



# **The Tr-Ac-Net Organization**

**Transparency and Accountability Network**

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# **Community Accountancy**

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

# **TIME COMPARISONS**

**FOR DISCUSSION ONLY**

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**The Tr-Ac-Net Organization**

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# TIME COMPARISONS

## WHY COMPARISON OVER TIME?

### **The purpose**

The purpose for collecting data and then doing analysis with the use of simple graphics is to help UNDERSTAND the way in which the various elements interact and how key socio-economic metrics behave ... and to use this understanding to help make decisions that improve socio-economic performance.

Earlier it has been highlighted that Community Accountancy is not a system that starts off with a hypothesis and collects data to prove or disprove the hypothesis ... it is a system that collects data that are important measures of the progress of a society or community ... and data that helps to explain the activities and the outcomes of the community.

The data are neutral ... they do nothing more than represent some part of a fact or reality.

These data and simple analysis becomes a framework for accountability ... a subject much talked about but less acted upon.

### **Constitutional Checks and Balances**

In fact, while the US Constitution designed the organs of Government to have checks and balances to ensure that there was a full degree of accountability ... the underlying data systems and accounting can hardly be recognized any more as a system with any capacity for this.

# TIME SERIES ANALYSIS

## Time series analysis

Time series analysis has all sorts of uses ... it is powerful. It is simple.

It may not be easy to know exactly about something ... or the complete story about anything ... but most often, it is easy to tell whether the direction is good or bad.

### One datapoint ... and two datapoints

If you have one datapoint it is a whole lot better than having no datapoints. If you know a person is 4 feet tall ... that is a lot more information than not having any height measure at all.

If another person is 5 feet tall ... there are now more datapoints ... and more questions ... and the beginning of some answers.

Perhaps ... is one person taller than the other because of age difference? Or is it some other factor?

If someone weighs 70 kg that is a potentially useful datapoint ... if they weighed 50 kg a year before, then the two datapoints are very useful. One datapoint tells only the status at one point in time or place ... two datapoints enable one to know what is different between two datapoints.

If the datapoint shows a bad situation at one point in time ... a better datapoint later is progress in the right direction.

There is a substantial amount of mathematics and statistics around time series analysis ... but there is a lot that can be learned by simple plots of data over time. Simple times series plots answer many important question of how things are changing over time.

Accountancy argues for more data that are simple and easy to understand ... and Community Accountancy argues for having more and more of the data with a community focus. If you cannot understand what the simple data shows ... walk around the community and see what is missing. Time series analysis helps to explain what is happening, especially if the time series can be related to something that is tangible and recognizable.

In corporate accountancy the standard presentation in the financial reports is one where there is a comparison between last year and this year. Some of the supporting tables give data for some aspects of the business for the past 10 years. There is more to be learned from these multipoint presentations than if the only data was for the one year.

## Materiality

Materiality is a key to successful use of data ... and time series plots help to sort out what is important and what is not. While there may be an academic causality that can be identified using sophisticated analysis, most of the big questions can be answered using very simple data and very simple analysis.

### Starvation

There is no food ... the crops have failed ... people are dying. Very simple data are needed to figure out that there is a problem with starvation.

More important very simple data would have shown that a problem with starvation is imminent.

There is a substantial amount of mathematics and statistics being used to analyze data ... and the mathematics are academically rigorous ... but it does not seem to have had much impact. There is a systemic problem of methodology and materiality. Most of what is being done in terms of data and analysis has little practical value and has made little difference in the past ... and needs to change in order to do anything of use in the future.

While it may not be possible to have absolute numbers about many important things ... time series analysis helps to show whether progress is being made or not, and something about how fast it is happening.

## **Timing ... the problem of compounding**

Nothing is linear ... everything compounds. In most cases there is compounding on top of compounding and things can get out of control very quickly. It is possible for compounding to work for good ... but for that to happen the incentives have to be right, but this is rarely the case. Most often incentives are the opposite of what they need to be to benefit society ... more what is needed to benefit those with economic power and in control.

When the data show something that is stable or linear ... it is likely that this is a netting out of exponential positive outcomes with exponential negative outcomes. This is a simple explanation of why socio-economic weakness can rapidly escalate to socio-economic crisis ... and why poor communities quickly gravitate to the lowest levels of poverty.

## **Causation**

Accountants think in rather simple terms ... not because things are simple, but because it is the most useful way for accountants to think. The question is how best to use the available resources ... and for this there needs to be some clarity about what causes what and how best for resources to be deployed.

For many reasons, good decisions based on a clear understanding of causality can have a big impact on results.

## **Incentives**

### **Getting results**

I have always taken the position that fixing a big problem was a lot easier than improving a near perfect operation. If this is a valid reality, then it should be possible to make a big impact on the global relief and development industry.

There is

## **Prices**

Price time series have historic value in putting current prices in perspective ... but prices are also a key indicator of what might be going to happen in the immediate future, or over a longer time span.

A big part of the theory of economics concerns itself with prices and behavior in the market. It is very interesting, however, to try to understand what is happening to prices based on real world facts about costs, demands and structure.

Time series of prices are very powerful. Every major market has time series about prices, whether the market is for financial instruments, commodities or engineered items.

Price information is also used in small markets ... and is just as powerful. More of the small market data re needed to be collected and put into easily accessible form. The outcome will be interesting.

### **Shrimp Prices ... Industry Economics**

I became the CFO of Continental Seafoods Inc. in June 1974. In the previous twelve months crude oil prices had increased from \$3.00 to \$13.50 and costs and prices for everything was in turmoil.

I was able to learn very quickly what impact fuel price was going to have on our trawler operations. We knew how much fuel we consumed and how much this was now costing compared with what it had before.

But what was going to happen to shrimp prices. I plotted shrimp prices month by month from 1946 to June 1974 ... nothing fancy ... just a long piece of graph paper with nearly 30 years of data plotted. From this it was fairly clear that there had been three distinct phases prior to the oil shock of 1973: (1) an expansion of shrimp demand that was easily satisfied by increased fishing effort (2) an expansion of shrimp demand that was less easily easily satisfied by more fishing effort ... prices generally moving up more rapidly than costs (3) increased demand but no more opportunity to increase fishing effort ... prices increasing by 100% per year.

With the oil shock shrimp prices crashed ... and shrimp production costs almost tripled. In mid 1974 the shrimp industry was in a global melt-down. We had some of the most cost efficient operations ... but world prices did not cover our operating costs. What to do?

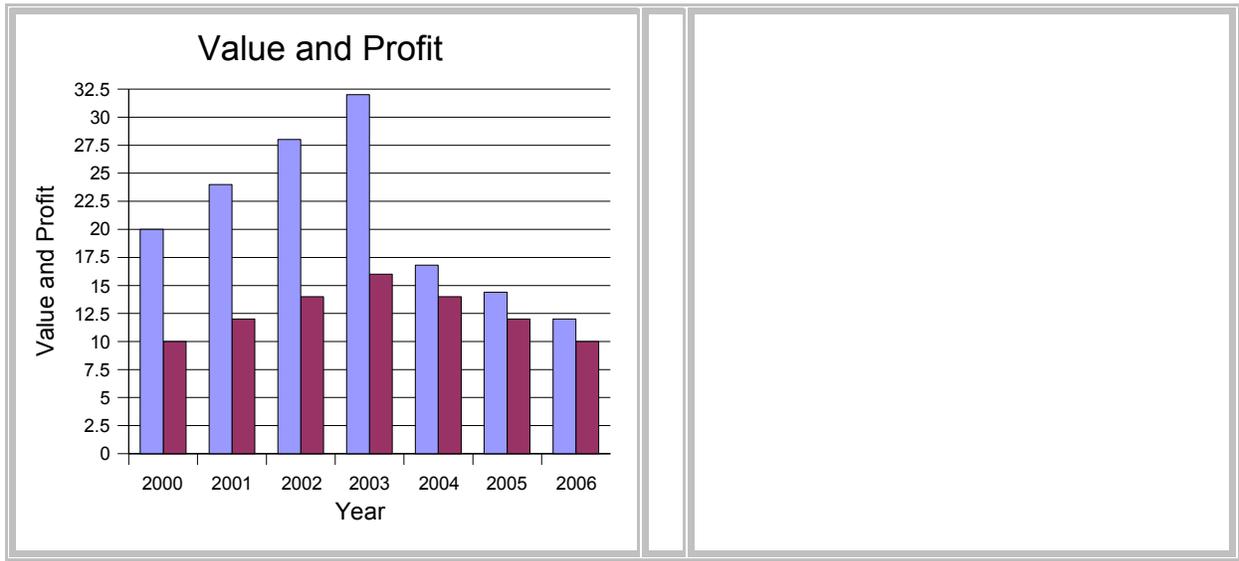
We were able to persuade our long time bankers that our inventory backed loans were not worth much if we folded ... but that if we used their financing to keep operating we would most likely be profitable the following year. The key logic was that market prices in the capture fishing industry cannot remain below production cost for very long .... and prices do not stay low when there is a shortage of supply. The bankers helped. Our analysis of price and cost was right ... Continental Seafoods was on its way to record profits.

### **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.



## **Time series of costs**

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 whole.

Time series of costs may be very different from a time series of prices. Costs reflect 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.

## Time series of EVA

Economic Value Adding (EVA) became a powerful tool to manage wealth perception. but it is only used in the process of personal wealth creation and ignores the impact that personal wealth creation activities are having on society as a whole.

Community Accountancy uses a similar accounting methodology to EVA but including all the impacts that economic activities of all sorts are having on the society.

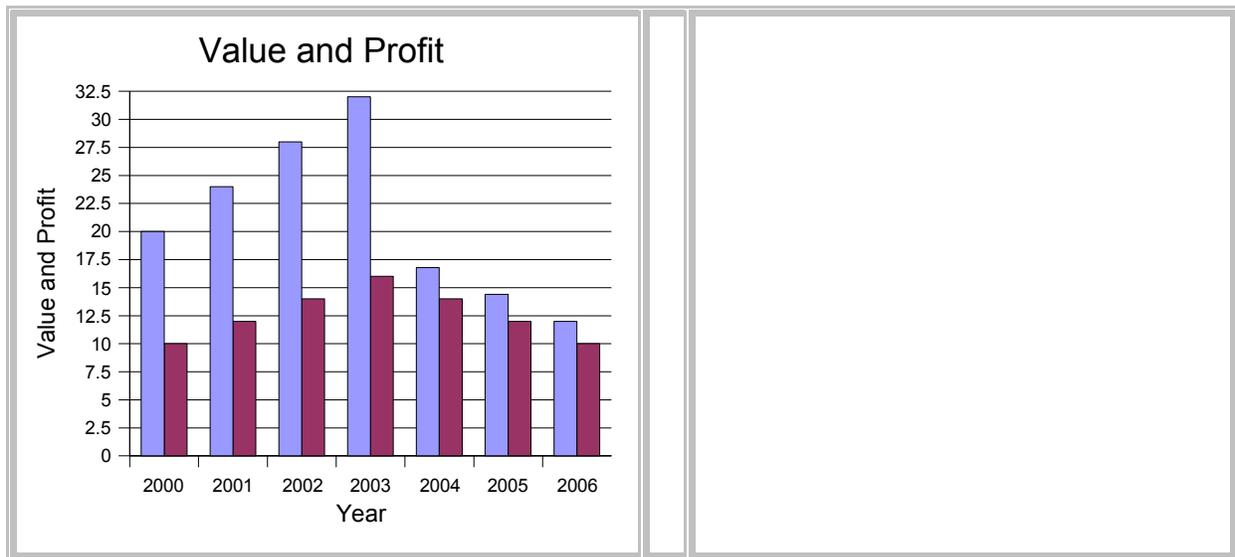
Economic Value Adding is used in the standard GAAP accounting world to optimize stockholder value. Impact on society is not taken into consideration.

Economic Value Adding in the Community Accountancy framework is concerned with the impact on society and answers the question whether or not economic activities are contributing to the quality of life of the community at large.

## Example

This graphic illustrates the way value in the capital market gets magnified when performance is improving and diminished when performance is declining. The concept is reasonable ... but in practice it has has been abused and there is a degree of hype that creates instability in the market or worse.

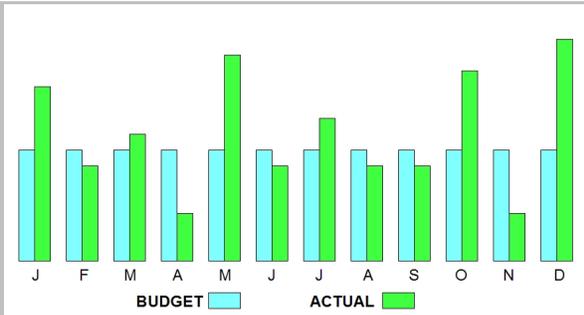
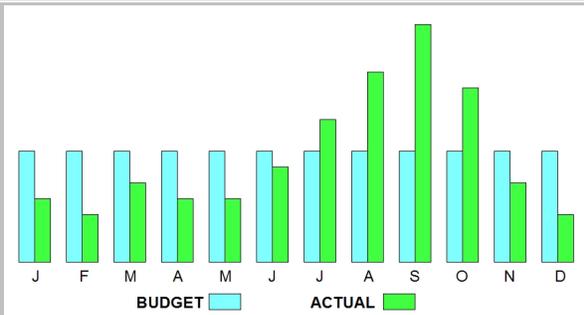
At the time when year over year profit changes from increase to decrease, the value of the stock drops substantially. These stock values are based on perception and in one case perception is probably overvaluing the stock, and in the later case is probably undervaluing the stock ... but both are unreal.



# Interpreting time series

## Budget and actual

Budget and actual by month is a commonly used plot. Sometimes it does not tell very much, sometimes it does.

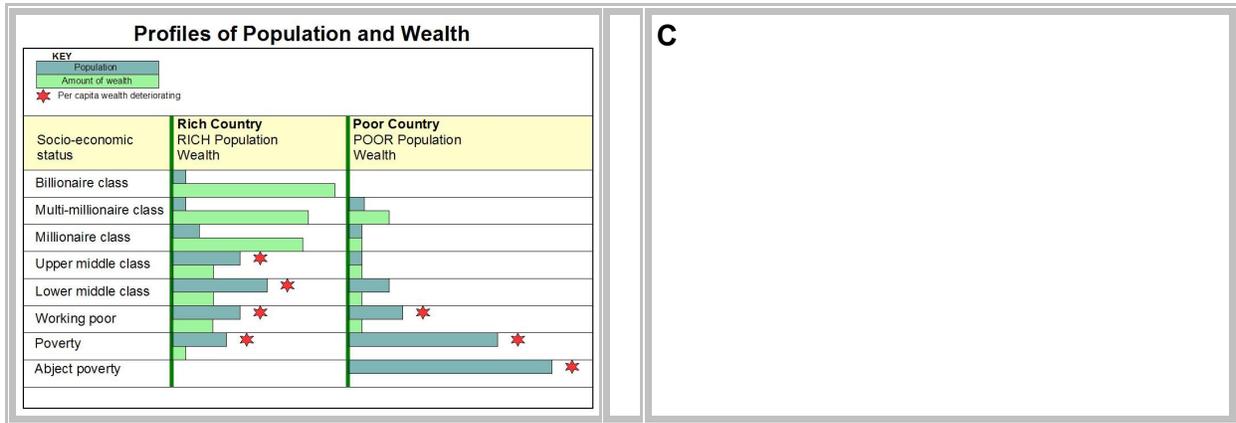
Budget/Actual By Month																																								
 <p>This bar chart compares budget and actual values by month. The x-axis lists months from J to D. The y-axis represents values. Budget values are constant across all months. Actual values vary significantly, with some months being above budget and others below.</p> <table border="1"><thead><tr><th>Month</th><th>Budget</th><th>Actual</th></tr></thead><tbody><tr><td>J</td><td>1.0</td><td>1.5</td></tr><tr><td>F</td><td>1.0</td><td>0.8</td></tr><tr><td>M</td><td>1.0</td><td>1.2</td></tr><tr><td>A</td><td>1.0</td><td>0.5</td></tr><tr><td>M</td><td>1.0</td><td>1.8</td></tr><tr><td>J</td><td>1.0</td><td>0.8</td></tr><tr><td>J</td><td>1.0</td><td>1.3</td></tr><tr><td>A</td><td>1.0</td><td>0.8</td></tr><tr><td>S</td><td>1.0</td><td>0.8</td></tr><tr><td>O</td><td>1.0</td><td>1.5</td></tr><tr><td>N</td><td>1.0</td><td>0.5</td></tr><tr><td>D</td><td>1.0</td><td>1.8</td></tr></tbody></table>	Month	Budget	Actual	J	1.0	1.5	F	1.0	0.8	M	1.0	1.2	A	1.0	0.5	M	1.0	1.8	J	1.0	0.8	J	1.0	1.3	A	1.0	0.8	S	1.0	0.8	O	1.0	1.5	N	1.0	0.5	D	1.0	1.8	<p>This plot of budget and actual by month does not show very much ... some months are above budget, some below.</p>
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# Time series of the population

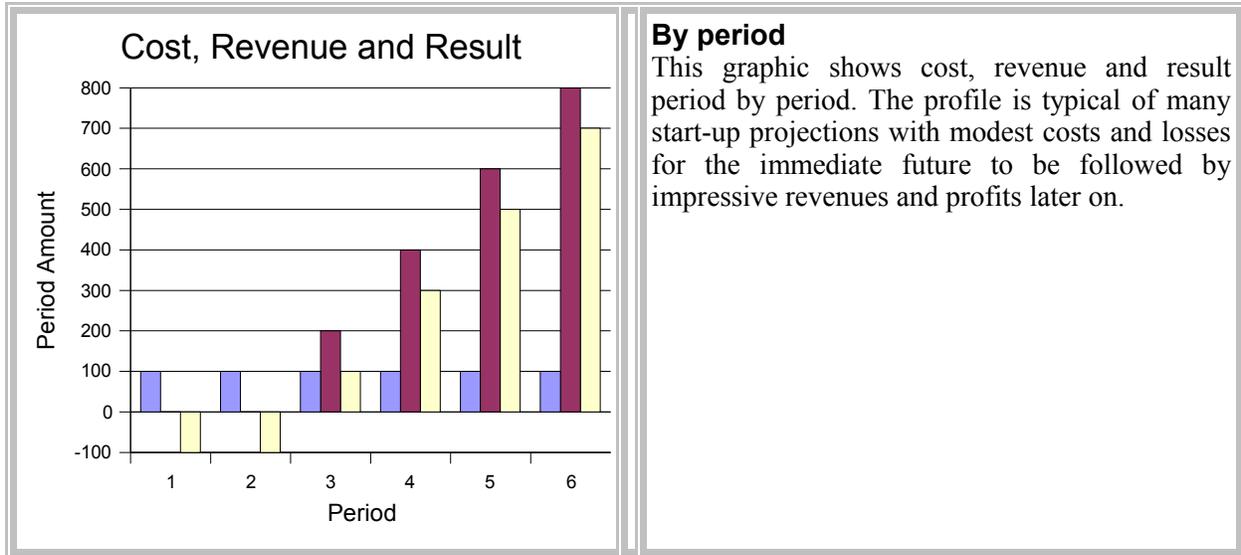
The profile of the population tells a whole lot about the community ...

- There are the questions of how many:
- There are questions of health:
- There are questions of education
- There are questions of jobs, work
- There are questions of wealth
- There are questions of housing

How to present this so that it is clear, simple but nor simplistic.

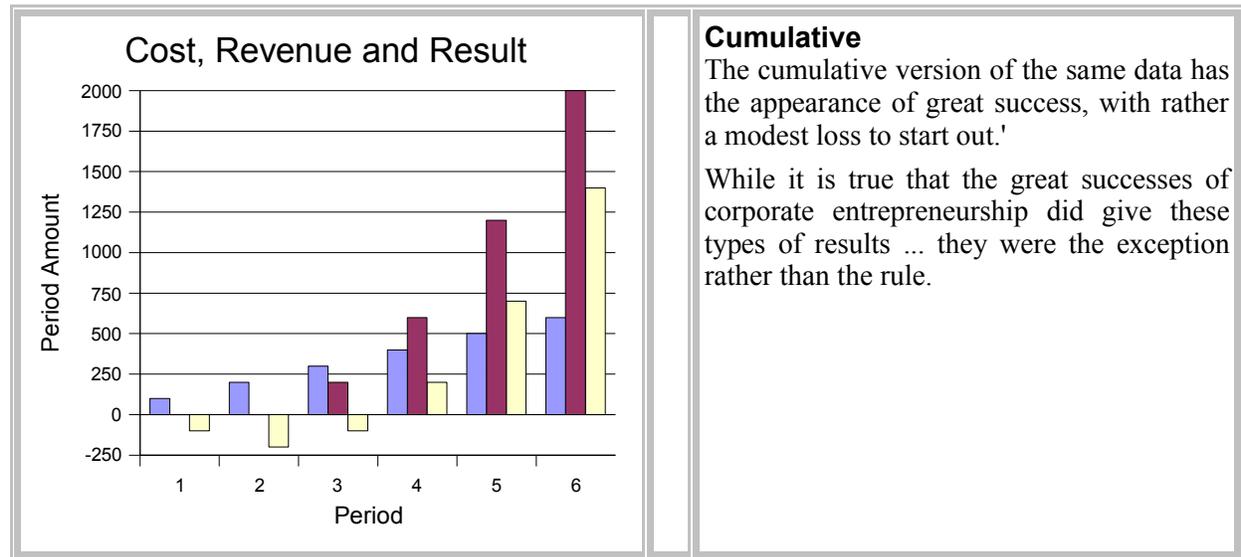


# Cost, revenues and results



## By period

This graphic shows cost, revenue and result period by period. The profile is typical of many start-up projections with modest costs and losses for the immediate future to be followed by impressive revenues and profits later on.



## Cumulative

The cumulative version of the same data has the appearance of great success, with rather a modest loss to start out.'

While it is true that the great successes of corporate entrepreneurship did give these types of results ... they were the exception rather than the rule.

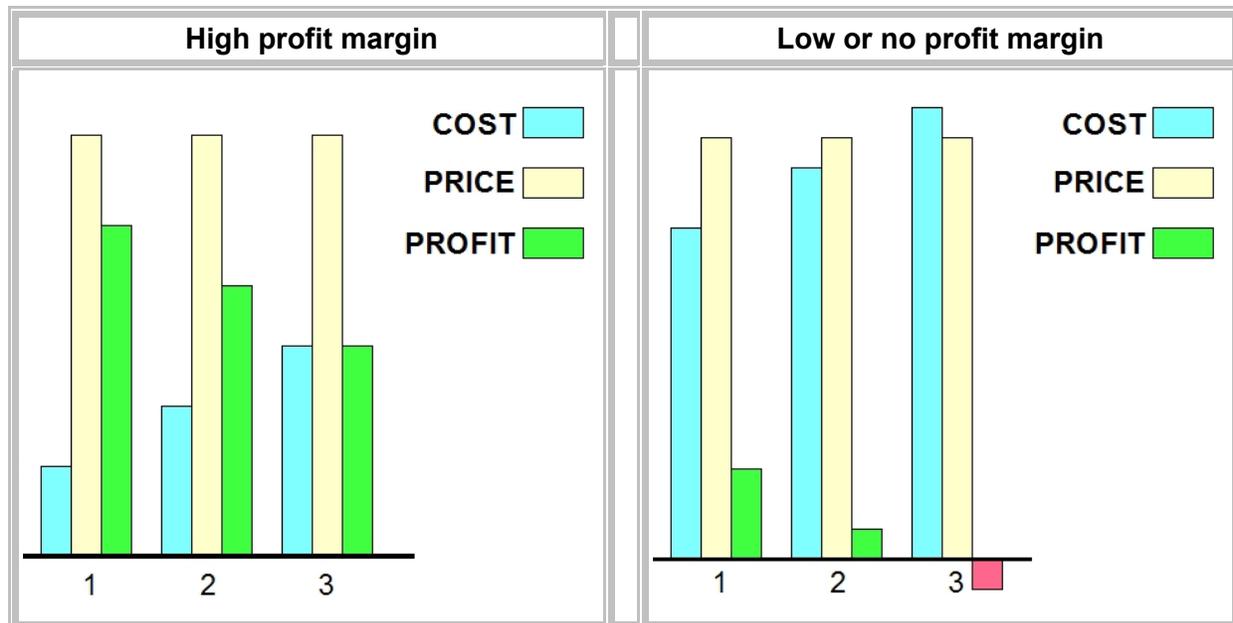
The lesson to take from this is that enterprise has the potential to have good results ... but that the period by period costs in the early stages are for sure, and the revenues and positive results further out are less and less for sure.

As enterprise moves into social business activities where the market has little buying power ... and the society has a great need ... there is a need to have data that show result in terms of social impact as well as simply in terms of money results.

When costs are very low relative to price, an increase in cost does not automatically result in a profit decline. The business has options. But when the costs are close to the price, then the business options are limited, and the likely outcome is that prices will increase.

When costs are near prices, there is cost push inflation ... and very little that monetary policy can do to constrain its virulence.

The first graphic shows high profit margin with cost increases moving from a low level. The second graphic shows cost increases that move from little profit to even less profit and then to a loss.



When costs are small relative to the price, then the company has options. By reducing price it may be possible to increase sales and increase profits. Even though the costs have gone up, the price goes down and the profits go up ... the cost inflation statistics fail to pick up the cost increase because it is the price that drives that metric.

Watching price movements over the past five years, it has been apparent that low priced goods were under cost and margin pressure ... and because of this costs were pushing prices up in order to maintain modest profits. This was not at all apparent in higher priced items ... the luxury sector ... where prices and margins were good. As customer resistance increased it was possible to entice buyers with lower prices which translated into more sales and in fact increased profits.

For cost of living type statistics with a broad basket of items, the lower prices in luxury items probably masked underlying cost increases while the essentials with increasing costs and increasing prices were small in the total basket, though vital to the cost of living of real people in the poorer segments of society.

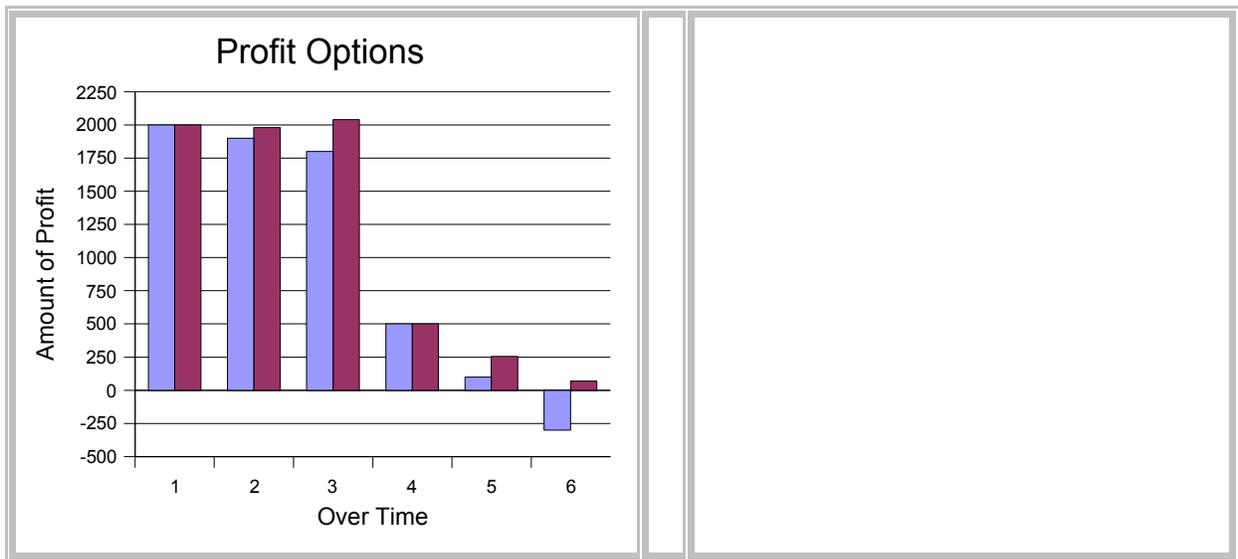
So even though costs have gone up, price goes down in period 3 ... but with high underlying costs and only one option prices go up in 5 and 6.



Assuming a constant quantity of sales shipments ... the profit has the same form as the unit profit of the unit cost, price and profit graphic.

But with a low cost and a high unit profit it is possible to decrease the price and increase volume and increase profits.

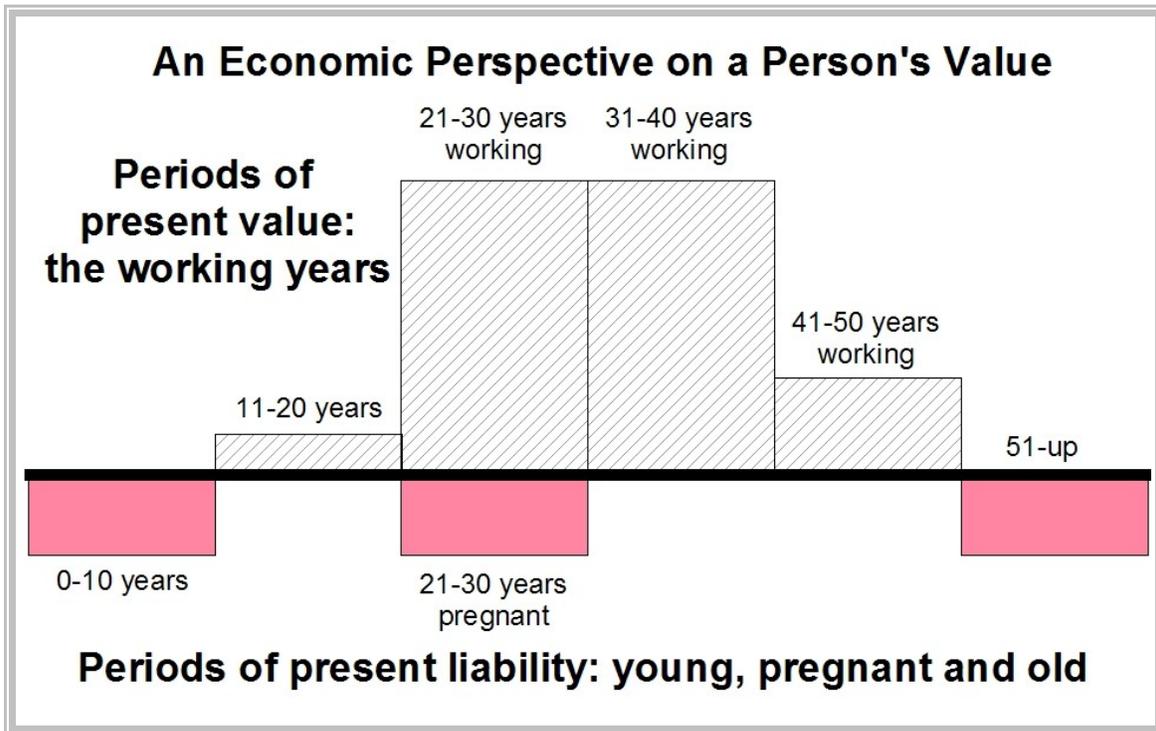
This option no longer exists with the higher cost situation. The business has only one option, and that is to raise prices to cover costs.

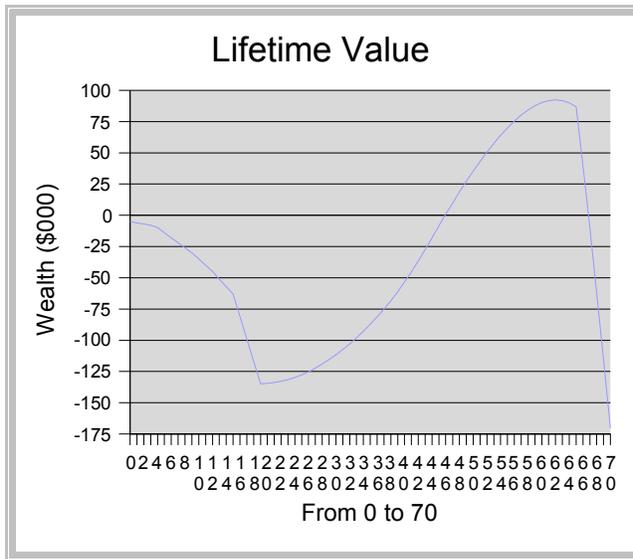


# VALUE CHANGE OVER TIME

## The value of a human being

This is a stylized graphic that shows value from a developing country perspective. Young children represent an immediate liability as they must be fed ... as they get a bit older they have a net value positive because they can do essential chores like carrying water. The working adult has the most value, but offset when a women is pregnant and cannot work. Old people unable to work are again an economic liability.





This graphic illustrates the way in which a person's cost and value changes over time.

During childhood the cost of raising a child cumulates ... with the college years the most costly. This is around 20 years.

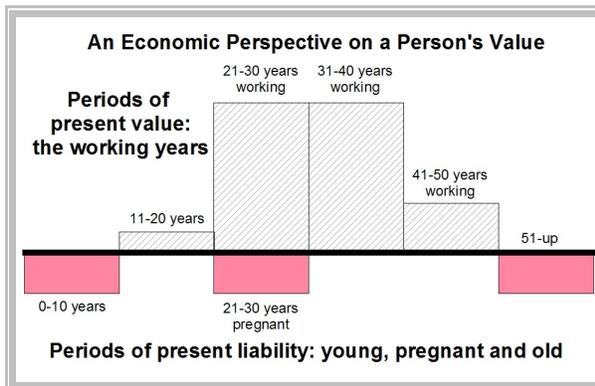
After that, there is are earning years that justify childhood investment ... and go on for about 40 years.

And then there are the golden years ... retirement ... or an inability to earn and a growing need to incur the cost of healthcare.



It is helpful to understand the costs or investment associated with growing up, and the earning power and value of a working adult, and the increasing cost and liability associated with old age and sickness.

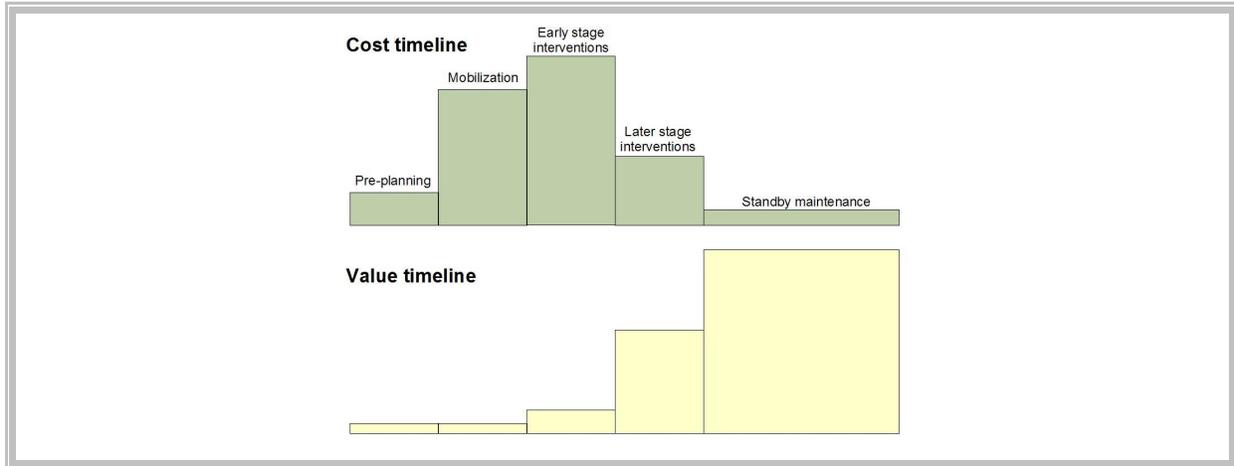
There are two graphics below which depict this ... the first shows lifetime value, and is nothing more than the cumulative cost of raising a child, and subsequently offset by cumulative earnings less annual lifestyle costs ... and then impacted by the cumulating costs of old age.



## 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.