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## Forecasting change - 5 Paradigms parlayed

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### End of the road?

In earlier articles we saw how every major paradigm of the Industrial Revolution is coming to an end. We have seen how no more meaningful progress can be achieved in the manufacturing sector. The road we have been travelling so far has come to an end. The discussion raises several disturbing questions:

Is it really THE END? Is progress possible at all from where we stand? Is further economic prosperity no more than an illusion? Is the oft-repeated claim-that the next generation will be worse off than our generation-really true? Is Generation X-the twenty something people of today-condemned to live in an era of reduced prosperity and chronic unemployment.

### The highway ahead

The evidence suggests that while we have reached the end of one road, we are about to enter a highway. The highway is the new paradigm. This paradigm will take us to new heights in terms of quality of life and material prosperity. But what is this new paradigm that is expected to lead us from our current state of economic depression to new heights of prosperity?

### Characteristics of major economic paradigms

Every major economic paradigm is characterized by three factors: Driver, Engines and Infrastructure.

*Driver* is what drives a paradigm. It is an inexpensive commodity which can be used in a number of different ways (Beck 1992 characterizes this as the key factor).

For example, steel was the driver for the first phase of the industrial revolution. Steel was an inexpensive material that could be used in a number of different ways and in many industries. The cheap price of oil and gas was the driver for the second phase of the industrial revolution-the versatility of the driver made the mass manufacturing paradigm possible.

*Engines* provide the power that is needed to sustain the paradigm. They fully exploit the driver and provide employment to a large number of people. During the industrial revolution the engines were industries such as the railroad and textiles. During the mass production era, the engines were industries such as autos, machine tools and retailing.

*Infrastructure* refers to the installations and facilities needed to back up the paradigm. During the first phase of the industrial revolution the infrastructure consisted of railroad, shipping lines and telegraph lines. During the mass production era, highways, airports and telecommunications provided the infrastructure.

### What is the new paradigm?

If we are on the threshold of a major paradigm change what is the new paradigm? What drives it, what fuels it and what is its infrastructure?

Futurist Alvin Toffler (1990) suggests that the new paradigm is information technology. He calls it the Third Wave. The first wave was agriculture-based, the second wave was manufacture-based and now we are entering the information-based economy. Economist Nuala Beck (1992) also believes that we are entering a third major paradigm. The first one was based on raw material, the second one manufactured goods and the third one-the one we are entering now-is information based. Two out of the three largest companies in the world today are telecommunications companies-those that deals with information technology (Exhibit 1)

**EXHIBIT 1**  
**WORLD'S LARGEST COMPANIES In 1993**  
**(In terms of market capitalization)**

| Rank | Company          |
|------|------------------|
| 1    | NTT              |
| 2    | AT&T             |
| 3    | General Electric |

**Source:** *The Economist* , August 28-September 3, 1993, p.98.

While there is some difference in the way the past paradigms are viewed, there is a general consensus as to the nature of changes taking place currently. Our current paradigm is based on information, although several ancillary paradigm changes-such as biotechnology-are also happening concurrently. We suggested that for a major paradigm change, we need the following: Driver, Engines and Infrastructure. All three are now in place.

### **Why are the three elements crucial?**

I suggested earlier that the three elements-Driver, Engines and Infrastructure-define major economic paradigms. But why are they so critical?

Without the Driver, no major paradigm change is likely to last. The main characteristics of the Driver are that it has wide application and is inexpensive. The microchip fulfils that function now just as cheap oil did in the paradigm that is currently ending. Even people who don't want to have anything to do with computers are-without their knowing-users of microchips. Most modern alarm systems, cars and household appliances use microchips. Their uses are now increasing exponentially.

Without the Engines, there would be nothing to propel the economy . In the information paradigm, the engines are computers, semiconductors and the industries related to information transfer. In the pre-mass production era, each instrument had its own specifications. In the mass production era, parts were standardized. For instance, any standard light bulb manufactured by any company anywhere in the world will fit any standard light socket in any household anywhere in the world. In the emerging post-mass production era, you can have any specification-standard or nonstandard-and have it manufactured as quickly as mass manufactured items. For instance, you can potentially have a computer or refrigerator built exactly according to your needs and have it delivered at the same speed as a mass manufactured product. The engines of the new paradigm, such as computers, make this possible.

Without the infrastructure, there will be nothing to support the paradigm. The infrastructure of the information paradigm is provided by LANs, satellites, telecommunications and fibre optics.

### **The nature of the evidence**

There is no perfectly reliable way to predict the future. The future is perfectly predictable only after its occurrence. So anyone interested in predicting the future will have better luck if s/he looks for a confluence of evidence-similar to the triangulation process commonly used in various disciplines.

I have proposed some criteria we can use to assess whether we are witnessing a major paradigm shift with far reaching implications or merely seeing changes that are normal at any given period. We saw that:

- New paradigms emerge when old paradigms reach their ceiling. The data presented here show that our current paradigms have reached their ceiling.
- New paradigms emerge at (approximately) predictable intervals. We noted that we are at the right sequence of events and can expect a major paradigm change.
- Major new economic paradigms are characterized by Driver, Engines and Infrastructure (Exhibit 2).

## EXHIBIT 2 THE STRUCTURE OF THE NEW PARADIGM

Information Age Paradigm

Driver

**Microprocessor**

Engines

**Computers and semiconductors**

Precision instrumentation

Health and wellness

Information transfer'

Infrastructure

**Electronic superhighway'**

Satellites, fibre optices, faxes, modems,  
cellular technology

We saw how all of these criteria are met.

Exhibits 3 and 4 compare the mass manufacturing paradigm (that is coming to an end) and the information technology paradigm (that is just beginning).

## EXHIBIT 3 'THE OLD ORDER CHANGETH ...'

*Mass Manufacturing Paradigm*

*Information technology Paradigm*

**Production oriented**

**Service oriented**

Driver

**Oil and gas**

**Microprocessor**

Engines

**Autos**

**Computers/semiconductors**

**Machine tools**

**Precision tools**

**Housing**

**Health/wellness industry**

**Retailing**

**Information transfer**

Infrastructure

**Highways**

**'Electronic highways'**

**Airports**

**Satellites**

**Telephones, telegraphs, teletype**

**Fiberoptics, fax, modem cellular  
technology, local area networks**

**EXHIBIT 4**  
**"... YIELDING PLACE TO THE NEW"**

|             | <i>Mass Manufacturing Paradigm</i> | <i>Information technology Paradigm</i> |
|-------------|------------------------------------|--|
| Orientation | <b>Goods</b>                       | <b>Services</b>                        |
| Mode        | <b>Mass Standardized</b>           | <b>Mass Customized</b>                 |
| Mobility    | <b>Forced</b>                      | <b>Free</b>                            |
| Controller  | <b>Producer</b>                    | <b>Customer</b>                        |

Most of the terms used in these exhibits are self-explanatory except perhaps for the newly coined 'electronic highways'. This term refers to two way communication in areas where only one way communication existed. For instance, TV enabled us to receive messages from different sources such as advertisers, news casters etc. But now (or soon) we will be able to send messages through our TV sets. We can do our shopping and banking and manipulate the outside world through the medium. Such two way communication, through a variety of media, where information flows both ways and at high speed is often referred to as the 'electronic highway', 'information highway' or the 'electronic superhighway'.

The old and new paradigms differ in other major ways as well. As Exhibit 4 shows we are moving away from goods to services, from standardization to customization, from forced mobility to free mobility. Power to influence the products and services will be transferred from the producer to the consumer. On the basis of this confluence of evidence, we conclude that what we are witnessing is not the effect of another run-of-the-mill recession but a profound change with far-reaching implications. The new paradigm is based on information technology.

We will continue to explore this new information age paradigm in greater detail in the next issue of *Imprints*.

## REFERENCES

Beck, N. (1992) *Shifting Gears*. Toronto: Harper Collins Publishers.

Toffler, Alvin (1990). *Power Shift*. New York: Bantam Books

### BOOK REVIEW

A Matter of Survival

**Canada in the 21st Century**

In her new book, *A Matter of Survival*, (Key Porter, \$19.95) Diane Francis argues that the world is changing drastically. Not exactly news, but a fair proposition for a book.

The basic premise of the book is this: Canada is lucky, but badly mismanaged. We are lucky-we are resource rich, our neighbour is our biggest trading partner and we are insulated from wars that ravage other nations. We are mismanaged- we have run out of savings, we have run up huge deficits, our welfare system is unaffordable and our tax rates are too high. As a result, 'sometime in the 1990s, a Canadian crisis of monumental proportions will occur'. Ms Francis is convinced that this is not speculation but something that will happen.

Three powerful trading blocks -North America, Europe and the Far East-are currently forming the new economic world order. The outcasts such as Russia, the Middle East and Africa who do not belong to any of the three blocks will have to form alliances to thrive.

What is the fate of Canada in the 21st Century? Pretty bleak, the way it looks now. Unless of course Canada follows the author's prescriptions:

*Canada should avert its debt crisis.*

- Governments in Canada should sell off their assets, such as Ontario and Quebec Hydro, to pay off debts.

*Canada should become a tax haven.* This would encourage U.S. plants to relocate in Canada.

- Institutions such as prisons, police forces and highways can also be privatized.

*Canada should be restructured.*

Canada is like a flabby corporation. It should be restructured by combining the four Atlantic provinces into one and combining Western provinces and territories (except BC) into another.

*Canada should scrap subsidies.*

Subsidies for milk, eggs, chickens and turkeys should be scrapped. They guarantee profits for the least efficient producers, making our prices uncompetitive compared to those in the U.S.

*Canada should update and privatize its educational system.*

Students should be encouraged to be more competitive.

*Canada should have restrictive immigration policies until our unemployment level falls to 5 or 6%.*

*Canada's unions should be made less powerful.*

How convincing are the arguments and how effective are the solutions? As one reads the book, one cannot help feeling that both the problems and the solutions (in various forms) have been around for at least 10 years. Current global changes have just provided these arguments with another backdrop. The book provides no compelling justification (except the standard arguments against debt and deficit reduction) or new evidence for its proscriptions.

To be fair, Diane Francis states that the book is 'an idiosyncratic analysis of the news noise around us ... based on travels and interviews'. As a result, the book reads more like a partisan column in a newspaper than a dispassionate analysis of events and the forces that are shaping them. One wishes that a talented writer like Francis would do more.

Francis correctly identifies the triumph of capitalism as a catalyst shaping current global economic changes. Yet she notes the other major factor-the technological paradigm shift-only in passing. Perhaps this is my personal bias, but I don't believe that the current economic and political events can be fully understood without reference to this major paradigm shift that is currently influencing those events in a very major way. Technology played no small part in the emergence of the new world order and Canada is well poised to take advantage of the new paradigm. Canada's debts may be its liability, but how can we ignore its assets when we speculate on Canada's place in the 21st Century? I hope Francis will apply her considerable skills to putting the current events into perspective in her next book.

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