



MULTI DIMENSION IMPACT ACCOUNTING (MDIA)

Accounting for Impact in the Supply Chain

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Supply Chain

As a product moves through the supply chain there is at each stage:

State 1 ---> Flow | Process | Flow ---> State 2

As the product moves from stage 1 to stage 2, 2 to 3, 3 to 4, etc there is:

State (at end of stage n) = State (at start of stage n+1)

The State at any time reflects (1) the transfer price from stage n to stage n+1 and (2) the cumulative balance for each of these elements:

Analysis of the Process

At each stage of the supply chain there is a process: A financial analysis of the process should show cost for these elements:

Transfer Price
Material and Energy inputs (product)
Material and Energy related waste
Water
Other supplies
Labor payroll
Labor benefits
Payroll taxes to government
Advertising
R&D
Equipment maintenance
Equipment depreciation
Pro Good expenditure
Financial expenditure
Government taxes
Cost of capital
Cash to owners
Retained surplus

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The Flow | Process | Flow of any state reflects the transformation taking place at this stage

	<i>State n</i>	<i>Flow process Flow</i>	<i>State n+1</i>
Transfer Price			
Material and Energy inputs (product)			
Material and Energy related waste			
Water			
Other supplies			
Labor payroll			
Labor benefits			
Payroll taxes to government			
Advertising			
R&D			
Equipment maintenance			
Equipment depreciation			
Pro Good expenditure			
Financial expenditure			
Government taxes			
Cost of capital			
Cash to owners			
Retained surplus			

There is a P&L for every stage in the supply chain. MDIA provides a framework for account adjustments so that there is accounting for impact on externalities as well as the money impact within the reporting entity

Elements of the Money P&L

	<i>State n</i>	<i>Flow process Flow</i>	<i>State n+1</i>
Transfer Price			This is the transfer price as the product moves on to the next stage of the supply chain.
Material and Energy inputs (product)		The money cost of the material inputs to this stage.	
Material and Energy waste		The money cost of the energy inputs to this stage	
Water		The water cost	
Other supplies			
Labor payroll			
Labor benefits			
Payroll taxes to government			
Advertising			
R&D			
Equipment maintenance			
Equipment depreciation			
Pro Good expenditure			
Financial expenditure			
Government taxes			
Cost of capital			
Cash to owners			
Retained surplus/profit			

Note 1

Column 1 identifies the elements of cost in the analysis.

Column 2 is the cost analysis of the product as it enters Stage n

Column 3 is the cost of the flow|process|flow at this stage

Column 4 is the resultant cumulative cost

Note 2

In the first stage of the supply chain, all the entries in column 2 (State n) are 0 (zero).

The impacts arising from a process at any stage

	<i>State n</i>	<i>Flow process Flow – NEGATIVE IMPACT</i>	<i>Flow process Flow – POSITIVE IMPACT</i>	<i>State n+1</i>
Transfer Price			Product has a price as it is sold into the next stage of the chain. In addition product has a value to the new owner either in a further process of for final use.	
Material and Energy inputs (product)		The use of materials and energy has a negative impact because of resource depletion. In addition each of the material and energy flows has its own role in environmental degradation		
Material and Energy related waste		The cost of waste is usually not reported explicitly, but waste does have a real cost. In addition waste has a big negative impact on land fill or other systems where waste flows.		
Water		The water cost may be small, but the use of water may be having a significant impact on the water dimension of NC		
Other supplies (Note 3)				
Labor payroll			Payroll is a cost to the operation, but the positive impact of this is a multiple of the cost to the operation because it benefits both the employee as an individual, the family of the individual and the broader community where the family lives. This is	

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			a key input to the local multiplier behavior.	
Labor benefits			Benefits that are paid by the operation are a cost, but the value of these benefits to the individual employee are usually much larger than the cost to the company.	
Payroll taxes to government			Payroll taxes paid to government have a cost to the operation, but they have a positive impact on the Society as a whole	
Advertising		Advertising is a cost to the operation, and in some case advertising has a negative social impact because a message that is good for the company is not always good for society.		
R&D			R&D is a cost to the operation, and while it has immediate costs there are future benefits for the company, and in some case benefits for the broader society as well. Knowledge within the company does not benefit society when it is closely held	
Capital cost of equipment (see note 1)		See note 1	See note 1	
Equipment maintenance				
Equipment depreciation				
Pro Good expenditure			Pro good expenditures are a cost to the process, but there is value to the beneficiaries, In most cases the value to beneficiaries is high relative to the money cost to the process.	

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Financial expenditure				
Government taxes			Payment of taxes to the government is a cost to the process but is a value to the broader society	
Capital employed in the process (Note 2)		See note 2	See note 2	
Cost of capital (Note 2)		See note 2	See note 2	
Cash to owners			Cash pulled out by owners reduces the retained surplus/profit but is a value to owners	
Retained surplus/profit				

Note 1

Any process requires some level of capital investment in equipment. The cost of this may be included in the costs of the operation as depreciation, but only if the depreciation charge is based on the economic life of the equipment. Where depreciation is determined by tax rules, this may not be the same.

Note 2

Any process requires some level of employment of capital ... the use of plant and equipment, the use of working capital and some cash liquidity. There is a cost to making this available. On a standard basis a charge that is computed on the basis of 10% per annum should be included in the analysis. This becomes a benefit to the owners of the capital employed.

Note 3

Supplies and other expenses are many different items. In general they are not individually going to be of great importance in the analysis of impact at the process level.

The Process and Impact on Externalities

In addition to the money elements of the P&L, an economic activity also is having impact on people and planet. This is a function of the processes that are going in the facility. Each process has a profile that shows the relationship between the money expenses (in the P&L) of the process and the impact on externalities.

The impact on externalities is quantified using a standard impact value.

There are multiple units of measure for impact accounting.

These units of measure are NOT based on the idea that a 'market price' is the way to ascertain the value of anything. These units of measure aim to make a quantification of important issues in the impact arena, and provide an indication of the relative importance of many different elements having impact on the quality of life and standard of living of people and the impact on all the components of natural capital and man built capitals.

The Adjustments for Each Element of the Account

Transfer Price

Transfer price is the price paid for the product by the buyer. This is a cost to the buyer and is a revenue (price) to the seller. This is a money element and there are no adjustments for this element.

Material (product)

Materials that are purchased have a supply chain history. The money cost of the material are recorded in the P&L accounts. The supply chain history of each of the products purchased has to be exploded into the component elements.

This is a substantial exercise. There may be 10s of thousands of products that go into a manufacturing process. Initially only the major purchases will be processed in this way, but in the fully operating MDIA environment all will be processed based on every product having a standard value profile.

Energy (product)

Energy is similar to material. It is a separate section because of the relatively greater importance energy use has on many externalities.

The supply chain history of each of the energy products purchased has to be exploded into the component elements.

Water

Water is also similar to material in that it has a life cycle. In the case of water the impact of economic activity related to water is a function of the place and well as the process.

Other supplies

These are similar to material, but the individual items may be relatively small, and impact on externalities may be treated as not being material and at this stage disregarded in the adjustment calculation.

Labor payroll (LPX)

The labor payroll is a cost to the business, but the labor payroll has a positive impact on the people being paid, and then on their families and the places where they live.

As pay goes up, profits go down. As pay goes down profits go up.

It is in the news (early January 2015) that bank profits reported for the last quarter of 2014 are down. The market price of these stocks have declined significantly. In response, some banks have announced substantial payroll reductions, in one case the termination of 9,000 staff ... and the stock goes up. The value dynamic for the owners of the bank stock is positive when payroll goes down, while the value dynamic for the people is negative. The financial capital of this behavior is clear, but the human capital impact of this behavior is equally clear and the impact more substantial and negative

The relationship between the payroll cost and the impact on people varies depending on the profile of the payroll. The impact on quality of life by raising pay for people earning low wages is more substantial than for people earning higher wages. At very high rates or remuneration the

impact on quality of life for these people is insignificant, though there is an impact on the financial capital owned by this class of people.

Labor benefits (LBX)

There has been recognition that quality of life is not only about wages, but is also about benefits that are available, such as health benefits, paid leave, and retirement programs. These cost the company money, and have positive impact on the staff and their families.

Payroll taxes to government

It is common for the government to be paid to provide certain social programs by a tax on payroll. These taxes are a cost to the company, but they have a positive benefit for society and people because they fund government programs to benefit people.

Advertising

Advertising is a cost, but widely embraced by companies because expenditure on advertising has a positive correlation with increased sales. This is a positive for the money profit performance of the company, but at the same time is a negative for the overall enviro-socio-economic system depending on the state of the place and the people in the place.

R&D

Expenditures on R&D lower profit now but are expected to have a favorable impact on profit in the future. Capital markets make judgment about the relative value of profit now and profit in the future.

R&D also has impact on knowledge capital. The impact on knowledge capital and the performance of the enviro-socio-economic system as a whole depends on whether the knowledge developed is kept private or is made available to everyone ... company protected intellectual property versus open source fully accessible knowledge.

Equipment maintenance

Expenditure on maintenance of plant and equipment is a cost and charge to the profit. An adequate level of maintenance is required otherwise plant and equipment deteriorates more rapidly.

Equipment depreciation

Equipment depreciation may not be charged to the profit in an adequate amount. The purpose of depreciation is to allocate cost to production on a basis that will write off the cost of the asset over its useful life.

The charge to the P&L related to equipment maintenance and depreciation should be an amount that is around 10% of the capital cost of the equipment. The capital cost may be the historic cost or the capital cost may be the prevailing replacement cost.

Pro Good expenditure (PGX)

Pro-Good expenditures are a cost to the business and a charge to the P&L. They also can have a very big impact on the place, people and society. The impact can be hugely beneficial, even when the cost to the business is quite small.

Financial expenditure (FX)

Access to finance has a cost which is a charge to the P&L. This merely moves some financial capital from the business to a bank or some other financing institution.

Government taxes

Government taxes are a cost to the business and a charge to the P&L. However the payment of taxes has an important benefit for government that is in turn able to pay for the services it is expected to provide. The value dynamic of taxes is that they reduce profit for the business, but they make it possible for the infrastructure paid for by government to be built and maintained, for social services to be paid for including the national security apparatus, the justice system and so on. These all serve to maintain Institutional Capital (IC)

Cost of capital

This cost of capital is a notional charge to account for the benefit that the business should pay for in respect of the assets employed in the business. The assets employed should earn an amount of around 10% per annum based on cost. This cost should normally be the depreciated amount on the books.

Cash to owners

Surplus cash in a business may be returned to the owners. The impact of this on the business is a reduction in the retained surplus. The impact on the owners is that they have financial capital rather than the business having the financial capital.

Retained surplus

The retained surplus is net of the business revenue and the total of all the costs.

I have observed as early as the 1980s that the biggest 'cost' in modern business, was the profit. I said this because even though productivity was increasing and manufacturing costs were declining, the prices to consumers were increasing. This was because all of the benefit of productivity was translating into profit more than being used to reduce prices to customers.

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