Forecasting change - 1

Paradigms lost

By Chuck Chakrapani

Our fascination with the future

Human beings have always been fascinated with the future. Consequently, there is no shortage of prophesies - the Revelation, the predictions of Nostradamus and astrology columns in daily news papers - the list can be continued indefinitely. Current forecasting techniques include arcane statistical techniques, obscure mathematical formulas, high speed computers and weather satellites.

There are two reasons for this fascination with the future. First is simple curiosity: Will I be rich? Will I have a comfortable retirement? Second is the belief that if we know how events will unfold in the future, we may be able to direct our efforts to adjust to the future. if it is going to rain, I will carry an umbrella. If the stock market is going to crash, I'll put my money elsewhere. If my sales are going to decline, I'll step up advertising expenditure.

The business of predicting the future

Whenever a new decade is about to begin, we see a flurry of books and articles which purport to tell us how things will develop during the new decade. In the next few years not only will we have a new decade, but a new century and a new millennium as well. One future prediction can be made with certainty - there will be no dearth of books that will predict the future in the new decade/century/millennium.

Yet there is no reason why things should be different on January 1, 2000 as opposed to December 31, 1999. Things don't take shape on the basis of calendar years. Change is not predicated on calendar dates.

All the same, there seems to be a consensus among trend watchers that we are in the midst of unprecedented changes.

Rapidity of change

Imagine, if you will, that you visit 10 business establishments:

- None of these establishments has a single computer.
- None of these establishments has a fax machine.
- No cellular phones are in use.
- Nobody has ever heard of spreadsheets and don't know how to use them.

Imagine visiting another 10 business establishments:

- There is a computer on practically every desk.
- Faxes are received and sent directly by computers.
- You can simply handwrite your appointments on your palm-top computer and have it printed without connecting the computer to the printer.
- Most calculations one needs to carry on business are being done on computers using spreadsheets by people with minimal mathematical and computer skills.

You may find it hard to visualize the first scenario yet, the scenario is hardly 10 years old. The second scenario is now. This scenario itself will become outmoded in the next few years.

There is more

Not just that.
Consider these changes, just in the past 10 years.
• The world's most powerful computer company (IBM) is challenged by two college dropouts (Steve Jobs and Steve Wozniak). Within about 10 years IBM changes its marketing strategies, collaborates with its challenger.
• The largest company in the world is replaced by another which didn't exist 12 years ago (Microsoft).
• A young man starts a company and before the founder is 25 years old, the company (Dell) is a Fortune 500 company.
• Video recorders have become universal.
The change that has taken place in the past decade is unlike any other decade since the industrial revolution in terms of rapidity of change. The rate of change is now accelerating. The world of 2003 will be very different from the world of 1983.

Even more rapid changes on the way
Before the decade is out, we will have access to hundreds of TV channels. We will be doing our banking and grocery shopping without leaving home. We will be ordering movies and specific episodes of sitcoms, to be seen wherever we choose, without leaving home. The hand held computer that you can carry in your vest pocket or purse will double as your calculator, phone, fax machine, appointment book, data modem, reading material, learning device and much more.

How meaningful are the changes?
At any given time, one can list a number of changes that have recently taken place. Are the changes that are currently taking place truly different? Are they unlike any changes we have seen in the past?

The largest 3 manufacturing industries (excluding motor vehicles)

1972	*1992*
Meat Products	Petroleum Refining
Steel Mill Products	Aerospace
Textiles	Computers & Electronics

There are reasons to believe that the changes that are currently taking place are monumental and far reaching. Consider how the US industry structure has changed over the past 20 years (See box above).
the changes are dramatic. What is particularly noteworthy is that two (steel and textiles) of the top three industries of 1972 were not even in the top 10 list of 1992! Conversely, the Computers and Semiconductors industry (one of the top three in 1992) did not even reach the 20th place in 1972.

Paradigm shifts

things change constantly. But from time to time, the changes are so dramatic - both in nature and rapidity - that they radically change the way we live and work. Such changes happen as a result of what futurists call ‘paradigm shifts’ or a radical change in the way we look at things and believe what is and what is not possible to accomplish.
A paradigm is a set of rules (written and unwritten) that does two things: (1) it establishes boundaries; and (2) it tells you how to behave inside the boundaries in order to be successful. (Barker, J.E. *Paradigms*. New York: Harper Business, 1992).
Because paradigms define the boundaries of what is possible, when a paradigm shift occurs, even experts fail to see it. Here are a few examples:

How Xerox missed the boat
The technology of WIMP computers (computers that have **W**indows, **I**cons, **M**ouse, **P**ull down menus) was originally invented by researchers working at Xerox. Xerox did not know what to do with a paradigm that did not look or feel like the old paradigm for a computer. People who saw the potential of the new paradigm took the technology elsewhere and developed the Macintosh family of computers. The WIMP technology is now emulated by other computer operating systems, such as DOS computers, via Windows.

How the Swiss gave away the technology, profits and jobs

Unit share of watches

	1968	*1980*
Switzerland	65%	10%
Japan	10%	33%

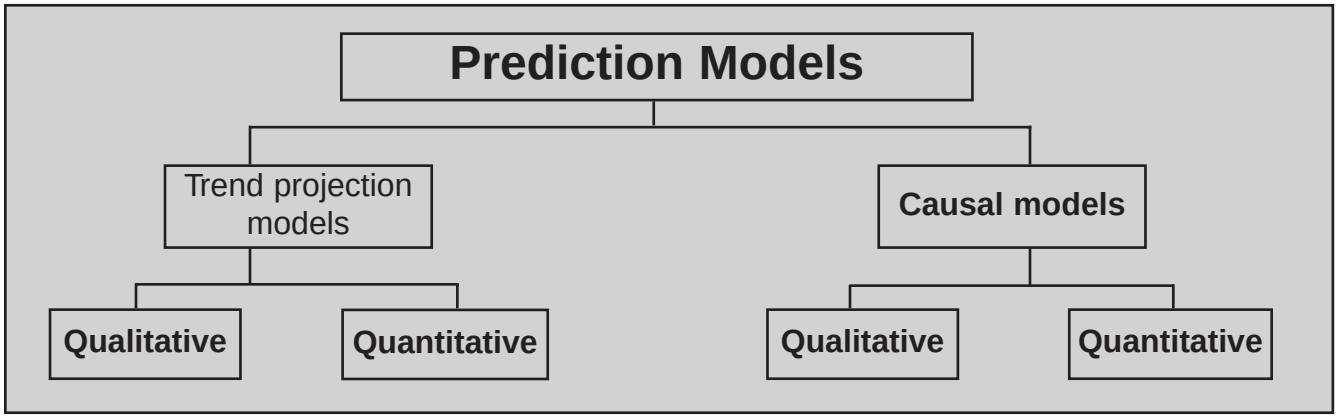
Here is another story.
What happened? Swiss researchers invented the electronic quartz movement watch in 1967. Swiss watch manufacturers who used gears, ball bearings and mainsprings rejected the idea. They couldn’t see a market for the new paradigm. Japan picked up the quartz technology. In a short span of time 80% of the employees in the Swiss’s watch industries (which employed over 60,000) lost their jobs.
there are many other examples. The important point to note is that when a major paradigm shift occurs, experts in the field and the people who will be profoundly affected by the new paradigm often fail to see it.

Can we predict the future?
Radical changes are unsettling. they may be less unsettling if we know what is likely to happen in the future. The question is, can we predict the future?
There are no shortage of predictions of course. But if the accuracy of predictions in the past are any indication, long range predictions have been more wrong than right. Can we improve upon the past and arrive at better predictions so we can prepare better for the future?

How predictions work
We can begin with reviewing how scientists and others predict the future.
The logic of all predictions (excluding mystical predictions) fall into two categories:
1. Project current trends into the future.

This can take many forms. For instance,
• Observe current trends. Make assumptions about how they will extend into the future. Develop a future scenario based on such projections. (Example: The computer industry is growing at x% a year. This will lead to consequence by a specified time in the future.)
• Observe current trends. Paint a scenario that is contrary to currently dominant trends by identifying dormant trends that will change the course of current trends. (Example: Although there is currently a growing market for fax machines, they will become extinct in the not-too-distant future. This is predicated on the assumption that the use of computers will become universal and faxes can be received directly on your computer without going through a fax machine.)

2. Identify factors that will influence the future course of events. Predict future trends through causal relationships.
An example of this model will be:
• Baby boomers are affluent;
• In the next few years many baby boomers will retire;
• This will change the nature of our economy since a large part of our population will be affluent older people, whose needs are different from those of a younger generation.



The prediction models used in either case can be either quantitative or qualitative. A qualitative model would, for instance, predict that in the next 20 years most of our financial transactions will be carried out from home through the use of two way TVs. A quantitative model, on the other hand, would predict that by the year 2000 more than 70% of people will be using computers for 80% of their financial transactions.

How qualitative models can go wrong
Let's first look at a qualitative model in which trends are projected.

1. The crime rate is on the increase, making people isolate and protect themselves.
2. Current technology makes isolation possible and effective.

Based on the above two trends, a qualitative prediction for the future might be that people will 'cocoon' themselves in the future(*The Popcorn Report*, New York: Doubleday 1991). Such predictions observe the following structure:
• Event A (an undesirable event such as crime) is on the rise.
• Event B (such as cocooning) is a solution that is being used more and more frequently by people.

The conclusion therefore is that the future trend is towards 'cocooning'. While the observations (increasing crime rate and increasing tendency towards cocooning) themselves are of interest and value, such predictions seldom come true, because they tend to assume that the most widely used solutions are the most enduring. The model ignores other - potentially far more powerful - factors that are dormant. Such dormant factors could include, for instance:

• Resistance to crime once it reaches intolerable proportions. It is conceivable that once crime reaches a certain level, the society may take vigorous steps to suppress the trend and possibly reverse it. If this happens, projection of Event A will be misleading.

• Resistance to being a prisoner in one's own home, except perhaps as a temporary measure. While one may be fully entertained and fully safe in one's home, one may not *want* to live such a restricted life.

How quantitative models can go wrong

Quantitative models may appear more authoritative because the mathematics used in the models make them look 'scientific'. But what makes a model go wrong is not whether it is qualitative or quantitative but whether it is based on sustainable assumptions.

Quantitative models, consequently fail for the same reasons as qualitative models.

• When we project current trends on the future, we hypothesize some kind of relationship between the past and the future data. To the extent these relationships don't hold, our predictions will be wrong.

• When we use causal quantitative models, our models can fail if the relationship that held in the past fails to hold in the future.

Why prediction models fail

1. the assumed relationship between the past and the future fails to hold.
2. The causal relationships change.

In both these cases models that provide an excellent fit now may not work in the future.

Major impediments

All predictions problems can be reduced to two:

1. Our assumed relationship between the past and the future does not hold. For instance, Malthus, observing that the population grew geometrically while food production grew arithmetically, predicted disaster. Neither relationship came to pass.

2. The relationships that worked in the past do not work in the future. For instance, if retired people spend 10% of their income on travel and if we project this on to the future, our prediction will be faulty if retirees in the future spend 20% of their income on travel.

➔ *This is the first in a series of articles dealing with forecast change*.

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