Knowledge capital is the enabler of a high performance enviro-socio-economic system. Knowledge may be thought to behave somewhat like energy ... potential energy, kinetic energy, heat energy and so on. Knowledge has money costs to support research and all sorts of impacts when knowledge is used, both good and bad. There is both a static and a dynamic dimension.

Quantification of Social Capital

Social capital is the group version of individual human capital. Social capital has impact on individual human capital and individual human capital has impact on social capital. There is both a static and a dynamic dimension.

Follow up ... Request for Feedback

Getting these ideas fleshed out into a clear, simple but comprehensive structure is a big job and remains a work-in-progress. Many organizations are making progress with this, but there is no broad universal framework yet that will enable all the pieces to come together and work efficiently.

I would like to get feedback from anyone and everyone to help move this initiative forward. While I have some clear concepts about much of this architecture, there are many details that I

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do not know enough about and need help. So, please feel free to contact me. If you email, please put something relevant and catchy in the subject line.

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