

COMMUNICATIONS KNOWLEDGE SOFTWARE INDUSTRY FOR CANADA.

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ABSTRACT

Canada's unique advantages and problems likely to be encountered in the creation of a communications knowledge software industry are examined in the light of two recent documents, one Japanese and one Canadian, on the topic of computers and communications.

Innovation, according to one of our Canadian idea generators breaks down into two classes with respect to the treatment of labour. Eric Burke of the University of Waterloo states that insufficient attention has been given to the labour absorbing kind of innovation to balance the amount of labour releasing innovation we are practising. In describing these two classifications of innovation, he has drawn our attention to the relationship between the innovative imbalance that exists in our society in this regard, and economic instability. There is no real risk in an innovation that will release labour, as in a cost reduction innovation. On the other hand, labour absorbing kinds of innovation are generally more complex, and contain more uncertainty and risk. Canadian conservatism favours the patch-up labour releasing kind of innovation. We are really very good at it. Now, according to Burke, we must get very much better at the more complex kind of innovation if we want a healthy economy.

What sort of labour absorbing kinds of innovation can be created and brought into wide application that don't require complex organizational structures for each individual innovation? Does such a class of innovative activities exist? Our studies indicate that it indeed does, and miniscule examples of such activities already exist to-day. The Quaternary or communications knowledge software industry is the area we have been investigating.

Some writers have described this Quaternary sector as the knowledge sector, but perhaps this is only a temporary name, for it doesn't catch the essence of the unique characteristic of this fourth sector. This sector,

which really can't exist without the first three being very well developed somewhere in the world, can in itself produce wealth. It is the wealth creating aspect that is both relatively new and potentially very significant.

The Japanese view the knowledge industry as becoming the most significant sector of their economy during the next decade, Ando, (1972). They define this knowledge industry as a portion of both the secondary and tertiary economic sectors of old. Those hardware products that relate to the knowledge industry, like computers for example, are included, along with education, broadcasting and publishing. Hence, their definition of the knowledge industry includes both hardware and software products. As a result the unique characteristics of the software portion of this industry will remain hidden from their view for some time. They have rightly identified the knowledge industry as both big and very significant, however they may have partitioned or defined the sector incorrectly. In so doing, the real wealth producing characteristic remains less well monitored and understood than if the partitioning had been otherwise.

In their model of the world's transactions, the Club of Rome researchers didn't include the possibility of a significant and increasing portion of the world's transactions being both non-polluting and capital or wealth producing. For small levels of this activity, the "World Two" model, reported by Meadows (1972), is quite adequate. But, should we learn to make this activity really run, then the future looks very much brighter than the authors have forecast.

Software transactions already exist to-day. They are not really new. Everytime a song is played on a radio or television station, there is a transaction, and money flows through a network to the author and composer. Galt MacDermot worked for two weeks to produce the musical score for "Hair", and his ownership of the rights, which is a sort of virtual capital, has earned him over a million dollars. He can go to a political convention, while his rights continue to earn his keep. He is one of the new kind of capitalists. The challenge is to create an environment that stimulates more and more people to discover more and more ways of doing the same kind of thing.

By building a transaction sensitive network embracing our communications and computer technology skills, an environment can be created that would allow one to produce software products and offer them for sale by investing principally time and effort. One wouldn't need to set up a corporation to manufacture, distribute and market one's

creation as is the case of innovative activity in the secondary sector. The manufacturing, distribution and marketing functions in the Quaternary sector are shared very effectively.

Canada is in a unique position to lead the world in this new economic activity. First of all, we are world leaders in terms of per capita installed communications facilities. Secondly, we are world leaders in understanding something about the significance and utility of the communications and computer technologies. We probably have a decade of very good times ahead of us to provide the funds necessary to embark upon research and implementation programs. With all of this going for us, maybe we even have a responsibility to search out the potential of this Quaternary sector of economic activity.

Illich (1972) suggests that communications networks should serve society in a manner that aids in the discovery of mutual interests amongst the users. Robert Theobald holds similar opinions of the value of dynamic and responsive networks. This is one of the properties that could be designed into the communications knowledge software industry should we so desire. Both writers claim rather fantastic payoffs for such efforts, and our analysis would tend to support their views. However, we have one or two experimental situations that point out the extreme difficulty in actually creating a network that gets used the way these authors describe. There is a need for some quite sophisticated research here. The issues are not clear, and the evaluation parameters are just non-existent. However, continued development of the simplistic broadcast syndrome seems both unimaginative and counterproductive. It is expected that work in this area in the next year will cause a revision of Thompson's (1970) third characterization of communications innovations.

Why isn't there more research in these areas? Why don't the Department of Communications outputs discuss these larger issues? It is my hypothesis that the structure of the organization within which the inquiring group is embedded, largely determines the kind of output that will be produced. Our increasing dependence upon prestigious research done in institutionalized centers may be an even greater inhibitor of the communications knowledge industry than our Canadian tradition of conservatism in innovation.

When Marshall McLuhan says the medium is the message, he is referring to a characteristic of mass media. However, this principle may well be more general. It seems also to apply to the various ways we study and report within our

society.

Royal commissions, government task forces, and other similar bodies seem constrained to produce output that is free of significant surprises. Perhaps this somewhat conservative characteristic is due to the environment in which the inquiring organization finds itself, and so is determined at the inception of the inquiry.

As a case in point, a comparison, albeit biased, of the output of Canada's Task Force on Computer Communications with that of the Japan Computer Usage Development Institute shows our Canadian document as a rather mild mannered innocuous statement, while the Japanese one is a strong statement relating to a real hope of survival for the Japanese over the next quarter century. The comparison is rather like that between lemonade and whisky. But how can you make whisky in a juice squeezer? The message from the juice squeezer can only be lemonade, never whisky! In this sense, the medium is the message.

The Japanese report suggests that as a national goal of the highest priority, it is mandatory to change their way of thinking, from one based on "the industrial mind" to one based on "the computer mind". They are not unaware of the extent of the change this involves. They state that in order to meet their objectives, they will require a cumulative investment of \$65 billion by the year 1985, and that this amount of capital can be drained off the economy if they maintain a yearly GNP growth of eleven percent. One measure of the changes they expect to produce is that by 1985 they hope to see fifteen percent of the average wage-earner's expenditures devoted to services he receives from the computer communications industry. In short, they relate post-industrial survival to the successful establishment of an information based economy.

The Canadian Task Force on Computer Communication had no mandate to go so far. A new business seemed to be opening, so a government sponsored organization was established to do a conventional analysis of this business. They did an admirable job. Their report is really very good, given the restrictions placed on the alternatives they might have chosen. They were part of an organization whose rate of causing change is, by definition, geared to what the majority of the Canadian population will accept. This rate of change can hardly be described as radical.

It is probably very safe to say that predictions about computers and communications are either very much overstated or else very much understated. There is no

significant probability that our perceptions can be right on target. Given the bias to conventional extrapolative forecasting that pervades the organizational structure in which the task force was embedded, and the duality of the future they are dealing with, little question remains as to why the output was "so Canadian".

But, isn't this what government is for? Should not society's minimum acceptable goals of advancement come from its democratically chosen government? The risky and uncertain advances must come from organizations that can be killed if they are wrong. Killing a government is dangerous and expensive. Killing a corporation is called bankruptcy, and can even be profitable. Hence, a study done under government sponsorship can hardly be expected to be dangerous.

On the other hand, large corporate interests don't have the public trust nor the capital needed to get truly new, large and complex ideas launched, particularly if these ideas involve public attitude changes.

Universities really can't help here, for their role relates to teaching, identification and preservation of that that is accepted as truly valuable. They are in a poor position to embrace risky enterprise. Too much is at stake if they embrace an idea that turns out to be foolish.

If government task forces are inhibited from producing risk laden, imaginative and fundamentally new outputs, corporations can't because of capital and believability constraints, and Universities find the job too risky, who can do this job competently in our society?

There remain the think-tank institutes that have been proposed, with the Ritchie Report being an example of such a proposal. These institutes are likely to produce no real force for change, and like the Hudson Institute, become concerned with their own survival to an extent that really affects their ability to act in a dangerous or preposterous way. Any prestigious organization is vitally concerned with the preservation of that prestige. The right to fail gloriously must be one of the characteristics built into any organization that is to do a really effective job at producing predictive output that relates to basic changes that might significantly alter our present course of development. Perhaps we need some new structures for this kind of research.

Returning to the comparison between the Canadian and Japanese computer documents, one can observe that the

difference is most probably due to the totally different organizational environment in which the two groups were embedded. The Japanese situation was that of a blatantly biased, special purpose, multi-sponsored, institute of limited life. The Canadian group found itself bound into a more conventional situation, and so their output, perforce, represents a reasonable minimum level of expectation. On the other hand, the Japanese document, because of their particular organizational arrangement, presents something approaching their view of an upper bound.

The information marketplace business is like an atomic reaction. It has a critical mass that must be exceeded before it can carry on by itself. In the upper bound studies we have made, the critical size that is required before economic self-sufficiency is reached seems very large. The scale on which the thinking must be done is uncomfortably large. This is perhaps why the wealth generating characteristics of a purely software kind of marketplace have gone unheralded for so long. It is possible that even the Japanese upper bound view can turn out to be too small.

Clearly there are many problems to be overcome before Canadians can claim to have established a knowledge software industry of significance. Few countries have the advantages we have, and none on a per capita basis can come close. There is much research to be done, research that seems to be less context free than those of us with a scientific inclination would prefer. The challenge is great, but the scenario at the end looks so rewarding.

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