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**Transparency and Accountability Network**

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# **Community Accountancy**

**PUTTING ACCOUNTANCY TO  
WORK FOR ALL OF SOCIETY**

# **COST ACCOUNTING**

**FOR DISCUSSION ONLY**

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# COST ACCOUNTING

## Historic cost accounting

A valid criticism of accounting is that it is all about history ... and this also applies to cost accountancy. But it is also a fact that if you know something about the past, it is possible better to understand today and the future.

### Why history is important

Someone told me a long time ago that if you do not know where you have been, and do not know where you are, you are unlikely to know where you are going.

Clearly knowing everything about the past is going to be costly, consume time and therefore be counterproductive ... but having knowledge about the behavior of costs, prices and values ... and about productivity, profits and value adding are valuable. In fact, there is no high performing corporate organization that does not understand these things.

### Appreciation of cost behavior

I have never come across a successful organization where the management and responsible department heads did not have very clear understanding of the behavior of costs and the characteristics that make their products or services valuable. Where key staff understand these things ... there is success.

With cost accounting I am able to learn more about the structure of costs ... material labor, indirect production costs, etc. than most of the operating staff. Because they know how to combine what I know with their real world it is possible to do things that enhance productivity. Knowledge of cost gave people the confidence to try something that they would not do otherwise ... it lowered the risk of trying to improve! Knowledge of cost also helped people to focus on what is important and do things that had a material impact.

In the corporate world, there is a good foundation of knowledge about cost, prices and profits. Not much of this is available to the public, but it is an integral part of decision making in the corporate setting. The situation about cost knowledge in the public sector as a whole and the relief and development sector in particular is remarkably limited. As a result it is fair to say that society gets a lot less from its government than it should ... even at the best of times.

## Cost accounting ... two settings

Cost accounting ... and thinking about cost, price and profit are central to management information in the corporate setting. But this is not the case for society as a whole. Cost accounting is weak in most public sector organizations ... and there is no history of cost accounting about society and socio-economic progress. But what works to help understand the behavior of cost in the corporate sector can be modified for use within the Community Accountancy setting. Almost all the tips and tricks that may be used for corporate understanding can also be used to understand how to make better progress in the societal setting.

# WHAT IS COSTING FOR?

## Understanding costs

The purpose of cost accounting is to understand costs and thus be in a position to manage costs. There are many different techniques that can be used, but the overriding goal is to have a useful understanding of costs, for better decisions to be made and for progress to be accelerated.

The goal is not only to understand what costs are and what progress is being made ... but to understand also how this progress relates to the progress that should have been made.

Cost accounting provides the data foundation in the corporate setting so that management need not use anecdotes, journalism and publicity brochures for decision making ... and Community Accountancy takes these same ideas and applies them in the broader community setting.

## Moving data from neutral

The purpose of cost analysis is to improve understanding.

Good accounting data are neutral, and merely reflect some underlying reality. Cost analysis takes data and puts it in a form that augments understanding. It really does not matter what analysis is done as long as the result is better understanding and improved decision making. It does matter that the analysis is done on top of neutral data. It does matter that data are reliable and reflect an underlying reality.

### The problem of deteriorating data

In the 1970s, when fisheries population dynamics was a rapidly developing science, I had a conversation with Dr. Gulland at FAO about the problem of using more and more mathematics to compensate for less and less data. Over the years more and more mathematics has been done on less and less data.

As computational power has increased ... the problem has become more and more serious. It is time to get back to having more and better data.

Accountancy uses rather little mathematics on top of simple data that are well organized. A priority to improve data collection, data flows and data storage will be very valuable.

## A step toward creating value

Value is not created when data are collected, nor when analysis is done. Value is created when the understanding helps get better decisions made and there are better outcomes. Value only gets created when something is built ... when jobs are created ... when constraints are removed ... etc. There is no value increment from added understanding that stay in purely academic circles and is never used.

### Academia - huge amount of low value effort

Academic expenditures have grown substantially over the past several decades ... but have the results kept pace. Have the results justified these increased expenditures.

The data are not easy to find ... but it would appear that the activities favored by the academic community are high in visibility and rather low in value. The two key outputs seem to be study that leads to a PhD qualification, and research that furthers an academic career. From a personal perspective these are both fine ... but the global social value is not so clear.

The brain power that is available in the academic setting is impressive ... but it has little value until it is mobilized to do work that has value. It is not at all clear what work being done by the academic community has value ... such metrics broadly speaking do not exist!

# Applied common sense

## Estimating costs

Figuring out how much somethings costs starts out as a theoretical exercise ... but it can be done very accurately when people know what they are doing.

People who work in any area ought to know what things cost ... if they don't, then there is something wrong. Good people will also know something about the behavior of cost ... that is how costs vary depending on the prevailing conditions. Unit cost tends to go down as volume increases ... but then will increase if the production requires overtime pay or weekend pay ... or if there are shortages of raw materials that require higher cost procurement. Good people know this stuff ... and a good cost system lets these details into the analysis so that good decisions can be made.

### Estimating Costs

One of the most effective measures of organizational competence is the ability to estimate costs and get it right. The World Bank is reported to have had 300% cost overruns on the rebuilding of its headquarters building in Washington ... and the IMF had a similar experience. What does this tell you about two key organizations in the international relief and development sector

### Bureaucrats have no concept of cost behavior - I

I have never found a bureaucrat that had anything but the most simplistic view of costs and cost behavior. One of my pet peeved is the idea that costs are low when they are under budget ... especially when I have listened in on the budget process and know how the numbers were negotiated.

### Bureaucrats have no concept of cost behavior - II

This is typical. A colleague sat in at a high level UN audit meeting and heard the explanation that a big project ... actually a computer installation and upgrade ... had not cost anything because all the staff were on salary (and if I remember right this was maybe 50 people for 2 years!).

### **Integrated cost accounting**

The idea of integrated cost accounting was to make it possible to discipline cost analysis within the double entry framework of accountancy. This was important when analysis was manual and not easy to check in detail ... less important now that computer spreadsheets and relational databases are everywhere.

There is increasing evidence that since this discipline was discontinued, the understanding of operational cost behavior has deteriorated and instead some system that is quite superficial and dangerous. I cannot pretend to understand how some of the accounting works.

### **Being fooled**

My understanding is that a money instrument that pays 14% will have one value, and that a money instrument that pays 7% will have a substantially lesser value.

In the 1980s and 1990s the US banking industry replaced high yield mortgages with low yield mortgages ... and reported huge profits as they did this. How could this be?

We were being fooled then ... just as the fooling continues to this day. The banks charged fees for the work of issuing new mortgages. The old mortgages were paid off without losses. The new mortgages were bundled and sold off (securitized) ... and though the value of these new mortgages was small relative to the old mortgages ... the accounting for this drop in value did not appear anywhere.

Something is very wrong when an industry can do this and the system of accounting does not show it.

# PRODUCTIVITY

## Cost, productivity and impact on society

Cost, productivity and impact on society are all related. Cost is a very important parameter of economic performance. Cost is a derivative of productivity. If cost is low ... it is a proxy indicator that productivity may be high ... but not always.

Productivity is the single most important reason that modern society has potential ... modern society can do things today that were impossible only a few years ago.

In numerical terms, I suppose this means that productivity went from one over infinity (infinitesimal) to something measurable.

Cost has a relationship with productivity but is not a good proxy for it. There are several elements to a cost calculation, including these:

- What was consumed
- How much was consumed
- The unit costs for items consumed

Some of the consumption may be labor, some materials, some equipment and capital. Productivity is a function of the amounts of these things consumed for a unit of output. Cost is the derivative when the amounts consumed are multiplied by their respective unit costs.

Low productivity low wage areas may have lower costs than high productivity high wage areas. Corporate profits ... which are determined in large part by costs ... are maximized by focus on production in the lowest cost areas. Social value, on the other hand, may or may not be optimized by corporate profit maximization.

Agriculture is one of the few industries where the United States has retained a position of global competitiveness. The productivity of American agriculture is impressive, though there may be important questions about its environmental sustainability. That aside, American agriculture produces enough food for all of America, and enough for massive exports and does it using only 3% of the population. In contrast most of the countries that are poor have a large proportion of their population working in agriculture and not very much is produced ... not even enough to feed the country's population. This is a crisis of productivity ... which should not go ignored.

## Measurement

The process of measurement changes the reality of what is being measured. This is a well known problem in science at the limits of knowledge, but it is also a problem in the everyday world of life and living.

### Human behavior

The question was whether or not improved lighting in the factory improved production rates or not? It turned out that production stabilized at the same level no matter whether the lighting was brighter or dimmer. What appeared to improve production was a change in the lighting ... either brightening or dimming. In other words, simply paying attention to people was what really mattered.

In socio-economic measurement, it might be expected that there will be some beneficial result merely by doing data collection.

### Making measurements

I learned something about measurement as an engineering student. To understand something, you have to make measurements. If you want to understand causality ... measure what you are doing and measure the impact.

As an accountant trying to get business managers to make critical decisions, we measured everything that seemed to have potential importance. We got the most impact when what we measured had real relevance to the people doing the work. For the shipping department, measuring how many miles a truck drove per tire was important ... and the supervisor of that department knew and cared a lot about it. And when the purchasing department also understood the matter ... the company progressed. Measurement helped identify its importance and keep score so that responsible people could be given credit.

The lesson for Community Accountancy is that we need to measure what is important for the community ... and then get the understanding translated into action that translates into progress.

### Community measurements

The lesson for Community Accountancy is that we need to measure what is important for the community ... and then get the understanding translated into action that translated into progress.

MORE TO DO

## Relief and development industry

In the relief and development industry, there is but the skimpiest of knowledge and understanding of costs and the links between costs, activities and impact on society. The over-riding reason for this is that the incentives in the sector have little or nothing to do with costs and productivity. There are few, if any systems that have been institutionalized that have either of these parameters as a core interest.

### **The recurrent costs arising from development projects**

I remember being asked to prepare a report (in East Africa) about the recurrent costs arising from internationally funded development projects. This struck me as a silly question because in my corporate career all the investments were oriented to reducing recurrent or operating costs and increasing productivity. What was going on?

It turned out that very little of the international portfolio of assistance had any focus on cost and productivity ... the phrase “capacity building” was commonplace ... and in practice this covered the spending of money on almost anything a consulting firm wanted, and long term sustainability was totally dependent on the local government funding something in perpetuity.

Typically the government had these capacity building projects high priority for external funding and zero priority when own money had to be used!

There are many, many reasons for very weak cost accounting in the relief and development industry. One of these is that most activities are funded through donors under some agreement that limits the amount of “overhead cost” that will be reimbursed ... and in turn this limits the quality of the accounting and again in turn this limits the understanding of project performance and costs.

If the development industry had cost accounting that showed what worked and what did not ... there would be a much clearer basis for decision making. At the moment the modus operandi seems to have all of the characteristics of “blind man's bluff”.

The key is to get data about history that can be used to build understanding that is useful ... practical ... and not merely academically rigorous.

### **Project impact ... project design**

I have taken part in hundreds, if not thousands of project evaluations. The cost was always substantial ... and mostly the impact was negligible ... and in some cases quite detrimental. But that was hardly ever the subject of the evaluation.

The solution to having negative evaluation is simple ... include in the project design very limited goals ... and then measure performance against these tiny goals. Then, relative to the tiny goals, the project will be performing well. Make sure that the TOR for evaluation is to assess the project performance against the project goals.

Never mind that the money involved should have been able to do much more. This issue is not to be addressed. The money has been approved, and the question is simply whether or not the goals were achieved or not.

Many of the projects have cost a lot ... and done very little. A community of development experts is happy ... but development has not progressed.



## Corporate cost accounting

Corporate accounting systems usually have very effective cost accounting capability, but getting useful information from these systems is not always obvious.

### **Costing ... use the right tools**

American Airlines used to be one of the cutting edge users of computers ... developing the Sabre reservation system and dominating this part of the airline industry. At some point this team was asked to do some costing about the airline operations like baggage handling and airport operations. They tried ... and struggled ... and failed. The computer should not have been the starting point.

### **Relevance**

I was trained in the UK and learned cost accounting initially in that environment. The cost accounting was rigorous, and accurate ... but not very relevant. Later I worked in the USA and found the cost accountancy “sloppy” ... but relevant and effective.

Around this time Rolls Royce in the UK had an accounting system that enabled it to cost everything to 4 decimals points of a penny ... but the cost of building the new RB211 jet engine was wrong by about a billion dollars and the company faced bankruptcy. Meanwhile Pratt and Whitney in the USA with its rather sloppy cost accounting had an excellent handle on what its products cost. This is not to advocate for sloppiness ... but for relevance.

# BEHAVIOR OF COST

The purpose of cost accounting is to build the foundation for the understanding of cost behavior. Today's costs are a combination of both history and today ... and ultimately so also are profits. When applied to Community Accountancy understanding the behavior of cost helps to make socio-economic progress more than a zero-sum game ... or worse, a real world application of "Heads I win ... tails you lose".

It is helpful to understand not only the behavior of cost ... but also the behavior of productivity. Edward Deming ... one of the history's experts on systems and quality ... would have understood the idea. Cost and productivity are different manifestations of the same system. But cost also has an effect throughout the value chain ... and different parts of the value chain have a whole range of behaviors that impact on both corporate profits and on society.

All of the many different cost elements behave in different ways ... the aggregate cost depends on all of the pieces ... and the unit cost depends on all of the pieces as well ... but not always in ways that are immediately obvious.

At the same time the value elements also behave in complex ways ... sometimes a function of a cost change, sometimes for unrelated reasons.

## **Cost accounting is boring**

Yes ... cost accounting is boring if it is defined as simply the recording of the basis data. But cost accounting is exciting when it helps to understand the behavior of costs, and all the factors that influence these costs. Boredom is usually some reflection of the individual, more than it is cost accounting per se.

## **Estimating Costs**

My formal academic education is in engineering and economics ... and my professional training in accountancy. In the early 1960s, when I was working with Coopers and Lybrand in London I was assigned to recalculate the cost estimates for the Kariba Dam being planned for Zambia. My work showed that the World Bank's estimates were about 50% of what was required. My work not only took into consideration what costs had been in the past but what they were going to be during construction in the future in a remote location ... in other words, I tried to anticipate the behavior of costs rather than treating costs in a simplistic manner.

Clearly knowing everything about the past is counterproductive ... but knowing about the behavior of  
More and more detail may not be the best answer ... ability to look at data in different ways may be more useful.

Cost accounting is a powerful tool ... but it needs to be in the hands of people who have an understanding of accounting and the sectors involved.

Cost accounting is a part of accounting that informs about how much things cost. In the corporate enterprise the cost systems are well developed and are used extensively.

In the not for profit organization, cost systems are much less developed and analysis of costs is rarely integrated into the accounting systems, but done rather as ad hoc studies or as part of monitoring and evaluation exercises.

And cost accounting can be expensive ... with it being much less costly simply to have management and supervision that have some appreciation of cost control and their role in optimizing costs.

### **Management by Walking Around - I**

Eyes are a very powerful management tool. They provide a good link between reality and the numbers. For years accountancy students were taught that an auditor had a responsibility to “see” the inventory as part of the audit routine since it is very difficult to have a very big fictitious inventory and not be able to show something to the auditors.

But I use walking around as a way to see things that do not find direct expression in the numbers and reports ... working conditions ... factory noise ... happiness levels ... excess inventory ... obsolete ... factory effluent ... scrap ... workflows ... excess staffing or under staffing ... etc. etc.

### **Management by Walking Around - II**

I used to reckon that after a morning walking around a factory or construction site I would be able to identify hundreds of thousands of dollars worth of performance improvement.

Part of this was because I saw things myself ... but part was because the department managers knew a lot that they shared. Simply by walking around, a whole lot of sharing became possible. Operating managers know a lot, and rather little of it gets put into use.

## **How much did it cost ... how much should it have cost.**

The question “How much did it cost ... how much should it have cost?” is fundamental to managing performance. It is not a question that the relief and development industry wants to answer, nor to get answered.

The market mechanism has been called into play to help define what “price” should be ... but it really does not work very well. And when it is decided that the government can administer price better than the market, the results are usually horrendous. Examples abound:

### **Staff costs in the relief and development sector**

Staff costs are important ... and especially the huge difference between the remuneration paid to local staff and remuneration paid to international staff. This subject has not been much discussed though it is very important in the design and cost effectiveness of almost every development intervention.

Frankly ... this subject has been kept off the table for at least the last three decades because it is key to most development experts' career planning ... and many who aspire to this group. But it is too important a matter not to get it addressed.

### **Powdered milk – impact of subsidy**

I tried to organize the supply of powdered milk for a West African importer ... and what I expected to be relatively easy was a nightmare. The cost of milk is very variable depending on how much subsidy the farmer has negotiated and where the cows are located. Both the European Union and the United States have highly subsidized cows. Of course the ex-farm price of milk becomes a component of the cost of powdered milk ... but then there are programs that encourage export of agricultural products including powdered milk, and these programs are further subsidies. With the maximum of subsidy the price of powdered milk turned out to be about \$1,050 per MT in Europe and \$1,100 per MT in the United States ... and by the time shipping and insurance were factored in the cif cost was going to be somewhat lower from Europe than the United States.

But then it appeared that there were quantity questions ... and if the quota was exceeded and all the subsidy used, then the prices would not be \$1,050 and \$1,100 respectively but more like \$2,050 and \$2,100. At the lower price, the price being paid by our West African importer would have generated a modest trading profit ... at the higher price, a considerable loss. And then it started to appear that the problem of the missing subsidy on the supply side would go away if we ordered immediately with some premium to be negotiated. In other words everything had a price.

Meanwhile, our customer in Africa was relatively new to this business ... and the established importers did not want new competition. Suddenly his bank needed all sorts of additional information, and it became pretty clear that there was what amounted to an import cartel that also had influence in the bank.

Lesson ... while the market may be powerful as a theoretical construct, it is puny relative to the many different centers of economic power that control and profit from the status quo. The incentives that really matter ... the profits in the value chain are complex and usually driven by some important private relationships.

**Tea auction – Malawi**

The conventional wisdom is that I

**Cashew – farmgate prices in Kerala**

I

**Controlled prices for everything – Guinea Bissau**

I

**Coffee auction - Burundi**

I

**Exchange control distortion – Nigeria**

I

**Price projections – World Bank getting it wrong**

I

**Untapped capacity**

I have been in many hospitals around the world. Some amazing people doing incredible work with tiny resources.

I have only seen one surgery ... it was successful, with a minimum of equipment ... and performed by a nurse.

This is not a recommendation for universal surgery by nurses ... but more a reminder that much more can be done by people who do not have the top qualifications.



# COST OF RISK

Risk has interesting cost behavior. There was a time when the cost of risk was reduced by “managing” risk ... meaning that the various elements of risk were minimized so that bad things did not happen.

## **Health ... health insurance and pre-payment**

There needs to be a careful differentiation between insurance and pre-payment. Because this differentiation is rarely made, the analysis is usually wrong.

Insurance is needed so that when there is a big event, there can be resources available to address the problem. Ordinary day to day matters are paid for in the normal course of living life. A catastrophic accident ... a big event ... gets paid for from an insurance fund. But it is insurance, and the expectation is that few people will have such events, and small premiums spread over a lot of people pays for the infrequent large disbursements.

A prepayment program is very different and it should not be referred to as insurance. A premium is paid, and the expectation is that this premium will pay for the services that will be used. There may be some imbalance between years ... but broadly speaking the premiums balance the disbursements. As disbursements for services has increased, so have premiums, and other ways to fund the programs have been sought, mainly from government.

### **Fishing fleet insurance and reinsurance**

I was responsible for risk management for a fleet of fishing trawlers operating around the world. How best to reduce the risk of loss? How best to provide in case of loss. With a fleet of more than 80 vessels, it was reasonable to think in terms of self-insurance. The premium for insurance could be saved, and used to build a self-insurance fund for possible losses ... and the risk/reward for doing this was very good.

But what would happen if an unusual storm sank several of our vessels? What then? This is what re-insurance is needed for ... and for a modest premium the fleet was insured for this unlikely event.

# ANALYTICAL ACCOUNTING

## Various ways to do cost analysis

There are many ways to do simple analytical accounting. Rather than simply summarizing the accounts for the period based on the organization as a whole, the accounts can be summarized in more detail, as, for example:

- By department
- By cost center,
- By profit center
- By business segment

It is also possible to do analysis along the following lines:

- By individual product
- By product line
- By process or activity
- By product

## Departmental accounting

Cost centers, profit centers, investment centers, departments, etc are all rather similar. The key is to understand what they are doing and what they are costing. If what they are doing does not seem to have any value ... then some further questions need to be asked and decisions made.

Almost all companies will have department accounting so that the costs of a department can be understood and controlled. A department may have multiple cost centers. Department accounting is widespread because it informs about the costs of a department. Sometimes the costs are linked to revenues or activity levels. In Community Accounting applications, analysis of costs between activities in the community provides useful additional understanding. Departmental accounting and cost center accounting are similar, with cost centers often more detailed than the department.

## Cost center

A cost center is one way in which costs can be organized to help understand and control costs. By pulling costs together within a unit called a cost center, it is possible to get information about a company's activities in a simple way. The cost center is a common technique in corporate accounting to cumulate costs so that they are easily understandable and can be related to a tangible entity. Community Accountancy also uses the cost center concept to pull together all the cost information about an activity or set of activities.

### Cost center metrics

The first thing that cost center analysis shows is cost by element of cost.

How much of the cost is for labor and how is this made up ... direct, indirect, overtime, benefits, incentive pay, etc.

How much is for various supplies ... which are important? In a shipping department ... how much was being spent on tires? How much for fuel?

How much for equipment use? How much for equipment lease?

While a cost center does not directly generate profit ... it does have productivity that can be measured. How do the costs compare to metrics of performance ... what we used to refer to as key item controls.

The report shows actual costs ... how does this compare to what the costs should have been for what was done during the period.



## Profit center

A profit center is a version of a cost center ... in this case not only costs are associated with the unit, but also the revenues of the unit. This may or may not be useful depending on the structure of the company and the internal value chains. The profit center is similar to a cost center except that the profit center also brings in the revenue side as well as the costs. Variants include using contribution instead of revenues. In Community Accountancy applications the goal is to link costs and value adding. The same concepts that link cost and revenue works also for cost and value. Where there is activity, it is possible to go to the activity value analysis using standard costs and values.

### Profit center metrics

A profit center may be more useful for performance analysis than a cost center ... or it may confuse. This depends on the structure of the company and the internal value chains. Everything that applies to a cost center applies to a profit center, except that in addition the costs for a period may be related to a revenue as well.

There are some dangers with profit center analysis including the potential problem of signaling profitability at the cost center level when in fact there are big costs not allocated to the profit center, but very meaningful for the company's performance as a whole.

A dramatic example of this is the automobile industry's willingness to ignore the accounting for unfunded pension obligations and other retiree benefits ... but the same thing can happen on a more modest scale..

## Investment center

Another way to look at a part of the organization is to do it through the investment. The costs and revenues associated with a particular investment serves the reporting center.

### Return on capital employed

One of the most useful metrics is to measure profit and relate it to the amount of capital needed to earn this profit. Relating profit to sales may not be very important when the company's resources are the limiting factor ... the most usual case.

How much equipment and space is needed to earn the profit? This is the fixed capital needed, and might well be a critical constraining factor.

How much inventory is needed? How much receivables? This is the working capital needed ... and is often a much bigger amount than is expected. This may or may not be a constraint, because there are funding possibilities that tie into the level of working capital ... but these do have a cost and an impact on profit.

## Project costs

Project costs are used almost exclusively in the construction industry. It is a natural way to summarize costs, and serves the construction industry very well.

Much of the funding in the relief and development industry is also controlled in a project framework ... and while this was appropriate when the projects related to construction activities, it was much less appropriate when the funding was flowing to government programs and the ministries controlling these programs. In the case of most World Bank projects, the structures are so complex that they are practically unmanageable and strong accountability for performance absolutely impossible.

### **What should it have cost?**

Whether or not something is adequately profitable is a primary question in business analysis ... how much effort? How much investment? How much profit?

But when we have the answer to these questions, the next question is how much investment should be needed? How much should the costs be, and how much profit could be made if everything was done in the best possible way.

The answer to these questions is a function of understanding the behavior of costs ... how costs vary depending on the circumstances. But it is also a function of how prices and values behave ... and how effort and investment play into the equations.

### **Figuring out what matters?**

Cost accounting is not simple ... in fact it is impossibly complex. How best to get the best possible results in the face of complexity?

One trick that seems to work is to ignore everything except the few big things that matter ... and of course, it is critical that the big things that matter are those that are material. Cost accounting can be very helpful by giving some idea of what sort of cost profile the product has ... what really seems to dominate the cost ... and what seems to be the issues that impact value.

### **What impacts cost the most?**

#### **Aerosol Techniques**

The company was doing well ... rapid growth, but direct labor costs were getting out of control. Why? What was wrong?

We concluded that the reason why labor costs were escalating was very simple ... the production schedule was optimizing use of production lines and then staffing the production lines based on the theoretical production ignoring the technical problems of production line downtime. When the production lines were being scheduled at about 75% of capacity the inefficiency caused by downtime was masked because people would move to another production line and keep on going ... but when all the production lines were fully scheduled and fully staffed, and there was downtime ... this immediately translated into higher labor costs per unit of production.

The quick solution was referred to as the "spare line" approach ... planning an under-utilization of equipment in order to make best use of labor. A more sophisticated solution was to rebuild the production lines in a configuration that reduced downtime ... essentially doubling up in parallel the equipment that was prone to downtime. In the original configuration there were about 10 pieces of equipment, all about 95% reliable in series and the line was down almost 50% of the time ... with the improved configuration downtime was reduced to less than 10%.

The productivity of labor was improved by about 50% with the revised configurations ... the same labor hours resulted in 50% more production ... all arising from the reduction of wasted idle time.

## **Responsibility accounting**

Responsibility accounting is the name given to accounting where the reports specifically identify the responsible managers. This is a useful technique for getting clarity about who is responsible for what ... and there is rarely much agreement.

Not easy for the accountants ... but can be very effective in getting the management team to stop dodging their role in poor performance.

Responsibility accounting is a variant if GAAP accounting that aims to be very clear about who is responsible for the results being reported. Each page of a financial report is associated with a specific individual or team.

In Community Accountancy applications a similar approach can be used to help the public to identify responsible individuals and units and to hold them responsible for performance

### **Responsibility Accounting – I**

I first used responsibility accounting as a Division Controller at Aerosol Techniques Inc. (ATI) 40 years ago. It was amazing how fast people took exception to bad numbers when their name was on the paper ... and how quick they were to find fault with what the accountants had done. It was not comfortable. But quite quickly the errors made by the accountants were corrected and the reports started to reflect the performance of the responsible manager ... and then quite quickly these managers started to make decisions that made performance better. Most of their improvements would never have been identified by analysis of the numbers by accountants ... but most of these responsible managers knew their business, and now they had a reporting mechanism where their GOOD performance could be highlighted.

In these reports, the company used not only accounting costs ... budget and actual ... but also a fairly large set of key item controls that measured activity levels that were important for company performance.

### **Responsibility Accounting - II**

I tried to introduce Responsibility Accounting to UNDP almost 20 years ago. The proposal was to help UN leadership to have the management information that would identify financial performance issues and help to hold people accountable.

A colleague with UN experience suggested to me that the idea was silly since there were few, if any, UN staff that were interested in management or responsibility, and certainly not in accountability.

# Product and process costing

## Product costs

Product costs can be obtained by having accounts and sub accounts for each economic element for every product and charging all expenses to these detailed accounts. This is a costly approach but it can be done. Some systems still do costing using this basic approach.

### **Cost accounting is boring - II**

I have to admit to finding the theory of cost accounting boring ... but the information is far from boring. If I could, I would like to know how much everything around me cost ... and how much it is priced at ... and how much profit is being made with it.

I would like to map these facts ... to have charts that show changes over time ... and to have charts that show this from place to place.

## Process costs

### **Process costing or activity costing**

Many products are produced using an end to end process. This is the case in, for example: chemical factories, steel mills, refineries, and pulp and paper plants. In all of these cases it is possible to cost the product because the cost behavior of each step of the process is well understood.

For each step of the process all the costs ... by element of cost ... are known and the actual and standard are easily compared. When costs vary from standard, the cause can be easily identified and taken into consideration.

## Activity costs

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**Project costs**

Many **Project costs – construction project**

Many **Project costs – World Bank project**

## Contract costing

Too many contracts are strong in legal language, but weak with reference to costs and expectations. This need not be ... and should not be. But it does require some level of understanding of costs and the impact on contract performance.

### **Contract costing – construction project**

When 2% of a contract has been billed and paid for, it would seem that 2% of the work would have been done. A pulp and paper mill construction contract had a well known general contractor ... and the contract had a detailed project cost budget that defined the work to be done (together with engineering drawings).

But cost analysis showed that while 2% of the money had been consumed, only 1% of the work had been done ... suggesting a 100% cost overrun for the project at completion. For the contractor this would have been fine ... it was a cost plus contract ... but for the owner it would have been a disaster.

The contractor was spending the money ... payroll was legitimate ... materials and supplies were being bought and paid for ... etc. But something was wrong. We ran a series of cost audit tests and concluded that the workers were too many ... getting in each others way ... and generally more than needed ... and the same for use of materials and supplies. We made the case to the General Contractor who immediately reduced the workforce from 1,400 to 700. When the project was completed the cost was within 5% of the original budget ... way better than a 199% cost overrun.

## Value chain costing

One of the most useful tools for the business analysis is value chain costing ... how much of the cost is added at each stage ... from farm to consumer ... from mine to a consumer or industrial good.... etc. It is helpful to know how much profit is added at each stage, and what investment is required for each stage.

The transfer price from stage to stage in the value chain can be the difference between a value chain that works and one that does not. A value chain price at one stage becomes a value chain cost at the next stage ... but this cost contains an element of profit as well as just costs.

There is little public easily accessible information about value chain costing, but it is a critical piece of information for the understanding of progress. Progress drives itself when the incentives are right ... where the reward for investment and effort is adequate. Progress stops when the incentive is not there ... and in a long and complex value chain it only takes one piece of the chain to be devoid of incentive for the whole value chain to crumble.

Note: A number of different value chains are described in the Value Chain chapter.

### Location of industry

When I was first taught about location of industry it was mainly about the proximity to raw materials and energy and access to transportation. I observed at the time (1960) that this was changing because of more creative content in the emerging new products, and that location of industry was going to be driven by where the boss wanted to live.

I was much closer to being right than I got credit for at that time ... industry is now much more modular and each module is located where it is most cost effective. Modules that need creativity are in New York and California, modules that need labor efficiency are in China and South East Asia, modules that need natural resources are next to the mineral deposits and oilfields, modules that need to deliver to the consumer are next to the consumer wherever in the world that might be. There is an amazing interconnected global value chain optimized to make profit for the players and the investors.

# ELEMENTS OF COST

The elements of cost most discussed are material, labor and equipment ... but they are only part of the cost. There are very substantial costs associated with research and development, creation, design and engineering, marketing, distribution and rewarding capital.

## **Cost accounting is boring**

Yes ... cost accounting is boring if it is defined as simply the recording of the basis data. But cost accounting is exciting when it helps to understand the behavior of costs, and all the factors that influence these costs. Boredom is usually some reflection of the individual, more than it is cost accounting per se.

## **Materials, Labor and Equipment**

Materials, labor and equipment are the elements that go into most production activities ... and determine costs. These items also determine the behavior of costs and how costs can be improved. The interaction of these three elements can be optimized with respect to cost, and there is a large body of literature that helps decision makers optimize cost.

Optimizing cost may have a secondary impact on quality and value. This is one reason to talk of optimizing cost rather than minimizing cost.

Organizations like the IMF and the World Bank refer to “economic classifications”. In the corporate environment the phrase “elements of cost” were also used. What they are called matters less than understanding what they are and how they behave.

## **Working with other languages**

The idea that the semantics of word meaning is important gets minimized when the work is being done in a foreign language. I have worked a lot in English ... my native tongue, and in French, which I have studied over many years. The differences in the meaning of the language, and the understanding of the underlying concepts gets interesting ... but much more interesting when the language is quite different from my native language. Try explaining the concepts in Lao, or Russian, or Arabic! At the limit it is only the big concepts that move from language to language and culture to culture.



## **Materials**

Materials .. a critical element of most economic activity.

The availability of material has been a driver and a constraint on economic progress.

Iron and steel industry

Pulp and paper industry

Electricity generation

Construction

Consumer products

Automobiles, trucks and buses

### **South Korea**

I have always held the view that many industries owed their success to the easy availability of all the required raw materials for production. This was true in all industries, but very much a constraint for the automobile industry. Over the years automobiles have used more and more plastics ... engineered materials ... and until the 1980s these were not available in South Korea. When Dow Chemical started production of this type of material the groundwork was in place for international standard cars from South Korea.

## Labor

Labor ... potentially both a contributor to production and a beneficiary of production. Labor is an important element of cost, also a source of creativity, imagination and productivity, and also the reason for industry and pursuit of happiness. In classical economics people were producers and people were also consumers ... more recently people have been both, and sometimes referred to as “prosumers”. The trend for people to be in all aspects of the economic pot is continuing.

### Location of industry – labor

Labor is an important cost in most products ... not all. It can be minimized in some products by moving the production to a “low wage” country ... and further reduced when the low wages are linked with good productivity and good quality.

This is good news for the company doing the manufacturing ... costs are reduced and profits increased ... but is it to everyones advantage. While there are jobs gained in one place ... are there offsetting jobs lost in another place? Maybe ... but not necessarily. The analysis needs to be done carefully.

What other impacts are there? Are workers' rights respected ... do they exist at all? If the ONLY driver is enterprise profit, then labor is likely to be exploited ... if the driver is a more inclusive set of socio-economic progress metrics, there may be very valuable worker benefits and progress.

One of the techniques used in optimizing corporate performance is to look at the resources available to the company, and to try to organize the

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## Agriculture

Labor in agriculture is very different depending on the country. For developed industrial countries agriculture no longer is the dominant employer ... in the USA only some 3% of the population is employed in agriculture because it is highly mechanized ... in many countries subsistence agriculture is the norm and perhaps 70% or more of the population live in rural areas. There are many issues related to labor and agriculture including the role of migrant labor and the many questions about workers rights and conditions of employment. The biggest broad issue is labor productivity in the sector, and how the sector can be profitable and be fair to labor and all the other stakeholders..

## Mining

The mining industry has encouraged the development of bigger and bigger earth moving equipment ... the cost is ae situation.

**Construction**

Construction productivity has been improved tenfold ... or is it a hundredfold or more in the last fifty years. Tance, fuel and lubricants, insurance and anything else related to the equipment.

**Agro-industry****Transport****Shipping**

## **Production assets - machinery and equipment**

Equipment ... often the catalyst for improved productivity. The cost of machinery and equipment is an important part of cost ... and in some industries perhaps the dominant cost.

### **Airline industry**

The aircraft is a big capital cost ... and expensive to operate. Some of the costs accrue per flight mile as for example statutory repair and maintenance costs ... other costs also have a flight weight and speed component as for example fuel costs. Other costs relate to ground operations. The airline industry has been creative in both the financing of its aircraft, and in the way it has done the accounting for them on its balance sheet. For cost analysis purposes the idea of return on capital employed cuts through the financing arrangements to the underlying performance and productivity.

### **Mining**

The mining industry has encouraged the development of bigger and bigger earth moving equipment ... the cost is almost all about the equipment and the fuel to power the equipment. People costs are modest by comparison. Fuel, tires and maintenance are big expenses that vary depending on how much the equipment is used. Depreciation has a time component as well as something that relates to time used. The financing cost depends on time, unless there is some component that relates to use, as might be common in a lease situation.

### **Construction**

Construction productivity has been improved tenfold ... or is it a hundredfold or more in the last fifty years. The equipment that facilitates rapid large scale construction is impressive ... it has a high capital cost ... but makes construction rapid and cost effective. The equipment is often owned by specialized equipment contractors who charge based on deployment and the time used. If the equipment is owned by the general contractor, the equipment should be costed based on time, and cover depreciation, spares and maintenance, fuel and lubricants, insurance and anything else related to the equipment.

### **Agro-industry**

### **Transport**

### **Shipping**

## **Regulation ... the enabling environment**

The regulatory environment has costs .. and benefits ... and changes the economics of a product, service or business.

## The value chain

The value chain adds a level of complexity to cost analysis and understanding the behavior of costs.

### **Transfer pricing**

Transfer pricing is a central component of value chain analysis ... but it is not easy to get right. Ford was one of the first companies to have a vertically integrated production organization, but transfer pricing caused all sorts of problems. Was it the steel mills or the engine plant that was making money for the company? Big questions, with no easy definitive answers.

# BEHAVIOR OF COST

## Fixed and variable costs

One of the simple classifications is between fixed costs and variable costs. The corporate business that has success is usually one where there is a good understanding of how all cost behave and optimizes accordingly.

### **Making fixed cost variable**

Part of my success in the corporate world was my simple view that fixed costs were, in fact, variable and a big job of management was to change them so that they were optimized.

Getting to change fixed into variable meant changing established ways of doing things ... changing to different ways of thinking. Outsiders would do it very quickly in an acquisition setting ... we wanted to do it as insiders and have a positive outcome for the company. My job was to help make it happen ... and do it in weeks or months and not years.

### **Making variable costs fixed**

My impression, early in my career was that more senior people had deep legal training than had accounting or technical training and big decisions were made with very limited understanding of cost behavior. This sometimes translated into an unwillingness to have fixed costs ... even though this would end up reducing the unit cost and increasing profit. There was some risk ... but that is what gives enterprise the ability to drive progress.

Most of the Board of Aerosol Techniques were in this mindset ... and too many at Gulton Industries. This was a serious problem at Gulton, an early pioneer of microelectronics which completely failed to enter the second phase of circuit integration because of the high fixed costs of the required production and testing gear and disappeared from contention.

## Breakeven

When costs are thought of as being fixed and variable, and revenues are thought of as being directly related to quantities, in a profitable activity, there is a mathematical point where revenues equal the sum of fixed and variable costs. This is known as the breakeven point.

The idea of a breakeven point is useful, albeit simplistic since the assumptions about linearity are rarely realistic in a real situation.

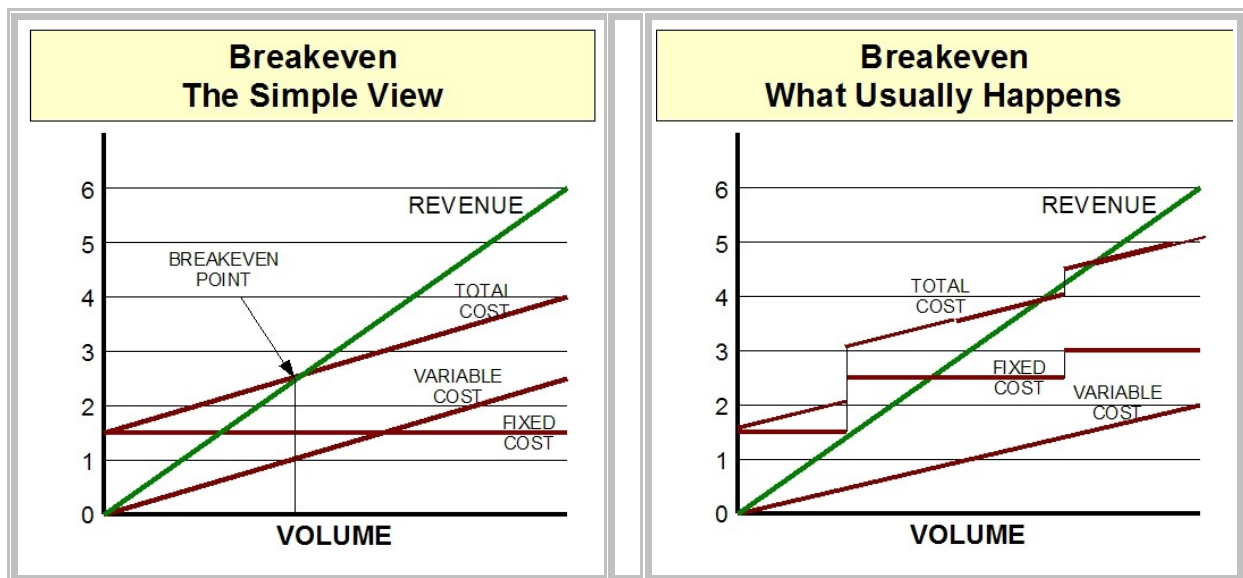
Students are taught the basics of a breakeven analysis ... with the simple breakdown of costs between fixed and variable costs ... and a revenue that increases linearly with volume.

There is nothing wrong with the concept ... but the simplified assumptions do not take into account much what happens in the real world.

There are much more complex changes going on that must be taken into consideration.

In a real situation the fixed costs tend to grow ... not in the same pattern as variable costs ... but they do grow. They tend to increase in steps ... but they do increase with scale.

In a well managed organization the fixed costs can be reduced ... can be made variable to some extent by good decision making and thoughtfulness.





# COSTS AND PRODUCTIVITY

## Costs

Corporate profit performance has been optimized by a deep understanding of the behavior of costs. Cost accounting and the analysis of cost behavior has a very long history in corporate management ... but its equivalent is practically non-existent in the public sector and in the international relief and development arena. Understanding costs is essential ... and simply this will materially improve profit performance in the international relief and development industry.

The Community Accountancy system provides a framework for understanding the behavior of cost. It can show what costs are in a specific set of circumstances, and compare this with what might have been expected and what has been achieved in other places, or at other times.

## Productivity

Productivity is a derivative of cost ...

For many years low unemployment was seen as a way to improve economic performance and reduce poverty ... but it rarely achieved much of either. The jobs that were created were unproductive jobs that did nothing to create incremental value, rather the work diverted people from more useful activities to absolutely useless activity.

### Cutting Grass

When I was in Ethiopia (in the 1980s) I observed women being employed by the government to cut grass in the public areas of Addis Ababa using hand scissors. Very many women were paid tiny wages to do this work and did it laboriously and with great inefficiency. One person and a lawn mower could have done the work of 1,000 of the women. The value of the work would have been the same.

In one case one person was the labor cost. In the other case, 1000 people was the labor cost. In a case like this there is the potential to improve the grass cutting productivity by 1000 times ... but the productivity gain does not become a priority.

What are the reasons?

Perhaps it is because the leadership is using employment as a measure of success ... and by doing this ensuring that the economy remains unproductive.

# COST BEHAVIOR BY SECTOR

## Industrial machinery

The example of Davy Ashmore ... manufacturing heavy equipment for the steel industry

- Technical development
- Engineering design
- Manufacturing
- Marketing
- Shipping
- Set up ... start up
- Profit contribution

## Consumer products

The example of Aerosol Techniques Inc. ... contract manufacture in the consumer products industry: hair products, personal care, perfume, cosmetics, etc.

- Development
- Product design
- Manufacturing
- Marketing
- Shipping
- Set up ... start up
- Profit contribution

## Technical products

The example of Gulton Industries Inc. ... manufacture of electronic components, instruments, batteries, communications systems, etc.

- Development
- Product design
- Manufacturing
- Marketing
- Shipping
- Set up ... start up
- Profit contribution

## **Industrial products**

The example of Southern States Inc. ... manufacture of airbreak switches and substation gear for the electric utility industry

- Development
- Product design
- Manufacturing
- Marketing
- Shipping
- Set up ... start up
- Profit contribution

## **Construction**

The example of HA Simons International Ltd. ... consulting engineers to the pulp and paper industry

- Development
- Product design
- Manufacturing
- Marketing
- Shipping
- Set up ... start up
- Profit contribution

## **Public health ... vector control**

The example of mosquito control in the USA

- Development
- Product design
- Manufacturing
- Marketing
- Shipping
- Set up ... start up
- Profit contribution

## **Banking and financial services**

The example of small bank ... small resources

- Development
- Product design
- Manufacturing
- Marketing
- Shipping
- Set up ... start up
- Profit contribution

## **Software**

The example of small bank ... small resources

- Development
- Product design
- Manufacturing
- Marketing
- Shipping
- Set up ... start up
- Profit contribution

## **Recorded music and entertainment**

The example of small bank ... small resources

- Development
- Product design
- Manufacturing
- Marketing
- Shipping
- Set up ... start up
- Profit contribution

## **Professional sport**

The example of small bank ... small resources

- Development
- Product design
- Manufacturing
- Marketing
- Shipping
- Set up ... start up
- Profit contribution

## **Public transport**

The example of small bank ... small resources

- Development
- Product design
- Manufacturing
- Marketing
- Shipping
- Set up ... start up
- Profit contribution

## **Roads**

The example of small bank ... small resources

- Development
- Product design
- Manufacturing
- Marketing
- Shipping
- Set up ... start up
- Profit contribution

## Cost time series

Cost time series are very interesting ... but much less accessible than price time series.

Cost is a result of productivity ... which in turn is a result of science, technology, organization, training and investment.

Modern economic society has been blessed with amazing progress in science and technology that has translated into low costs for valuable things. But also high profit and low value for society as a while.

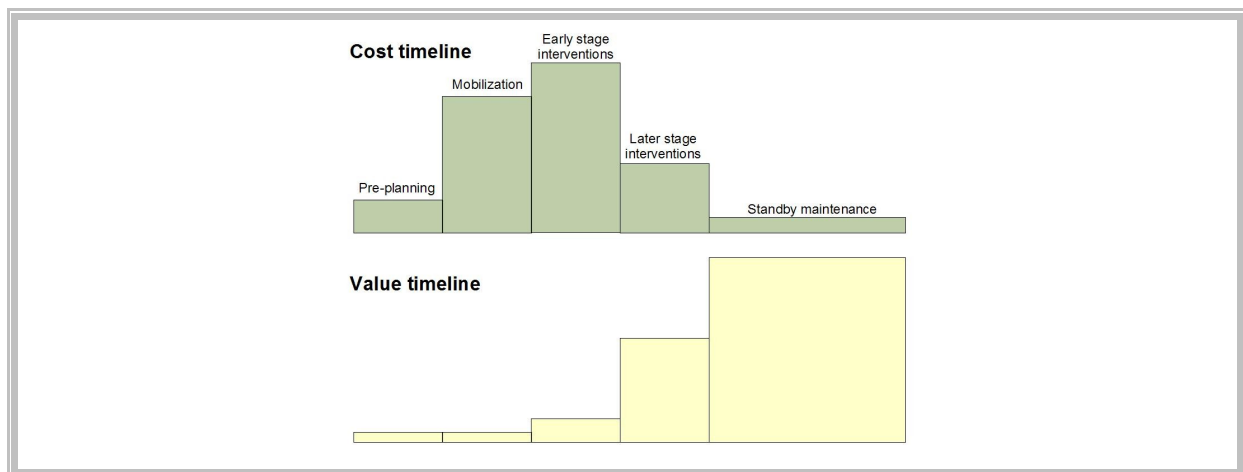
Time series of costs may be very different from a time series of prices. Costs reflects productivity and it is costs that have the most impact on the socio-economic status of the planet.

Cost has multiple components, and one of the most useful data points for cost is the one that eliminates all the profit elements from the cost value chain. The socio-economic success of the last two centuries has been reduction in cost.

## Timeline of costs and values

The following graphic shows the very different timeline for incurring costs and realizing values. This is a critical problem in development and not central to much of the development planning process that is practiced.

As a practical matter most of the cost have been incurred before it can be shown that there are any benefits ... and this provides a dangerous opportunity for costs to be misused long before the lack of benefit raises questions about performance.



The project form of organization accentuates problem with

The F line subway station at Lexington Avenue and 63<sup>rd</sup> Street in Manhattan is a interesting example. It is a new subway station opened around 1990 serving a deep subway with multiple sets of escalators. Almost every week some of the escalators are broken down and awaiting maintenance. ... these are Otis Escalators, a reputable product, but in this situation they are always breaking down. Though almost impossible to prove, it is likely that the contractors who installed the original equipment did not do the work right ... and that the inspectors and contract oversight engineers did not do their work right either. It is pretty clear that something went wrong, and in the best of all worlds, we should know what is was and be able to hold the people responsible to account. Almost certainly something like over-billing and under-performing was involved ... payments for favorable inspections ... and so on. It is pretty obvious this is what happened ... but there is no practical way to find the facts and hold people to account.

Many cities have a problem with street congestion ... and several cities around the world have tried to address the problem with some form of “pricing” that charges users for road use. But before the discussion of congestion pricing, it would be useful to have a discussion of congestion costing. How much does it cost society to have such a dysfunctional system of city transport so that productivity is far below what it should be. This is where data about behavior of cost is useful.

Operating a truck has three major cost elements, the labor cost, the cost of fuel and the cost of the equipment (truck). These costs vary based on time (labor), the power being used (fuel) and mainly time (for the truck). A truck stuck in traffic has high costs ... and is doing nothing useful ... just waiting to get moving and go somewhere. There might be another big cost ... the cost of not delivering on time.

Buses carrying passengers have another cost to society which is the opportunity cost of the time being wasted by all the passengers on board. If 30 people on a bus are delayed one hour by congestion ... what cost does this have. If the costing is done at \$50 an hour, the hourly cost is \$1,500 ... and at a low wage rate of \$10 an hour it is still \$300 an hour.

How many people in a city like New York lose an hour a day because of getting stuck in traffic. Maybe its 500,000 people ... maybe a lot more. At a wage rate of \$10 an hour, not that much above minimum wage, the daily cost is \$5 million. For a year this amounts to \$1.25 billion.

There needs to be dialog about congestion costs ... when society knows what congestion is costing ... then perhaps leadership will give this an appropriate priority.

### **Commodity Price Projects and the World Bank**

For several years I did financial analysis assignments for the World Bank in connection ... and was frequently faced with questions about the future cost of commodities. The deep study of commodity prices was not my specialty ... but I had some fairly broad knowledge of markets and the behavior of prices, especially in turbulent times.

As a consultant to the World Bank ... ones expertise does not have the same weight as the staff expert. Over and over again the World Bank embraced price projections that the consultants considered completely wrong ... they helped to get flawed projects to have numbers that satisfied World Bank criteria for approval ... and ensured from the start that the World Bank would have a failed project.

Nobody at the World Bank has seen fit to allow me to compare the long term price projections made by the World Bank in the period from 1978 to 1982 with the prices actually realized ... but my work during that time suggests that the World Bank was embarrassingly wrong.